



## MATHS

### BOOKS - INDEPENDENTLY PUBLISHED

### MATHS (ENGLISH)

### PRACTICE TEST

#### Multiple Choice

1. If  $x^{-2} = 64$ , what is the value of  $x^{\frac{1}{3}}$ ?

A.  $\frac{1}{8}$

B.  $\frac{1}{4}$

C.  $\frac{1}{2}$

D. 2

**Answer: C**



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2.  $C(n) = 110n + 900$

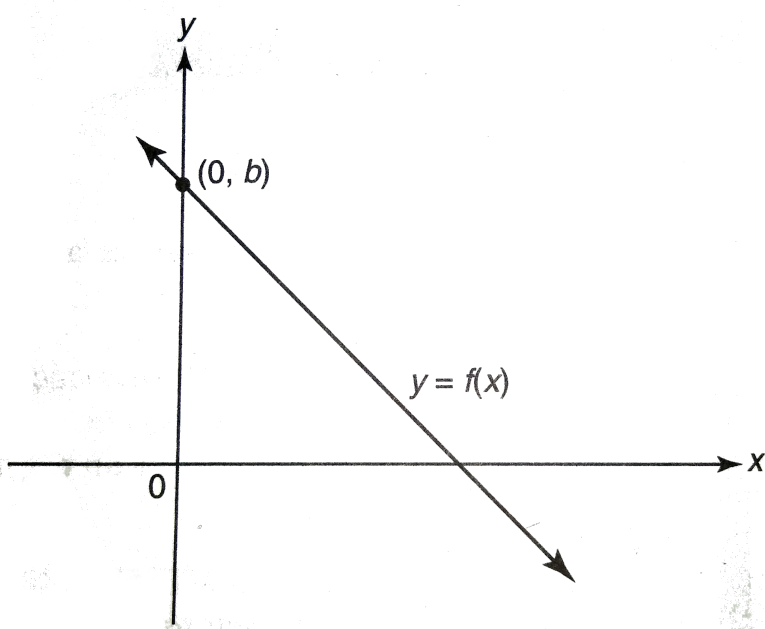
The cost of airing a commercial on television,  $C$ , is modeled by the function above where  $n$  is the number of times the commercial is aired. Based on this model, which statement is true?

- A. The commercial costs \$0 to produce and \$110 per airing up to \$900.
- B. The commercial costs \$119 to produce and \$900 each time is aired.
- C. The commercial costs \$900 to produce and \$110 each time it is a aired.
- D. The commercial costs \$110 to produce and can air an unlimited number of times.

**Answer: C**



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3.

The figure above shows the graph of the linear function,  $y = f(x)$ . If slope of the line is  $-2$  and  $f(3)=4$ , what is the value of  $b$ ?

A. 8

B. 9

C. 10

D. 11

**Answer: C**



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4. If  $x - 3$  is 1 less than  $y + 3$ , then  $x + 2$  exceeds  $y$  by what amount?

A. 4

B. 5

C. 6

D. 7

**Answer: D**



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5. the weights of 5 boxes of screws vary from 2.85 pounds to 3.45 pounds. If  $w$  represents the weight, in pounds, of one of these boxes, which of the following must be true?

A.  $|w - 2.85| \leq 0.3$

B.  $|w - 3.15| \leq 0.3$

C.  $|w - 5| \leq 0.3$

D.  $|w - 0.3| \leq 3.15$

**Answer: B**



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6. Mikala exercise in her gym by jogging on the treadmill at a average rate of 4 miles per hour and then pedaling on a stationary bicycle at an average rate of 8 miles per hour. In her workout , she jogs the equivalent of  $x$  miles and bicycles the equivalent of  $y$  miles. If Mikala works out for at least 45 minutes, which of the following is true?

A.  $\frac{x}{4} + \frac{y}{8} \geq \frac{3}{4}$

B.  $x + \frac{y}{4} \geq \frac{3}{4}$

C.  $4x + 8y \geq 45$

D.  $\frac{4}{x} + \frac{8}{y} \geq 45$

**Answer: A**



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7. If  $7^k = 100$ , what is the value of  $7^{\frac{k}{2} + 1}$ ?

A. 18

B. 51

C. 57

D. 70

**Answer: D**



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8.  $3y + 6 = 2x$

$2y - 3x = 6$

The system of equations above can best be described as having

- A. no solution
- B. one solutions with the graphs intersecting at right angles in the xy-plane
- C. one solution with the graphs not intersecting at right angles in the xy-plane.
- D. infinitely many solutions.

**Answer: C**



9. Which of following statements is true about the parabola whose equation in the  $xy$ -plane is  $y = (2x - 6)(x + 1)$ ?

I. The line  $x = 2$  is vertical line of symmetry.

II. The minimum value of  $y$  is  $-8$ .

III. The  $y$ -intercepts is  $-6$ .

A. I and III only

B. II and III only

C. I and II only

D. I, II, and III

**Answer: B**



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**10.** A survey is conducted in which 60% of the individuals who responded indicated that they do not support issuing a bond to help raise money to fund the construction of a new sports arena in their city. A statistician calculates the confidence level to be 95% for an interval of 5% below and above the 60% mark. What conclusions is best supported by this information?

A. 95% of the people surveyed do not support the issuing of the bond.

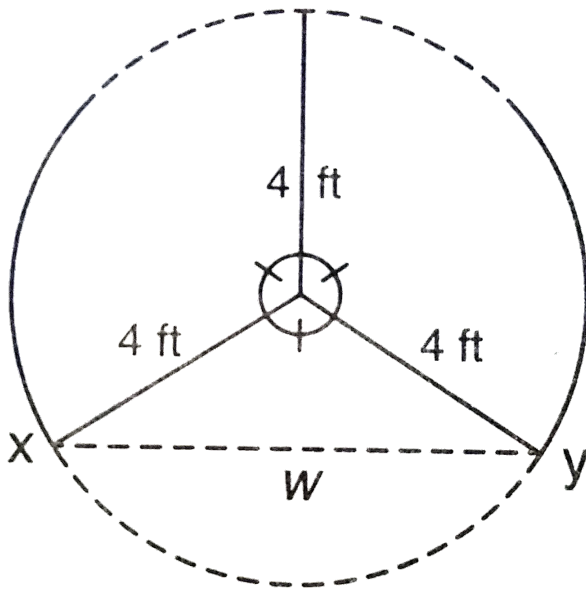
B. The probability that a person selected at random from the sample does not support the issuing of the bond ranges from 0.57 to 0.63.

C. The probability that a person selected at random from the sample supports the issuing of the bond is 0.4.

D. If the survey were to be repeated 100 times, 95% of the times the number of people who would not support the issuing of the bond would range from 55% to 65% of those surveyed.

Answer: D

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11.

The accompanying diagram shows a revolving door with three panels, each of which is 4 feet long. What is

the number of feet in the width,  $w$ , of the opening between points  $x$  and  $y$ ?

A.  $\frac{4}{\sqrt{3}}$

B.  $4\sqrt{3}$

C.  $8\sqrt{2}$

D.  $8\sqrt{3}$

**Answer: B**



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**12.** Impedance measures the oppositio of an electrical circuit to the flow of electricity. The total impedance in

a particular circuit is give by the formul

$$Z_r = \frac{Z_1 \cdot Z_2}{Z_1 + Z_2}$$

What is the total impedance of a circuit,  $Z_1$ , if  $Z_1 = 1 + 2i$  and  $Z_2 = 1 - 2i$  [ Note:

$$i = \sqrt{-1}]$$

A.  $-\frac{3}{2}$

B.  $2i$

C.  $\frac{1}{2}$

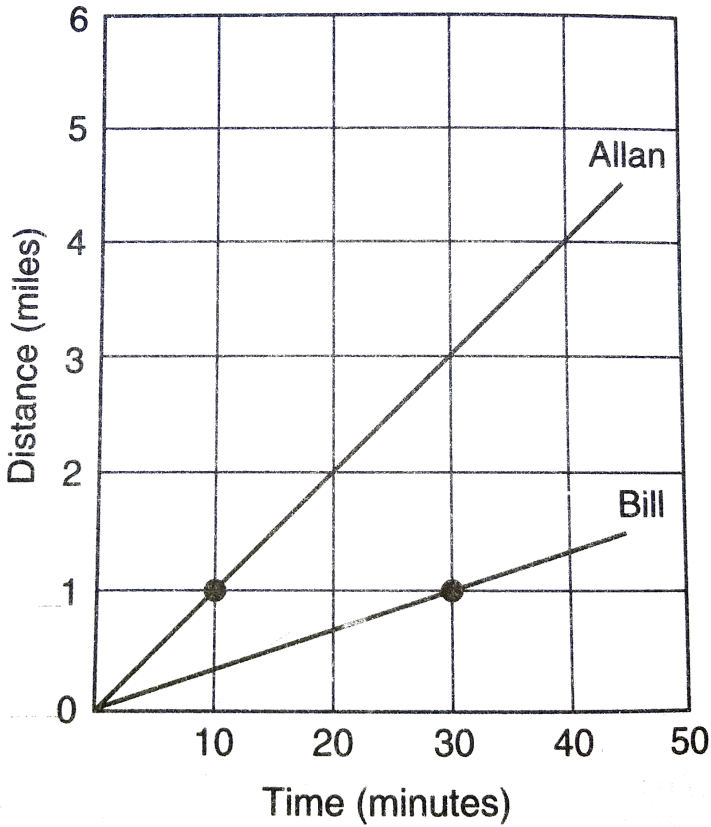
D.  $\frac{5}{2}$

**Answer: D**



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### Exercise



13.

At 9:00A.M. Allan began jogging and Bill began walking at constant rates around the same circular  $\frac{1}{4}$  mile track. The figure above compares their times in minutes and corresponding distances in miles. Which



statement or statements must be true?

I. Bill's average rate of walking was 2 miles per hour.

II. At 9:00A.M. Allan had jogged  $\frac{3}{5}$  mile more than Bill had walked.

III. At 9:30 A.M. Allan had completed 8 more laps around the track than Bill.

A. I only

B. II onlu

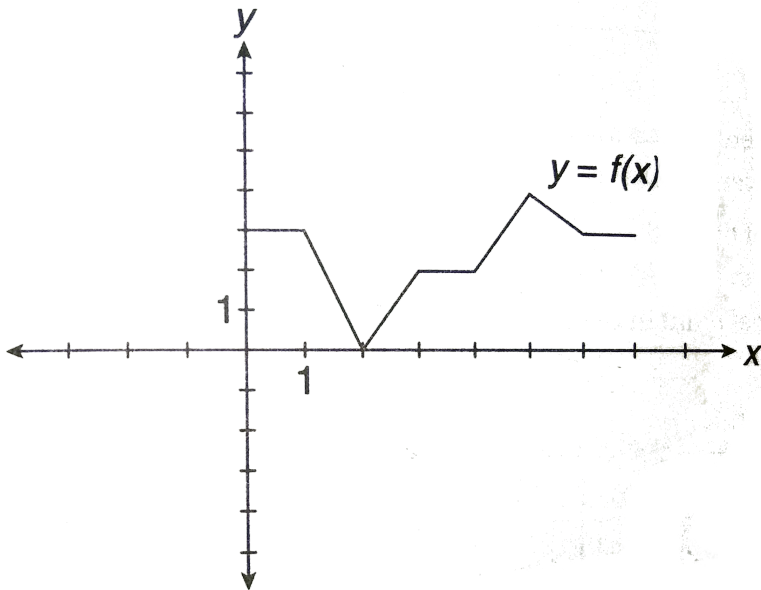
C. I and II only

D. I and III only

**Answer: D**



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14.

The figure above shows part of the graph of function  $f$ .

If  $f(x + 6) = f(x)$  for all values of  $x$ , what is the value of  $f(23)$ ?

A. 0

B. 2

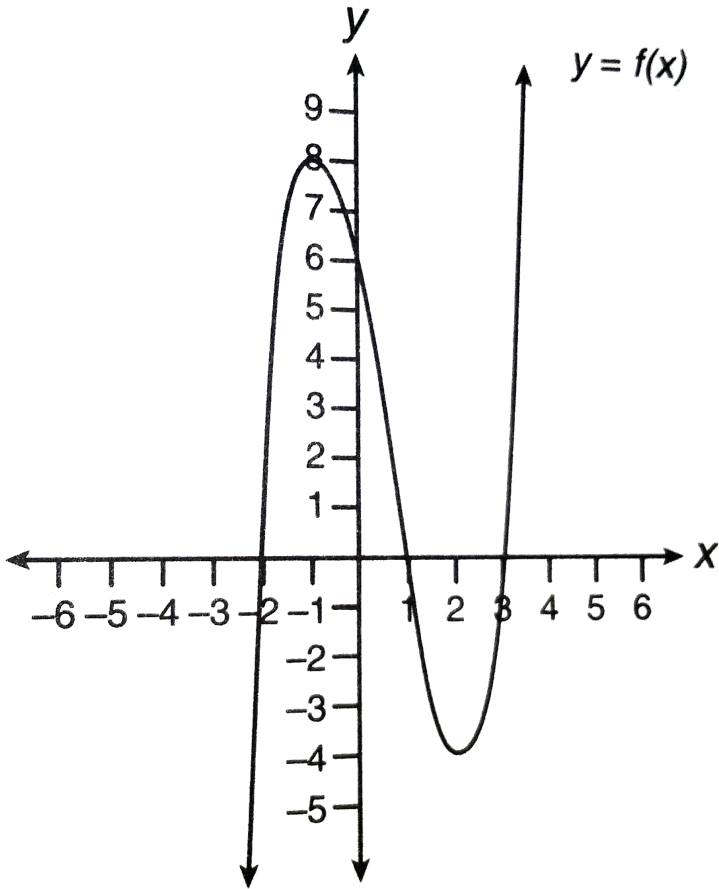
C. 3

D. 4

**Answer: D**



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15.

Which function could represent the graph above?

A.  $f(x) = (x - 6)(x^2 - 4x + 3)$

B.  $f(x) = (x - 3)(x^2 + x - 2)$

$$C. f(x) = (x - 1)(x^2 - 5x - 6)$$

$$D. f(x) = (x + 2)(x^2 - 4x - 12)$$

**Answer: B**



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**16.** On a test that has a normal distribution of scores of 59 falls two standard deviations below the mean, and score of 74 is one standard deviation above the mean. If  $x$  is an integer score that lies between 2.5 and 3.0 standard deviations above the means. What is a possible value of  $x$ ?



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<b>Hours Worked in a Week</b>	<b>Total Payment</b>
8	\$108.00
23	\$310.50
17	\$229.50

17.

Andrew keeps track of his paychecks over the past several weeks, recording the number of hours he worked and his total payments as indicated in the table above. He wants to model the relationship between  $h$  hours worked and total payments,  $p$ , in dollars, using an equation of the form  $p = kh$  where  $k$  is a constant. Based on the data in the table, what value of  $k$  should he use?



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18. If  $\frac{-3}{x} + 4 \leq -11$  and  $x > 0$ , what is the greatest possible value for  $x$ ?



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19. The equation of a circle in the  $xy$ -plane is  $x^2 + 4x + y^2 - 10y = 20$ . If the line  $x=k$  intersects the circle in exactly one point, what is the possible value of  $k$ ?



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$x$	1	2	3	4	5
$f(x)$	3	4	5	6	7

$x$	3	4	5	6	8
$g(x)$	4	6	8	10	7

20.

The tables above gives the values of functions  $f$  and  $g$  for several values of  $x$ . If  $g(f(b)) = 8$ , what is the value of  $b$ ?



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21. If  $(2b - 7)(2b + 7) = 1$ , what is the value of  $2b^2$ ?

A. 15

B. 25



C. 32

D. 50

**Answer: B**



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**22.** The number of donation pledges,  $p$ , made to a charity  $d$  days after the charity began a campaign for donations can be approximately by the equation  $p = 117 + 32d$ . What is the best interpretation of the number 32 in this equation?

- A. The number of donation pledges received before the campaign for donations started.
- B. The total number of donations pledges received during the campaign.
- C. The number of donation pledges received each day of the campaign.
- D. The number of donation pledges made on the test of the campaign.

**Answer: C**



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23. A long-distance telephone call costs \$1.80 for the first 3 minutes and \$0.40 for each additional minutes. If the charge for an  $x$ -minutes long distance call at this rate was \$4.20, then  $x=$

A. 7

B. 8

C. 9

D. 10

**Answer: C**



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<b>Gender</b>	<b>Type of College</b>				<b>Total</b>
	<b>4-Year Same State</b>	<b>2-Year Same State</b>	<b>4-Year Out-of- State</b>	<b>None</b>	
Male	64	26	22	7	119
Female	41	19	15	6	81
Total	105	45	37	13	200

24.

Based on the data in the table above, which of the following statements must be true?

- I. For every 3 men who applied to a same state collage, 2 women applied to a same state collage.
- II. If a female student is selected at random the probability that she did not apply to a 2-year collage is greater than 75%.
- III. Of the students who applied to a same state collage, 40 % were females

A. I and II only

B. I and III only

C. II and III only

D. I, II, and III

**Answer: D**



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25. If  $3x - 1 = x - \frac{7}{9}$ , what is the value of  $2x + 1$ ?

A.  $\frac{11}{9}$

B.  $\frac{4}{3}$

C.  $\frac{25}{9}$

D.  $\frac{10}{3}$

**Answer: A**



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**26.** The price of gas increased by 12% per gallon sometime during the first fiscal quarter and then decreased by 25% per gallon by the end of the second fiscal quarter. The final price of gas gallon at the end of the second quarter decreased by what percent compared to the starting price at the beginning of the first fiscal quarter?

A. 13 %

B. 16 %

C. 18.5 %

D. 20 %

**Answer: B**



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**27.** A population,  $T(x)$ , of wild turkeys, in a certain rural area is represented by the function,  $T(x) = 17(1.15)^{2x}$ , where  $x$  is number of years since 2010. According to this model, how many more turkeys

are in the population for the year 2015 than were available for 2010?

A. 46

B. 49

C. 51

D. 68

**Answer: C**



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**28.** If an equation of a parabola in the  $xy$ -plane is

$f(x) = -(x + 2)^2 - 1$ , what are the coordinates of



the vertex of the parabola defined by

$$g(x) = f(x - 2)?$$

A.  $(0, -1)$

B.  $(4, -1)$

C.  $(-2, -3)$

D.  $(-2, 1)$

**Answer: A**



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**29.** A city planner estimates that due to lower birth rates and changing demographics, enrollment in city's

public schools will decrease at the rate of 16% per year for the next 5 years. If the city planner uses the equation  $P = P_0(r)^n$  to estimate the school enrollment,  $P$ , after  $n$  years, what should be used for the value of  $r$ ?

A. 1.16

B. 0.84

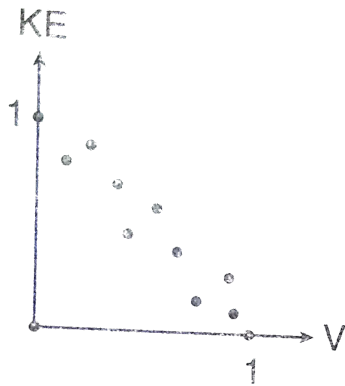
C. 0.80

D. 0.16

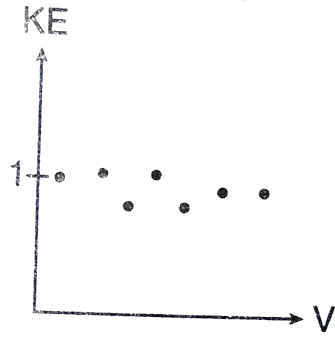
**Answer: B**



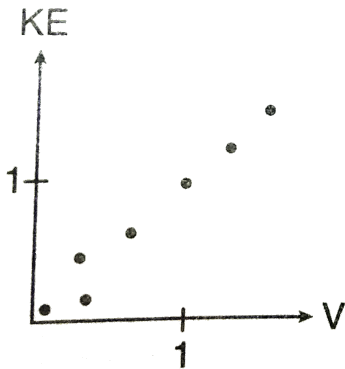
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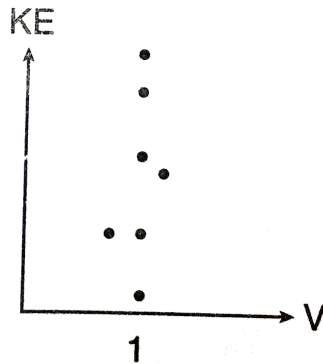
(1)



(3)



(2)



(4)

30.

In the physics lab, a student determined the kinetic energy,  $KE$ , of an object at various velocities,  $V$ , and found a strong positive association between  $KE$  and  $V$ .

Which of the above scatterplots show this relationship?

- A. Graph (1)
- B. Graph (2)
- C. Graph (3)
- D. Graph (4)

**Answer: B**



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**31.** The average (arithmetic mean) of  $a$ ,  $b$ ,  $c$ , and  $d$  is 3 times the median. If  $0 < a < b < c < d$ , what is  $a$  in

terms of  $b$ ,  $c$ , and  $d$ ?

A.  $5(b + c) - d$

B.  $3(b + c) + d$

C.  $5(b + c) + d$

D.  $3(b + c) - d$

**Answer: A**



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**32.** A person spent a total \$720 for dress shirts and sport shirts, each priced at \$35 and \$20, respectively. If the person purchased two \$35 dress shirts for each

\$20 sport shirts, what is the total number of shirts purchased?

A. 16

B. 21

C. 24

D. 28

**Answer: C**



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**33.** If 10 centimeters of blood contains 1.2 grams of hemoglobin, how many grams of hemoglobin are

contained in 35 cubic centimeters of same blood?

A. 2.7

B. 3.0

C. 3.6

D. 4.2

**Answer: D**



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<b>Players' Salaries</b> <b>(in millions of dollars)</b>					
0.5	0.5	0.6	0.7	0.75	0.8
1.0	1.0	1.1	1.25	1.3	1.4
1.6	1.8	2.5	3.7	3.8	4.0
4.2	4.6	5.1	6.0	6.3	7.2
Total = 61.7 Million					

**34.**

The table above shows the annual salaries for the 24 members of a professional sports team in terms of millions of dollars. If the team signs an additional player to a contract worth 7.3 million dollars per year, which statements about the median and mean is true?

A. The median and mean will increase by the same amount.

B. The median will increase by a greater amount.



C. The mean will increase by a greater amount

D. Neither will change

**Answer: C**



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$$35. m = \frac{M}{\sqrt{1 - \frac{v^2}{c^2}}}$$

The equation above describes, according to Einstein's theory of relativity, how the mass of an object increase with velocity where  $m$  is the mass of moving object,  $M$  is the mass the mass the object when it is not moving,  $v$  is the velocity of the object relative to a stationary

observer, and  $c$  is the speed of light. Which of the following expresses  $v$  in terms of  $m$ ,  $M$ , and  $c$ ?

A.  $c\sqrt{1 - \left(\frac{M}{m}\right)^2}$

B.  $c\sqrt{1 + \left(\frac{M}{m}\right)^2}$

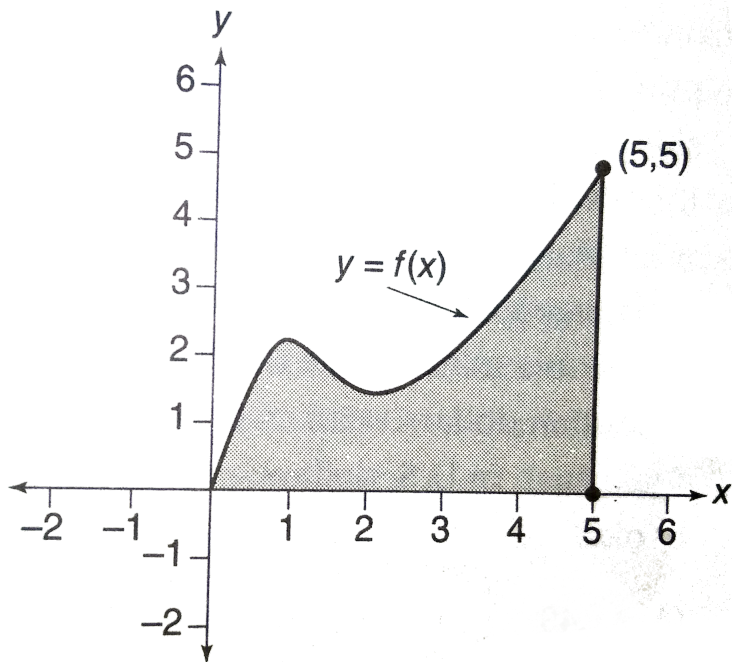
C.  $\sqrt{c^2 + \left(\frac{M}{m}\right)^2}$

D.  $\sqrt{c^2 + \left(\frac{M}{m}\right)^2} - 1$

**Answer: A**



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36.

Function  $f$  is defined for  $0 \leq x \leq 5$ , as shown in the accompanying figure. If  $(r, s)$  is a point inside the shaded region bounded by the  $x$ -axis, the line  $x=5$  and  $y=f(x)$ , which statement must be true?

I.  $r + s \leq 5$

II.  $s \leq f(r)$

III.  $f \neq s$

A. I only

B. II only

C. III only

D. I and III only

**Answer: B**



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**37.** Natalie is planning a school celebration and wants to have live music and food for everyone who attends. She has found a band that will charge her \$750 and a caterer who will provide snacks and drinks for \$2.25 per person. If her goal is to keep the average cost per

person between \$2.75 and \$3.25, how many people,  $p$ , must attend?

A.  $225 < p < 325$

B.  $325 < p < 750$

C.  $500 < p < 1,000$

D.  $750 < p < 1,500$

**Answer: D**



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**38.** If  $p(x)$  is a polynomial function with  $p(3)=0$ , which statement must be true?

A.  $p(x)$  is divisible by 3.

B.  $x-3$  is factor of  $p(x)$

C.  $p(x)$  is divisible by  $x+3$

D. The highest power of  $x$  in  $p(x)$  is 3.

**Answer: B**



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**39.** A group of  $p$  people plan to contribute equally to the purchase of gifts that costs  $d$  dollars. If  $n$  of the  $p$  people decide not to contribute, by what amount in dollars does the contribution needed from each of the remaining people increase?

A.  $\frac{d}{p - n}$

B.  $\frac{pd}{p - n}$

C.  $\frac{pd}{n(p - n)}$

D.  $\frac{nd}{p(p - n)}$

**Answer: D**



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**40.** Which of the following statements includes a function divisible by  $2x+1$ ?

I.  $f(x) = 8x^2 - 2$

II.  $g(x) = 2x^2 - 9x + 4$

III.  $h(x) = 4x^3 + 2x^2 - 6x - 3$

A. I only

B. I and II only

C. I and III only

D. I, II, and III

**Answer: C**



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**41.** When Sophie was born her parents invested a sum of \$20,000 in her collage fund. They invested it at a nominal annual rate a 5% with interest compounded quarterly. Which equation could be used to find the



number of dollars,  $y$ , in the account, after 18 years assuming no other deposits or withdrawals are made?

A.  $y = 20,000(1.05)^{18}$

B.  $y = 20,000(0.21)^{18 \times 4}$

C.  $y = 20,000(1.0125)^{\frac{18}{4}}$

D.  $y = 20,000(1.0125)^{18 \times 4}$

**Answer: D**



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**42.** If function  $g$  is defined by  $g(x)=x-1$  and  $2g(c)=10$ , what is the value of  $g(3c)$ ?

A. 6

B. 9

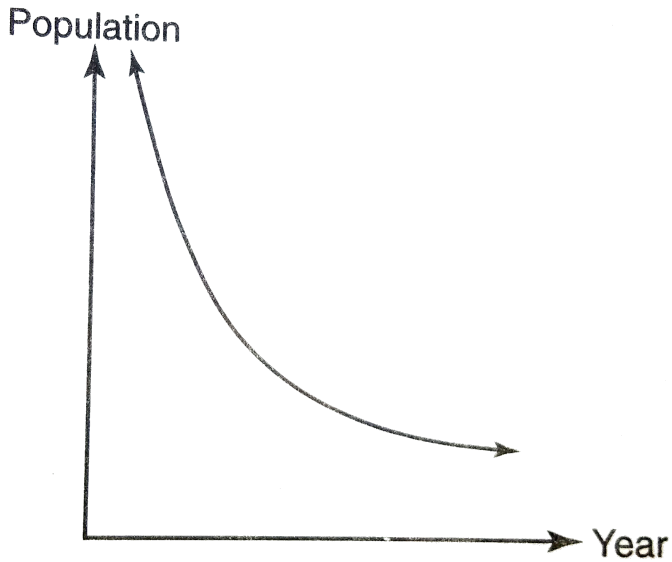
C. 15

D. 17

**Answer: D**



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43.

The graph above shows how the size of a country's population has changed over time. Which of the following are the most likely underlying reasons for the type of graph shown?

A. A moderate increase in annual birthrates and a liberal immigration policy.

B. A large increase in annual birthrates and increased life expectancy rates.

C. A liberal immigration policy and a opportunities.

D. The spread of a highly contagious fatal disease and a history of political strife and unrest.

**Answer: D**



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**44.** A teacher the united states wishes to purchase textbooks for her classroom when she goes on a trip to Canada, where they are on sale for 45 Canadian

dollars each. At the time of purchase one Canadian dollar can be exchanged for 0.76 U.S. dollars. Assuming she is able to exchange her U.S. dollars for Canadian dollars at no cost, what is the exact cost, in U.S. dollars, to purchase 30 books?

- A. \$849
- B. \$1026
- C. \$1350
- D. 1776

**Answer: B**



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<b>Age (years)</b>	<b>Average Pupil Diameter (mm)</b>
20	4.7
40	3.9
60	3.1
80	2.3

45.

The table above shows the average diameter, in millimeters, of a pupil in a person's eye as she or he grows older from age 20 to age 80. Which equation expresses the relationship between pupil diameter,  $p$ , and age  $a$ ?

A.  $p = -0.04a + 5.5$

B.  $p = 0.04a + 3.9$

C.  $p = 0.04a + 34.3$

$$D. p = 0.235a$$

**Answer: A**



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**46.** A small, open-top packing box, similar to a shoebox without a lid, is three times as long as it is wide, and half as high as it is long. Each square inch of the bottom of the box costs \$0.80 to produce, while each square inch of any side costs \$0.03 to produce. If  $x$  represents the number of inches in the width of the box, which of the following functions represents the cost,  $C$ , of producing the box?

A.  $C(x) = 0.42x^2$

B.  $C(x) = 0.60x^2$

C.  $C(x) = 0.72x^2$

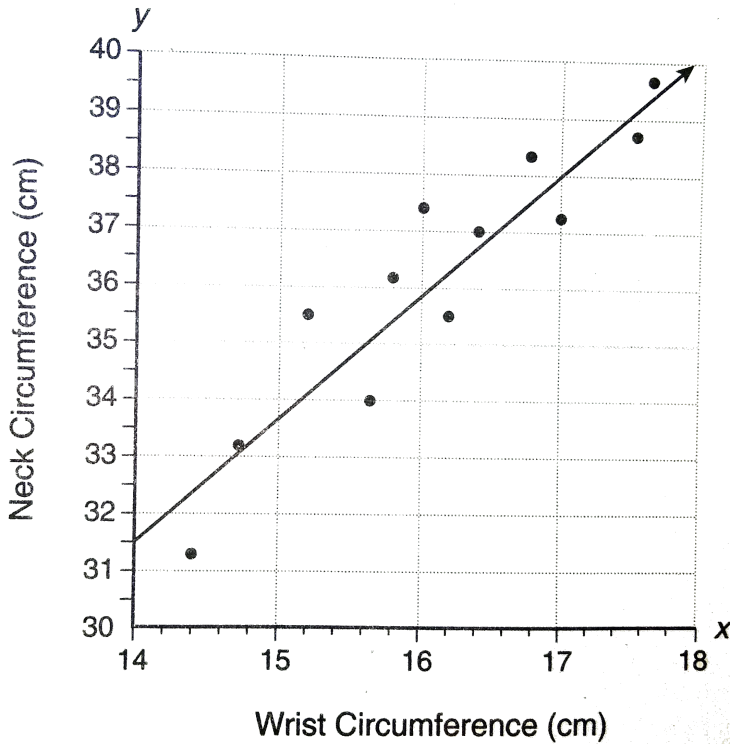
D.  $C(x) = 0.96x^2$

**Answer: B**



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47.

Wrist Circumference (cm)

The scatterplot above summarizes the wrist and neck circumference measurements, in centimeters, for 12 people. The line of best fit is drawn. What proportion of the measurements satisfy the inequality  $|o - p| \leq d$ , where  $o$  is the observed measurement,  $p$

is corresponding measurement predicted by the line of best fit, and  $d$  is 0.5cm?

A.  $\frac{1}{6}$

B.  $\frac{1}{4}$

C.  $\frac{1}{3}$

D.  $\frac{1}{2}$

**Answer: C**



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**48.** An arch is built so that it has the shape of a parabola with the equation  $y = -3x^2 + 24x$  where  $y$

represents the height of the arch in meters. How many times greater is the maximum height of the arch than the width of the arch at its base?

A. 4

B. 6

C. 8

D. 10

**Answer: B**



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**49.** A political strategist wants to conduct a survey to determine how the likely voters in a given state of 10,000,000 people feel about a politician's stand on an infrastructure spending plan. The strategist has a budget to make phone calls to 1,000 people. What would be the most effective approach for him to minimize the margin of error in his survey results?

A. Place calls to randomly selected phone numbers of residents within the state.

B. Place calls to residents of the state's largest city who have indicated they are members of political party

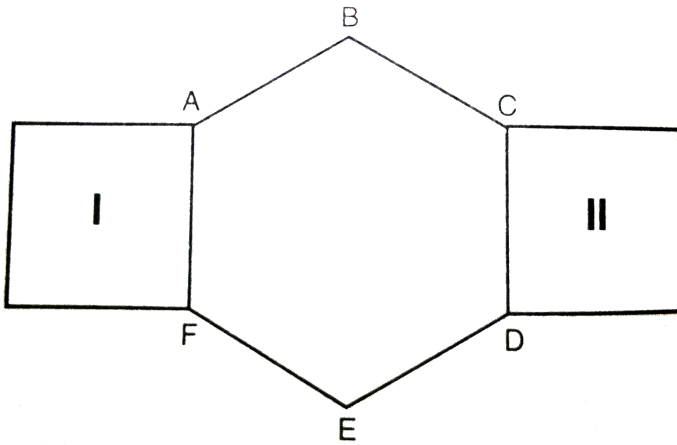
C. Place call rural residents of the state who have demonstrated political activism

D. Place calls to places of business so that people can more likely be reached during the work day.

**Answer: A**



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50.

A metal belt buckle is being designed so that it has the shape of a regular hexagon in the center and squares at opposite ends as shown in the figure above where ABCDEF is a regular hexagon and figures I and II are squares. The hexagon will be gold plated and the two squares silver plated. The length of a side of each square is 6 centimeters. Which of the following is closest to the percent of the total surface area of the buckle that will be silver plated?

A. 41

B. 44

C. 47

D. 49

**Answer: B**



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3 teaspoons = 1 tablespoon

16 tablespoons = 1 cup

1 cup = 8 ounces

29.6 milliliters = 1 ounce

**51.**

Using the conversion relationships above, what is the

maximum number of 2-teaspoon doses of cough medicine that can be dispensed from a bottle that contains 225 milliliters of cough medicine?

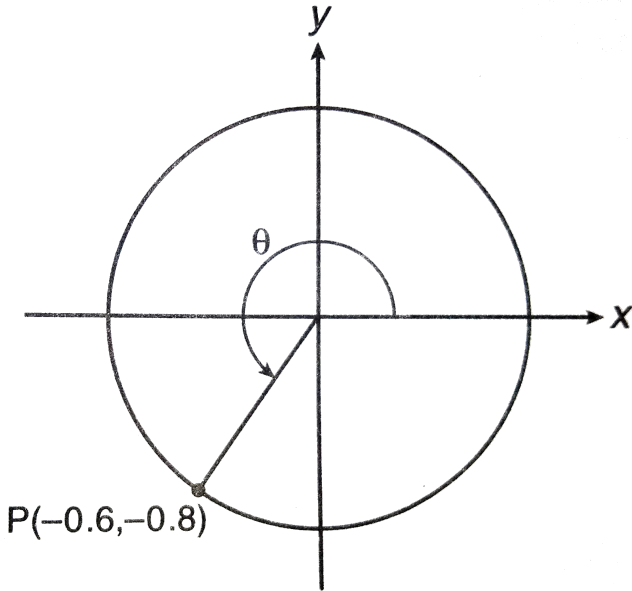


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52. NASA's New Horizons Interplanetary probe has been making its way to Pluto since January 2006. In July 2015, it reached Pluto and sent a radio transmission signal at speed of  $1.86 \times 10^5$  miles per second. If the signal traveled a distance back to Earth of approximately  $3.06 \times 10^9$  miles, how many minutes did it take for the signal to reach Earth, correct to the nearest 5 minutes?



 Watch Video Solution



53.

If  $P(-0.6, -0.8)$  is a point on the unit circle in the figure above, what is the exact value of  $\tan \theta + \sin \theta$ ?

 Watch Video Solution

**54.** If  $a + 2b = 13$  and  $8a + b = 20$ , what is the value of  $3a + b$ ?



**Watch Video Solution**

**55.** An opinion poll survey was conducted in which 120 sports fans and 75 non-sports fans participated. If the sample size was increased by 65 non-sports fans, how many sports fans should be added so that  $\frac{3}{5}$  of those polled are sports fans?



**Watch Video Solution**

**56.** The Eye Surgery Institute just purchased a new laser medicine for \$500,000 to use during eye surgery. The Institute must pay the inventor \$550 each time the medicine is used. If the Institute charges \$2,000 for each laser surgery that must be performed in order for the Institute to make a profit?



**Watch Video Solution**

**57.** Question 37 and 38 refer to the following information

The U.S. federal Government tracks the Consumer Price Index (CPI)- a comprehensive standard used to

estimate the average price change for the typical goods and services purchased by consumers. This measure gives economics a useful way to estimate the rates of the inflation or deflation, which reflects the respective general increase or decrease of prices of goods and services in the economy. The accompanying tables summarizes the changes in the CPI for the years 2005 through 2014, which can be assumed to be the corresponding percent rates of inflation.

<b>Year</b>	<b>Annual</b>	<b>First Half of Year</b>	<b>Second Half of Year</b>
2005	3.4	3.0	3.8
2006	3.2	3.8	2.6
2007	2.8	2.5	3.1
2008	3.8	4.2	3.4
2009	-0.4	-0.6	-0.1
2010	1.6	2.1	1.2
2011	3.2	2.8	3.5
2012	2.1	2.3	1.8
2013	1.5	1.5	1.4
2014	1.6	1.7	1.5

Q. An economist purchases a kitchen appliance at the beginning of 2014 for \$3,000. The sales person advises him that the only changes in prices for the appliance since the beginning of 2012 have been due to inflation. Assuming that is the case, what would have been the purchase price for the appliance at the beginning of 2012 correct to the nearest dollars?



**58.** Question 37 and 38 refer to the following information

The U.S. federal Government tracks the Consumer Price Index (CPI)- a comprehensive standard used to estimate the average price change for the typical goods and services purchased by consumers. This measure gives economics a useful way to estimate the rates of the inflation or deflation, which reflects the respective general increase or decrease of prices of goods and services in the economy. The accompanying tables summarizes the changes in the CPI for the years 2005 through 2014, which can be assumed to be the

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2008	3.8	4.2	3.4
2009	-0.4	-0.6	-0.1
2010	1.6	2.1	1.2
2011	3.2	2.8	3.5
2012	2.1	2.3	1.8
2013	1.5	1.5	1.4
2014	1.6	1.7	1.5

Q. At a beginning of 2015, a retired person is shopping for a retirement annuity, which is an investment policy that will give him fixed monthly payments for the rest of his life. He would like the amount of his annuity payments to more than keep up with the rate of inflation. He decides that he will choose a policy that issue payments that increase annually at a rate

of that is at least 1.5% greater than the average yearly compounded rate of inflation calculated from the period that extends from the second half of 2005 through the first half of 2008. What should be the minimum annual rate of increase in his monthly annuity payments, correct to the nearest tenth?



[View Text Solution](#)

59. 
$$\frac{5x - 3y}{3x + 5y} + \frac{2}{3} = 1$$

In the equation above, what is the value of  $\frac{x}{y}$ ?

A.  $\frac{1}{3}$

B.  $\frac{2}{3}$



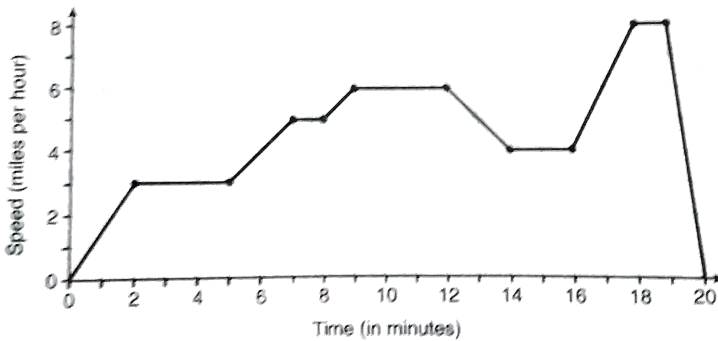
C.  $\frac{5}{6}$

D.  $\frac{7}{6}$

Answer: D



Watch Video Solution



60.

The graph above represents a jogger's speed during her 20-minutes jog around her neighbourhood. Which

statement best describes what the jogger was doing during the 9-12 minutes interval of her jog?

- A. She was standing still
- B. She was increasing her speed
- C. She was decreasing her speed
- D. She was jogging at a constant rate

**Answer: D**



**Watch Video Solution**

**61.** In the figure above,  $\overline{AB} \parallel \overline{CD}$ ,  $AD=42$ ,  $AB=12$ , and  $CD=16$ , what is the length of  $\overline{DE}$ ?

A. 21

B. 24

C. 27

D. 30

**Answer: B**



**View Text Solution**

**62.**  $C = 60 + 0.25d$

The equation represents the monthly cost of a cell phone that includes up to 1 gigabyte of data after which there is a charge for  $d$  gigabytes of any additional data. Which of the following must be true?

I. The cost of each additional megabyte of data is \$60.25.

II. The y-intercept of the graph of the cost equation represents the charge for each additional megabytes of data used.

III. If between 5 and 6 megabytes of data are used in month, the monthly charge is \$61.25.

A. I and II only

B. I and III only

C. II only

D. III only

**Answer: D**



63. For what set of values of  $x$  is the expression

$$|3x + 4| < 0 \text{ true?}$$

A.  $-\frac{4}{3} < 0 < x$

B.  $x < \frac{-4}{3}$

C. No real numbers

D. All real number

**Answer: C**



[Watch Video Solution](#)

**64.** The distance a free falling object has traveled can be modeled by the equation,  $d = \frac{1}{2}at^2$  where  $a$  is acceleration due to gravity and  $t$  is the amount of time the object has fallen. What is  $t$  in terms of  $a$  and  $d$ ?

A.  $t = \sqrt{\frac{da}{2}}$

B.  $t = \sqrt{\frac{2d}{a}}$

C.  $t = \left(\frac{da}{2}\right)^2$

D.  $t = \left(\frac{3d}{a}\right)^2$

**Answer: B**



**Watch Video Solution**

65. If  $x^2 - y^2 = 24$  and  $x - y = 3$ , what is the value of  $y$ ?

A.  $\frac{1}{2}$

B.  $\frac{3}{2}$

C.  $\frac{7}{4}$

D.  $\frac{5}{2}$

**Answer: D**



**Watch Video Solution**

66. If  $\frac{z}{2b} = 4$ ,  $\frac{z}{3c} = 6$ , and  $2b + 3c = 12$ , what is the value of  $z$ ?

A. 16

B. 20

C. 24

D. 48

**Answer: C**



**Watch Video Solution**

**67.** A pizza has a fixed initial cost of \$180,000 and a variable cost of \$4 for each pizza sold. If the pizza parlor charges \$10 for each pizza, how many pizzas will it have to sell before it makes a profit?



A. 24, 000

B. 30, 000

C. 38, 000

D. 42, 000

**Answer: B**



**Watch Video Solution**

**68.**  $(ax + 7)(bx - 1) = 12x^2 + kx + (b - 13)$

If the equation above is true for all values of  $x$  where  $a$ ,  $b$ , and  $k$  are non-zero constants, what is the value of  $k$ ?

A. 40

B. 25

C. 17

D. 8

**Answer: A**



**Watch Video Solution**

**69.** Function  $f$  is defined by the equation

$f(x) = ax^2 + \frac{2}{a}x$ . If  $f(3) - f(2) = 1$ , what is the

smallest possible value of  $a$ ?

A.  $\frac{1}{6}$

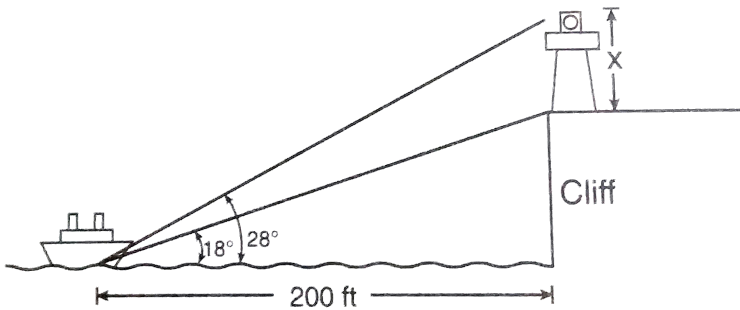
B.  $\frac{1}{5}$

C.  $\frac{1}{2}$

D.  $\frac{1}{2}$

**Answer: B**

 **Watch Video Solution**



A lighthouse is built on the edge of a cliff near the ocean, as shown in the diagram above. From a boat located 200 feet from the base of the cliff, the angle of

elevation to the top of the cliff is  $18^\circ$  and the angle of elevation to the top of the lighthouse is  $28^\circ$ . Which of the following equations could be used to find the height of the lighthouse,  $x$ , in feet?

A.  $x = 200\tan 10^\circ$

B.  $x = 200(\tan 28^\circ - \tan 18^\circ)$

C.  $x = \frac{200}{\tan 28^\circ - \tan 18^\circ}$

D.  $x = 200\left(\frac{\tan 18^\circ}{\tan 28^\circ}\right)$

**Answer: B**



**Watch Video Solution**

71. The local deli charges a fee for delivery. On Monday, they delivered two dozen bagels to an office at a total cost of \$8. On Tuesday, three dozen bagels were delivered at a total cost of \$11. Which system of equations could be used to find the cost of a dozen bagels,  $b$ , if the delivery fee is  $f$ ?

A.  $b + 2f = 8$

$$b + 3f = 11$$

B.  $2b + f = 8$

$$b + 3f = 11$$

C.  $b + 2f = 8$

$$3b + f = 11$$

$$D. 2b + f = 8$$

$$3b + f = 11$$

**Answer: D**



**Watch Video Solution**

**72.** The equation of a parabola in the  $xy$ -plane is  $y = 2x^2 - 12x + 7$ . What is the distance between the vertex of the parabola and the point  $(3, 4)$ ?

A. 6

B. 8

C. 11

D. 15

**Answer: D**



**Watch Video Solution**

**73.** When a base ball is hit by a batter, the height of the ball,  $h(t)$ , at time  $t$ , is determined by the equation  $h(t) = -16t^2 + 64t + 4$ , where  $t \geq 0$ . For which interval of time, in seconds, is the height of the ball at least 52 feet above the playing field?

A.  $0.5 \leq t \leq 2.5$

B.  $1.0 \leq t \leq 3.0$

C.  $1.5 \leq t \leq 3.5$

D.  $2.0 \leq t \leq 4.0$

**Answer: B**



**Watch Video Solution**

74.  $\frac{\frac{2}{3}a^2 - \frac{4}{9}a^2}{2a} = 4$  where  $a \neq 0$

What is the value of  $a$  in the expression above,

A. 28

B. 42

C. 36



D. 12

**Answer: C**



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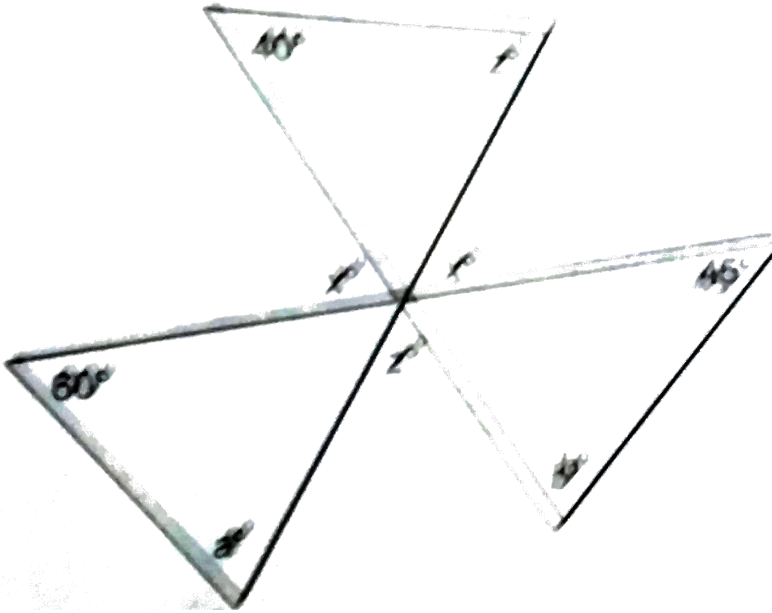
$$75. \frac{2}{3}x - \frac{1}{4}y = 6$$

$$kx - \frac{1}{3}y = 8$$

If the system of equations above has an infinite number of solutions, what is the value of the constant  $k$ ?



**Watch Video Solution**



76.

In the figure above, the measures of the angles are as marked. What is the value of  $a+b$ ?

A. The equation  $W = 120I - 12i^2$  represents the power,  $W$ , in watts, of a 120-volt circuit having a resistance of 12 ohms when current,  $I$ , is flowing

through the circuit. What is the maximum power, in watts, that can be delivered in this circuit?

B.

C.

D.

**Answer: A::D**



**View Text Solution**

77. The equation  $W = 120I - 12i^2$  represents the power,  $W$ , in watts, of a 120-volt circuit having a resistance of 12 ohms when current,  $I$ , is flowing

through the circuit. What is the maximum power, in watts, that can be delivered in this circuit?



[Watch Video Solution](#)

**78.** The graph of a line in the  $xy$ -plane passes through the points  $(5, -5)$  and  $(1, 3)$ . The graph of a second line has a slope of 6 and passes through the point  $(0, 1)$ . If the two lines intersect at  $(p, q)$ , what is the value of  $p+q$ ?



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**79.** If three times 1 less than a number  $n$  is the same as two times the number increased by 14, what is the value of  $n$ ?

A. 15

B. 17

C. 19

D. 21

**Answer: B**



**Watch Video Solution**

**80.** George spent 25% of the money he had on lunch and 60% of the remaining money on dinner. If he then had \$9.00 left, how much money did he spend on lunch and dinner?

A. \$19

B. \$20

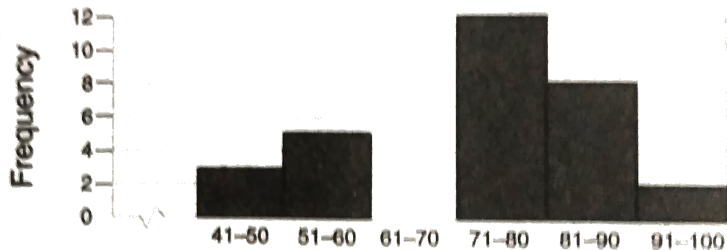
C. \$21

D. \$27

**Answer: C**



**Watch Video Solution**



81.

The histogram above shows the distribution of 30 test scores. If test score is selected at random, what is the probability that the score falls in the interval that contains the median score?

A.  $\frac{4}{15}$

B.  $\frac{2}{5}$

C.  $\frac{1}{2}$

D.  $\frac{3}{5}$

**Answer: B**

**82.** The breakdown of a 500-milligram sample of a chemical compounds in the bloodstream is represented by the function  $p(n) = 500(0.8)^n$ , where  $p(n)$  represents the number of milligrams of the compound that remains at the end of  $n$  hours. Which of the following is true?

- I. The amount of the compound present is decreasing by a constant amount.
- II. Each hour the compound gets reduced by 20% of the amount present at the beginning of that hour.
- III. Each hour the compound gets reduced by 80% of 500.



A. I only

B. II only

C. I and III only

D. II and III only

**Answer: B**



**View Text Solution**

**83.** Maggie's farm stand sold total of 165 pounds of apples and peaches. She sold apples for \$1.75 per pound and peaches for \$2.50 per pound. If she made \$337.50, how many pounds of peaches did she sell?

A. 11

B. 18

C. 65

D. 100

**Answer: C**



**Watch Video Solution**

<b>Number of Weeks</b>	1	2	3	4
<b>Number of Downloads</b>	120	180	270	405

**84.**

A computer program application developer released a new game app to be downloaded. The table above

gives the number downloads,  $y$ , for the first four weeks after the launch of the app. If  $w$  represents the number of weeks after the launch of the app, which equation best models these data?

A.  $y = 60(w + 1)$

B.  $y = 96(1.25)^w$

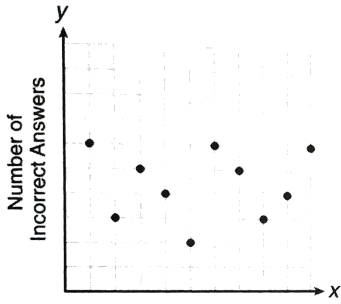
C.  $y = 80(1.50)^w$

D.  $y = 90w$

**Answer: C**

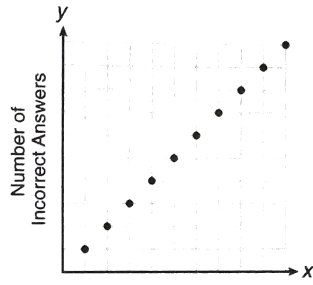


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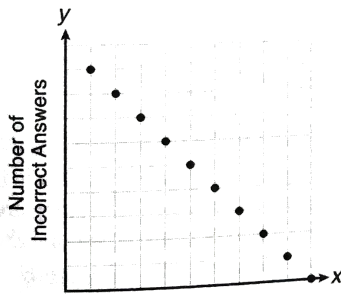
Test Scores

(1)



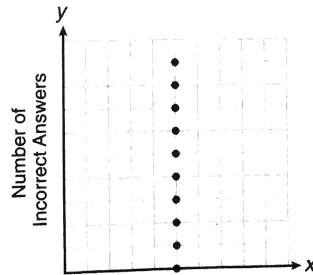
Test Scores

(3)



Test Scores

(2)



Test Scores

(4)

85.

Which of the four graphs above best shows the relationship between  $x$  and  $y$  if  $x$  represents a student score on a test and  $y$  represents the number of incorrect answers a student received on the same test?

A. Graph (1)

B. Graph (2)

C. Graph (3)

D. Graph (4)

**Answer: B**



**Watch Video Solution**

**86.** An animal boarding facility houses 3 dogs for every 2 cats. If the combined total of dogs and cats the boarding facility is 250, how many cats are housed?

A. 80

B. 100

C. 120

D. 150

**Answer: B**



**Watch Video Solution**

**87.** An airline flies two different planes over the same route. The faster of the two planes travels at an average speed of 540 mile per hour, and the other plane travels at an average speed of 450 miles per hour. How many more miles can the faster plane travel in 12 seconds than the slower plane?

A.  $\frac{1}{5}$

B.  $\frac{3}{10}$

C. 9

D. 18

**Answer: B**



**Watch Video Solution**

**88.**  $x - 3y = 2y + 7$

$$x + 2 = 3(y + 1)$$

In the above system of equations, what is the value of

$$\frac{x}{y}?$$

A.  $\frac{8}{3}$

B.  $\frac{11}{3}$

C. 4

D. 12

**Answer: A**



**Watch Video Solution**

**89.** An Ironman Triathlon consist of swimming 2.4 miles, biking 112 miles, and running a marathon distance of 28.2 miles. Dylan completed an Ironman Triathlon in 12 hours and 30 minutes. He spent approximately half the time biking. He needed hour 4



times as much time to run the 26.2 miles as to swim the 2.4 miles. The average rate of minutes per mile at which Dylan ran the marathon part of the triathlon is closest to which of the following

A. 10.6

B. 11.5

C. 12.2

D. 13.4

**Answer: B**



**Watch Video Solution**

**90.** The bottom of a ski slope is 6,500 feet above sea level, the top of the slope is 11,000 feet above sea level, and the slope drops 5 feet vertically for every 11 feet traveled in the horizontal direction. From the top of the slope, Kayla skis down at an average speed of 30 miles per hour. Which of the following functions gives the best estimate for the distance above sea level,  $d$ , Kayla is  $t$  seconds after she begins her ski run where  $6,500 < d < 11,000$ ?

A.  $d(t) = 11,000 - \left(\frac{150}{11}\right)t$

B.  $d(t) = 11,000 - 2.2t$

C.  $d(t) = 11,000 - 20t$

$$D. d(t) = 4,500 - 1,200t$$

**Answer: C**



**Watch Video Solution**

**91.** A gardener is planting two types of trees. One type is seven feet tall and grows at a rate of 8 inches per year. The other type is four feet tall and its rate of the growth is 50% greater than the rate of the other tree. In how many years will the two grow to the same height?

A. 6

B. 7

C. 8

D. 9

**Answer: D**



**Watch Video Solution**

Vaccination and Flu Status					
Age	Unvaccinated No Flu	Unvaccinated Got Flu	Vaccinated No Flu	Vaccinated Got Flu	Total
Under 21	6	4	8	2	20
21-50	17	15	22	14	68
Over 50	2	9	32	19	62

**92.**

The table above summarizes the result of a survey taken at the end of last year's flu seson. What fraction of the people who got the flu were unvaccinnated?

A.  $\frac{2}{3}$

B.  $\frac{4}{9}$

C.  $\frac{3}{8}$

D.  $\frac{1}{12}$

**Answer: B**



**Watch Video Solution**

**93.** The temperature,  $t$ , generated by an electrical circuit is represented by  $t = f(m) = 0.3m^2$ , where  $m$  is the number of moving parts. The resistance of the same circuits is represented by  $r = g(t) = 150 + 5t$ ,

where  $t$  is the temperature. What is the resistance in a circuit that has four moving parts?

A. 51

B. 156

C. 174

D. 8, 670

**Answer: C**



**Watch Video Solution**

Comparison of Combined State and Local Spending on Education						
State	Year					
	2011		2013		2015	
	Education Spending	Population	Education Spending	Population	Education Spending	Population
California	453,480.7	37.7	447,531.1	38.4	454,003.1	39.2
New York	300,031.9	19.5	306,395.8	19.7	316,104.0	19.8
Texas	221,155.9	25.7	226,805.0	26.5	252,655.5	27.4
Florida	163,070.8	19.1	157,010.2	19.6	162,548.3	20.2
Illinois	129,543.3	12.9	132,848.8	12.9	140,072.6	12.9

94.

Question 16 and 17 refer to the above table, that shows the population (in millions) and education spending (in millions) and by state for each of the states listed for the years 2011, 2013, and 2015.

Q. Which of the following best approximates the average rate of change in education spending in Texas from 2011 to 2015?

A. 3.2 billion per year

B. 6.3 billion per year

C. 10.5 per year

D. 7.9 billion per year

Answer: D

 Watch Video Solution

State	Year					
	2011		2013		2015	
	Education Spending	Population	Education Spending	Population	Education Spending	Population
California	453,480.7	37.7	447,531.1	38.4	454,003.1	39.2
New York	300,031.9	19.5	306,395.8	19.7	316,104.0	19.8
Texas	221,155.9	25.7	226,805.0	26.5	252,655.5	27.4
Florida	163,070.8	19.1	157,010.2	19.6	162,548.3	20.2
Illinois	129,543.3	12.9	132,848.8	12.9	140,072.6	12.9

95.

Question 16 and 17 refer to the above table, that shows the population (in millions) and education spending (in millions) and by state for each of the states listed for the years 2011, 2013, and 2015.



Q. Based on the data in the table, which of the following must be true?

I. In 2015 per capita (per person) spending on education in Illinois was greater than per capita spending on education in Texas.

II. Per capita spending on education in Florida declined in 2015 compared to 2011 spending.

III. California had the highest per capita spending in education for each year.

A. I and II only

B. I and III only

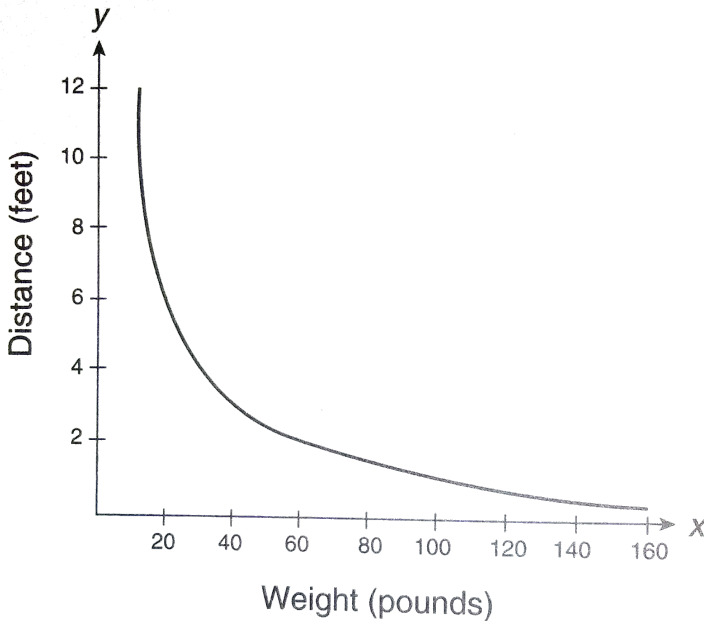
C. II and III only

D. I, II, and III

Answer: A



Watch Video Solution



96.

The graph above shows the relationship between a person's weight and the distance that the person must sit from the center of seesaw to make it

balanced. Which of the following best represents the equation of this graph?

A.  $y = 12x^2$

B.  $y = -120x$

C.  $y = 120\left(\frac{1}{2}\right)^x$

D.  $y = \frac{120}{x}$

**Answer: D**



**Watch Video Solution**

<b>Average Annual Salary Range By Highest Level of Degree Earned</b>				
<b>Highest Degree Earned</b>	<b>Average Annual Salary</b>			<b>Total</b>
	<b>Less than \$35,000</b>	<b>\$35,000 to \$70,000</b>	<b>More than \$70,000</b>	
High School	21	15	3	39
Two Year College	12	24	2	33
Four Year College	18	41	29	93
Graduate School	1	28	46	75
<b>Total</b>	<b>52</b>	<b>108</b>	<b>80</b>	<b>240</b>

97.

The table above summarizes the result of a survey taken in which 240 adults were asked about their education level and current annual salary. If a participant who reported earning \$35,000 or more per year is selected at random, what is the best estimate

of the probability that the person does not have a graduate school degree?

A. 0.31

B. 0.40

C. 0.60

D. 0.69

**Answer: C**



**Watch Video Solution**

**98.** If the sum of 10 dimes, 5 nickels and  $x$  quarters equals \$5.25, what is the value of  $x$ ?

A. 8

B. 10

C. 16

D. 22

**Answer: C**



**Watch Video Solution**

<b>Students at Washington High School</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>
<b>Taking AP Classes</b>	56	72	128
<b>Not Taking AP Classes</b>	23	26	49
<b>Total</b>	79	98	177

99.

The table above gives the number of male and female students at Washington High School who are taking Advanced Placement (AP) classes and those who are not. What is the proportions of the total number of students at the school who are both male and NOT taking AP classes?

A.  $\frac{23}{177}$

B.  $\frac{79}{177}$

C.  $\frac{23}{49}$

D.  $\frac{23}{56}$

**Answer: A**



**Watch Video Solution**

**100.** A travel agency sells ship cruises for a popular cruises line. Historically, 135 cruises can be sold when the price is \$950 per person. If the price drops to the minimum allowed by the cruises line of \$725 per person, 180 cruises can be sold. If the number of cruises sold increase at a constant rate as the price  $p$



decrease, where  $p \geq 725$ , which of the following functions best models the situation described?

A.  $f(p) = -\frac{1}{29}p + 205$

B.  $f(p) = -\frac{1}{19}p + 1,135$

C.  $f(p) = -5p + 4,885$

D.  $f(p) = -\frac{1}{5}p + 325$

**Answer: D**



**Watch Video Solution**

**101. I.** The coordinate of the center are (2, -3).

**II.** The coordinate of the center are (-2, 3).

III. The length of the radius is  $5\sqrt{2}$ .

IV. The length of the radius is 50.

Q. If an equation of a circle is  $x^2 + 4y + y^2 - 6y = 37$ ,

which of the statements above are true?

A. I and III

B. I and IV

C. II and III

D. II and IV

**Answer: C**



**Watch Video Solution**

$$102. f(x) = \frac{x^4 + 2x^3 - 3x^2 + 4x + 12}{x + 3}$$

Which of the following functions is equivalent to the functions above for all values of  $x$  for which function above for all values of  $x$  for which function  $f$  is defined?

A.  $g(x) = x^3 - x^2 + 4$

B.  $g(x) = x^2 - x + 4$

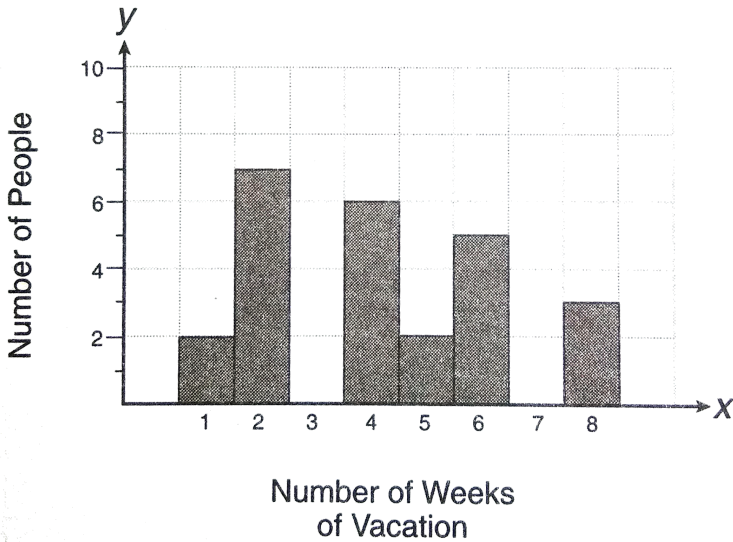
C.  $g(x) = x^3 - x^2 + 4x$

D.  $g(x) = x^4 + 2x^3 - 3x^2 + 4$

**Answer: A**



**Watch Video Solution**



103.

The histogram above shows the result of a survey taken of 25 individuals who were polled about how many weeks of vacation per year they receive. Which of the following is closest to the average (arithmetic mean) number of weeks of vacation per individual?

A. 2

B. 3

C. 4

D. 5

**Answer: C**



**Watch Video Solution**

**104.** If  $p(x)$  is a polynomial function and  $p(-1)=3$ , which statement is true?

A. The remainder when  $p(x)$  is divided by  $x-3$  is  $-1$ .

B. The remainder when  $p(x)$  is divided by  $x+3$  is  $-1$ .

C. The remainder when  $p(x)$  is divided by  $x-1$  is  $3$ .

D. The remainder when  $p(x)$  is divided by  $x+1$  by  $3$ .

Answer: D



Watch Video Solution

$$105. y = \frac{3}{h-2}x + 5$$

$$hy - 8x = 5$$

For what value of  $h$  does the system of equations above have no solution?

A.  $\frac{16}{5}$

B.  $\frac{13}{8}$

C.  $\frac{11}{15}$

D.  $\frac{5}{8}$

**Answer: A**



**Watch Video Solution**

**106.** A troy ounce is a unit of mass used for precious metals such as gold. There are 12 troy ounces in a troy pound and a troy pound is equivalent to 373.3 grams. If the density of gold is 19.3 grams per cubic centimeter, which of the following is closest to the number of cubic centimeters in the volume of block of gold with mass of 5 troy ounces? [ Note: density is mass divided by volume]

A. 7

B. 8

C. 9

D. 10

**Answer: B**



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**107.** A resresearcher is conducting a survey for which she currently has 93% confidence level. What would be two actions that she could take that would be most likely to increase the confidence level in her survey result?



- A. Increase the sample size and modify the design of the survey to increase the standard deviation.
- B. Increase the sample size and modify the design of the survey to decrease the standard deviation.
- C. Decrease the sample size and increase the randomness of the survey sample.
- D. Modify the design of the survey to increase the standard deviation and decrease the randomness of the survey sample.

**Answer: B**



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**108.** The coordinate of the vertex of a parabola in the  $xy$ -plane are  $(-4, k)$ . If the  $y$ -intercepts of the parabola is 12 and the parabola passes through the point  $(-3, 7)$ , what is the value of  $k$ ?

A.  $\frac{20}{3}$

B.  $\frac{16}{5}$

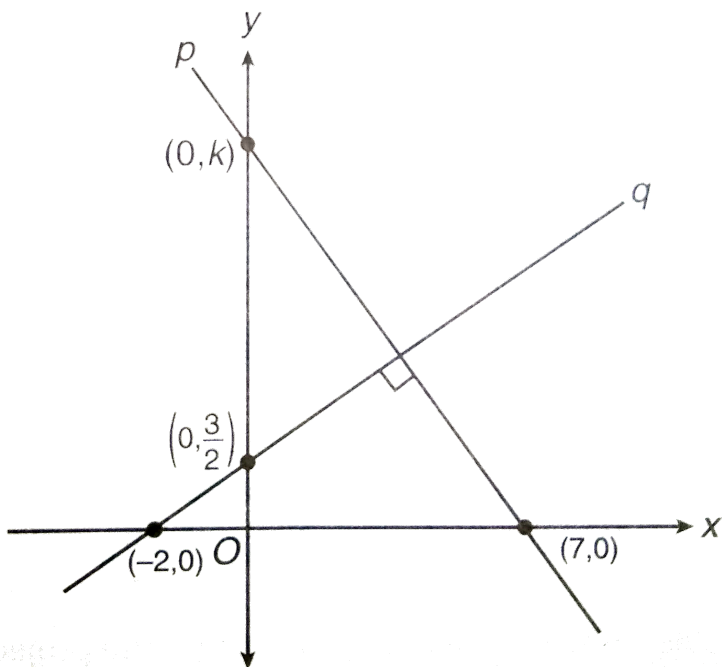
C.  $\frac{14}{3}$

D.  $\frac{12}{5}$

**Answer: A**



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109.

In the  $xy$ -plane above, line  $p$  is perpendicular to line  $q$ .

What is the value of  $k$ ?



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110. Even seconds after a deep sea diver jumps into the ocean he is 69 feet below sea level and 28 seconds

later, he is 195 feet below sea level. If he is descending under water at a constant rate, how many feet below sea level will he be 1.5 minutes after his initial descent?



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111. What is a possible value of  $x$  that satisfies

$$9 < 4x - |-3| < 10$$



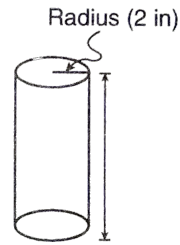
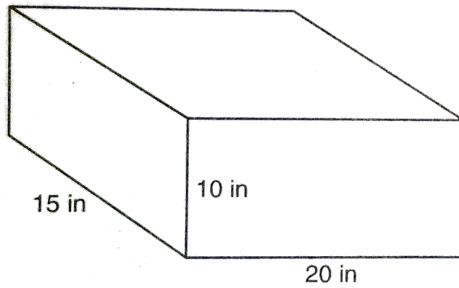
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112. One way of estimating wildlife population of interest is to draw a sample of the population, tag the animals, and then return them to the population.

Then, at a later date, draw another sample at random from the same population and compare the results. An ecologist using this methodology captures, tags, and then returns 198 fish to a lake. Three months later the ecologist captures a sample of 135 of the same type of fish, of which 22 were tagged. What would be the ecologist's best estimate for the number of fish of that type that are in the lake?



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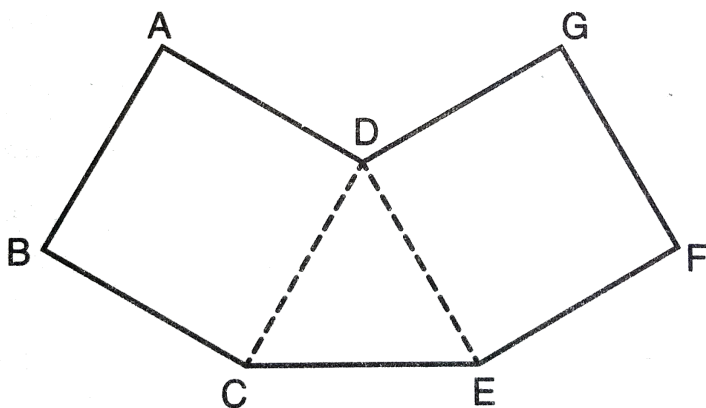


113.

In the figure above, a rectangular container with the dimensions 10 inches by 15 inches by 20 inches is to be filled with water, using a cylindrical cup whose radius is 2 inches and whose height is 5 inches. What is the maximum number of full cups of water that can be placed into the container without the water overflowing the container?



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114.

A sterling silver pendant is being designed to have the shape of polygon  $ABCDEFGD$  shown above where  $ABCD$  and  $EFGD$  are squares and triangle  $CDE$  is equilateral.

If the area of  $\triangle CDE$  is  $\frac{27}{\sqrt{3}}$  square centimeter, what is the total linear distance around the pendant?



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**115.** Questions 37 and 38 refer to the following information.

$$h(t) = -4.9t^2 + 88.2t$$

When a projectile is launched from ground level, the equation above gives the number of meters in its height,  $h$ , after  $t$  seconds have elapsed.

Q. How many seconds after the projectile is launched will it hit the ground?

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**116.** Questions 37 and 38 refer to the following information.



$$h(t) = -4.9t^2 + 88.2t$$

When a projectile is launched from ground level, the equation above gives the number of meters in its height,  $h$ , after  $t$  seconds have elapsed.

Q. What is the maximum height the projectile reaches, correct to the nearest meter?



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## MATH TEST (NO CALCULATOR)

1. If  $3(y-5)=33$ , then  $y+4$  ?

A. 6

B.  $12\frac{2}{3}$

C. 16

D. 20

**Answer: D**



[View Text Solution](#)

2. Consider the following system of equations :

$$x^2 + y^2 - x - y = 10$$

$$x^2 + y^2 - 5x + 3y = 4$$

What is the value of  $2x-2y$  ?

A. 6

B. 5

C. 4

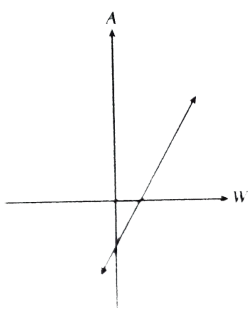
D. 3

**Answer: D**

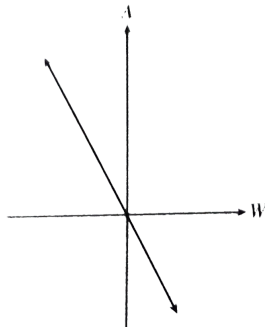


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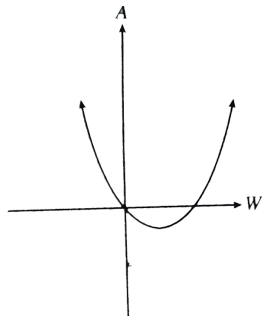
3. The length of a rectangle is 2 ft shorter than twice the width . Which of the following graphs represents the area of the rectangle in terms of its width ?



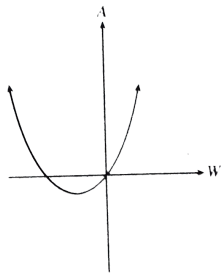
A.



B.



C.



D.

Answer: C



View Text Solution

4. Which of the following is not equivalent to the equation  $\frac{a}{bc} = \frac{d}{ef}$  ?

A.  $\frac{ae}{db} = \frac{c}{f}$

B.  $\frac{af}{d} = \frac{bc}{e}$

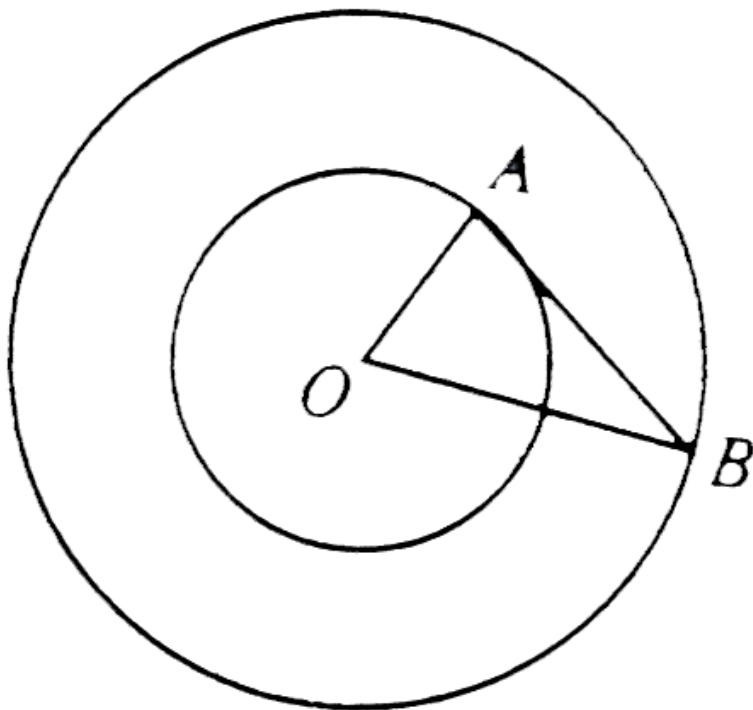
C.  $\frac{a}{d} = \frac{bc}{ef}$

D.  $\frac{ae}{f} = \frac{db}{c}$

Answer: D



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5.

The figure shows two circles with the same center  $O$ .

Line segment  $\overline{AB}$  is tangent to the smaller circle. If

$OA=5$  and  $AB=12$ . what is the ratio of the area of the

smaller circle to the area of the larger circle ?

A. 5: 13

B. 5: 12

C. 25: 169

D. 144: 169

**Answer: C**



**Watch Video Solution**

6. For the equation  $2x-1=-\sqrt{2-x}$ , find the sum of the roots.

A.  $-\frac{1}{4}$

B.  $\frac{1}{2}$

C.  $\frac{3}{4}$

D. 1

**Answer: A**



[View Text Solution](#)

7.  $\frac{15}{x} + \frac{90}{x + 30} = 2$

The equation above represents the following situation. On his way home from college, Juan traveled 15 miles on local roads and 90 miles on the highway. On the highway he traveled 30 miles per hour faster than on local roads. The whole trip took 2 hours.



Which of the following describes what the expression

$$\frac{90}{x + 30}$$

represents in the equation ?

A. The time , in hours , that Juan drove on local roads

B. The time , in hours , that Juan drove on the highway

C. Juan's rate of speed , in miles per hour, on local roads

D. Juan's rate of speed , in miles per hour, on the highway

**Answer: B**





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8. In the complex number, where  $i^2 = -1$ .

$$\frac{i - 1}{i} = ?$$

A.  $-1 - i$

B.  $-1 + i$

C.  $1 + i$

D.  $1 - i$

**Answer: C**



View Text Solution

$x$	$f(x)$	$g(x)$
-1	-2	4
0	0	3
1	2	2
2	4	1
3	6	0
4	8	-1

9.

According to the table above , for what value of  $x$  does

$$g(f(x)) = -1 ?$$

A. 2

B. 3

C. 4

D. 8

**Answer: A**



**View Text Solution**

**10.** An electronics store charges \$24 for a set of stereo headphones and has been selling about 1,000 of them a week. The store manager estimates that for every \$1 price reduction, 100 more headphones can be sold per week. For example, he could sell 1,000 headphones at \$23 each and 1,200 headphones at \$22 each. Let  $24-x$  be the reduced price, in dollars, per set of headphones. Which function best represents the total expected revenue in a week for these headphones?

A.  $f(x)=(24-x)(1,000+100x)$

B.  $f(x)=(x-1)(1,000 + 24x)$

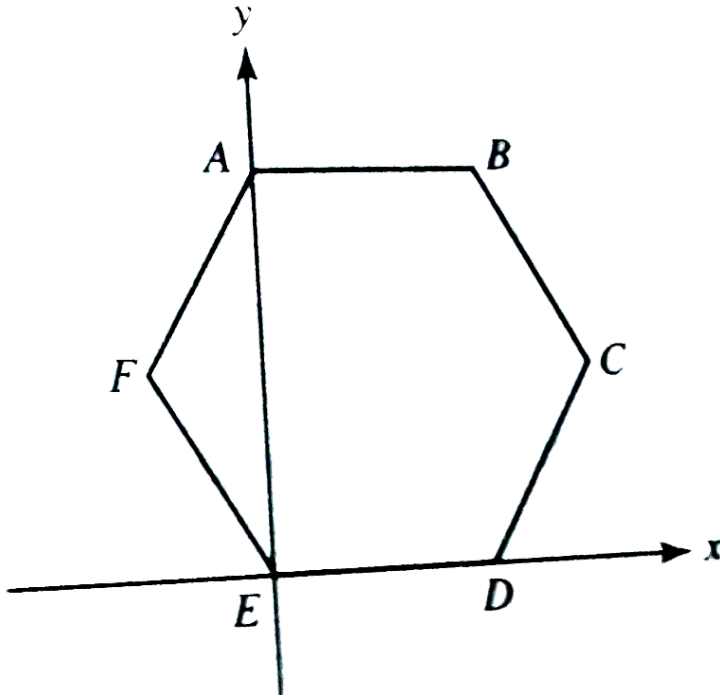
C.  $f(x)=100(24-x) + 1,000$

D.  $f(x)=(24)(1,000 + 100x) -x$

**Answer: A**



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11.

ABCDEF is a regular hexagon . What is the slope of the line containing  $\overline{FE}$  ?

A.  $-\frac{1}{2}$

B.  $-\sqrt{3}$

C.  $-\sqrt{2}$

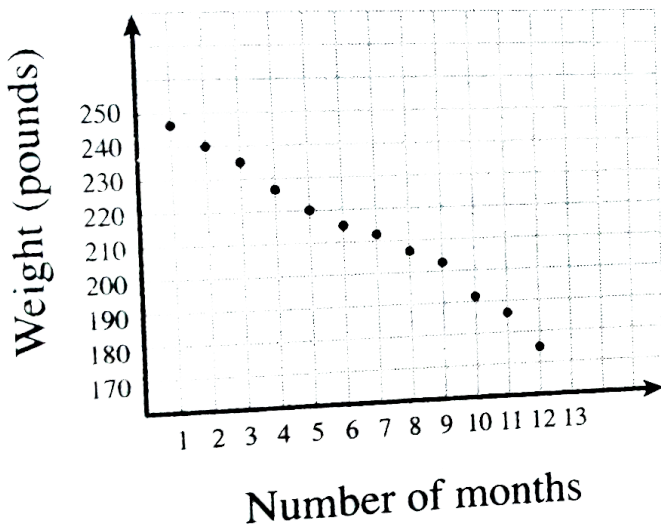
D.  $\sqrt{3}$

Answer: B



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### Weight After Months of Dieting



12.

John joins a program to lose weight. Each month he records the number of months in the program and his

weight at the end of the month. The graph of his progress is shown above.

Which of the following could be the equation of the line that best fits this data ?

A.  $w = -0.159x + 254.3$

B.  $w = 0.159x + 254.5$

C.  $w = 6.28x + 254.5$

D.  $w = -6.28x + 254.5$

**Answer: D**



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13. Which of the following is a root of the equation

$$\frac{x}{x+2} = \frac{3}{x} + \frac{4}{x(x+2)} ?$$

A. 5

B. 2

C. -2

D. 0

**Answer: A**



**View Text Solution**

14. The endpoints of the diameter of a circle are P(6,1) and Q(-4,-5). Which is the equation of the equation of the circle ?

A.  $x^2 + y^2 + 2x - 4y - 29 = 0$

B.  $x^2 + y^2 + 2x - 4y - 131 = 0$

C.  $x^2 + y^2 - 2x + 4y - 29 = 0$

D.  $x^2 + y^2 - 2x + 4y - 131 = 0$

**Answer: C**



**View Text Solution**

15. If  $12+6n$  is 20 percent bigger than  $k$ . what is  $k$  ?

A.  $\frac{12 + 6n}{5}$

B.  $10+5n$

C.  $2+n$

D.  $\frac{6(12 + 6n)}{5}$

**Answer: B**



[View Text Solution](#)

16. If  $\frac{1}{2}x + \frac{1}{5}y = x + 2$ , what is the value of  $2y-5x$  ?

A.  $-10$

B.  $-20$

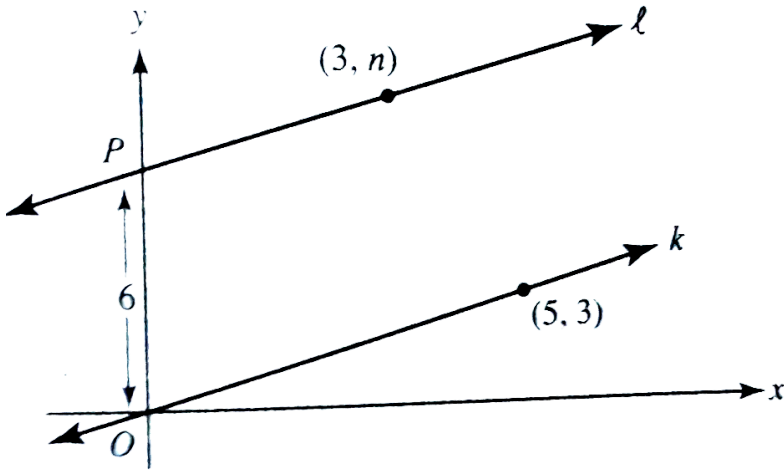
C.  $-15$

D.  $-25$

**Answer: B**



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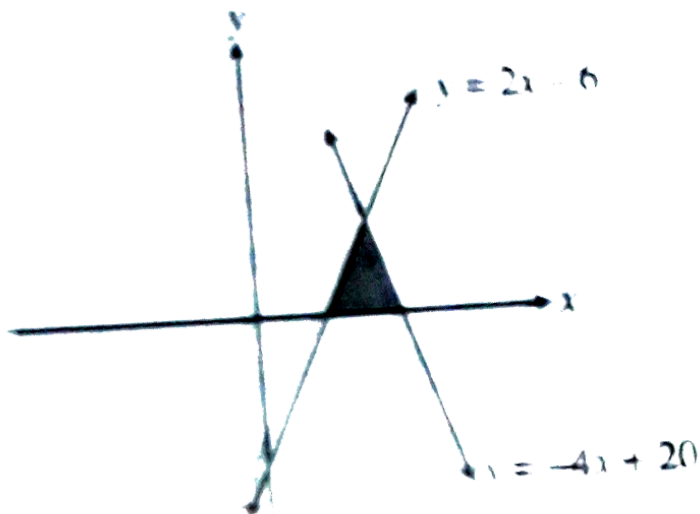
17.

Note: Figure not drawn to scale.

In the  $xy$ -coordinate system shown above, the lines  $l$  and  $k$  are parallel, and distance  $OP$  is 6. If the point  $(5, 3)$  is on line  $k$ , and the point  $(3, n)$  is on line  $l$ . What is the value of  $n$ ?



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18.

Find the area of the triangle that lies in the first quadrant, with its base on the x-axis and that is bounded by the lines  $y=2x-6$  and  $y=-4x+20$  (the shaded area in the diagram shown above).



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$$19. \frac{1}{5}x + \frac{1}{4}y = 2$$

$$px + 2y = 16$$

In the system of linear equations above,  $p$  is a constant. If the system has an infinite number of solutions, what is the value of  $p$ ?

A.  $\frac{8}{5}$

B.  $\frac{5}{8}$

C.  $\frac{3}{5}$

D.  $\frac{1}{8}$

**Answer: A**



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20. if  $2x+y=16$  ,  $x+2z=14$  , and  $2y+z=12$  find the arithmetic mean of  $x, y$  and  $z$ .

A.  $\frac{8}{3}$

B.  $\frac{11}{3}$

C.  $\frac{13}{3}$

D.  $\frac{14}{3}$

**Answer: D**



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**MATH TEST (WITH CALCULATOR)**



1. Jake can type 60 words per minute. If the total number of words typed is  $w$  and the number of hours that he types is  $h$ , which correctly shows the relationship between  $w$  and  $h$  ?

A.  $w=60 h$

B.  $w=3600h$

C.  $\frac{w}{h} = \frac{1}{60}$

D.  $\frac{w}{h} = \frac{1}{3,600}$

**Answer: B**



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2. Which is a solution to the following system of equations ?

$$y + x^2 = 6x - 3$$

$$y - x = 1$$

A. (3,4)

B. (4,5)

C. (5,6)

D. (1,3)

**Answer: B**



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3. In the junior class of a certain school, there are 24 more girls than boys . If the ratio of girls to boys is 5:4. which is the number of girls in the junior class ?

A. 216

B. 144

C. 120

D. 96

**Answer: C**



**Watch Video Solution**

4. Ticket prices for a school play are \$7.50 for students and \$10.00 for adults . For a given performance , 200 tickets were sold , and the performance took in \$1,775. Solving which of the following systems of equations yields the number of student tickets ,  $x$  , and the number of adult ticket ,  $y$ , that were bought for that performance ?

A.  $x+y=200$

$$7.5x+10y=1,775$$

B.  $x+y=1,775$

$$7.5x+10y=200$$

C.  $x+y=200$

$$7.5x + 10y = \frac{1,775}{2}$$

D.  $x+y=1,775$

$$7.5x+10y=(1,775)(2)$$

**Answer: A**



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5. Which is equivalent to  $x^{-\frac{2}{3}}=4$  ?

A.  $x^{\frac{2}{3}} = \frac{1}{4}$

B.  $x^{\frac{2}{3}} = -4$

$$\text{C. } x^{-\frac{2}{3}} = -\frac{1}{4}$$

$$\text{D. } x^{\frac{3}{2}} = \frac{1}{4}$$

**Answer: A**



**Watch Video Solution**

6. A scale drawing of a new building has  $\frac{1}{2}$  inch representing 40 feet . If a conference room has a floor length of 60 feet , what is the floor length , in inches , on the scale drawing ?

A.  $\frac{3}{4}$

B.  $\frac{7}{8}$

C. 1

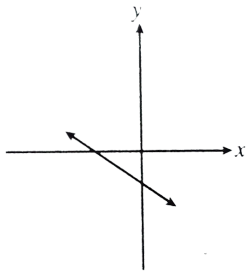
D.  $1\frac{1}{2}$

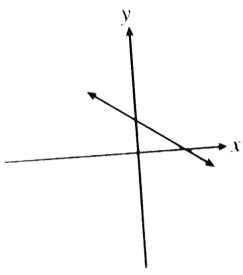
**Answer: A**



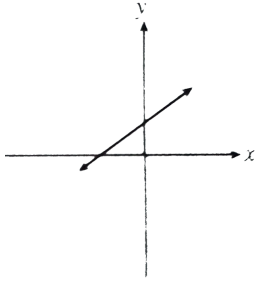
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7. Which of the following could be the graph of  $2x+3y+12=0$  ?

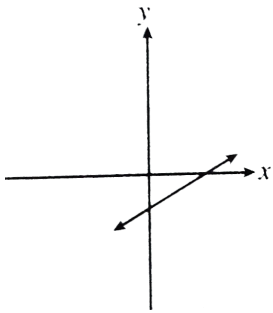




B.



C.



D.

**Answer: A**



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8. One leg of a right triangle is 1 cm shorter than the other leg and the hypotenuse is 2cm longer than the longer leg . What is the length of the longer leg ?

A.  $2 + 2\sqrt{3}$

B.  $3 + 2\sqrt{3}$

C.  $5 + 2\sqrt{3}$

D.  $3 - 2\sqrt{3}$

**Answer: B**



**Watch Video Solution**

9. A cookie store's weekly profit is a function of the number of cookies ,  $c$ , that it sells . The equation approximating the weekly profit , in dollars , is

$$f(c) = 0.60c - 900$$

Which of the following is a false statement about the weekly profits ?

A. The store needs to sell 1,500 cookies per week to break even (i.e., make neither a profit nor a loss).

B. If the store sells no cookies in a week , it will lose \$900.

C. If the equation for weekly profit was  $f(c) = 0.40c - 900$ , the store would need to sell fewer cookies

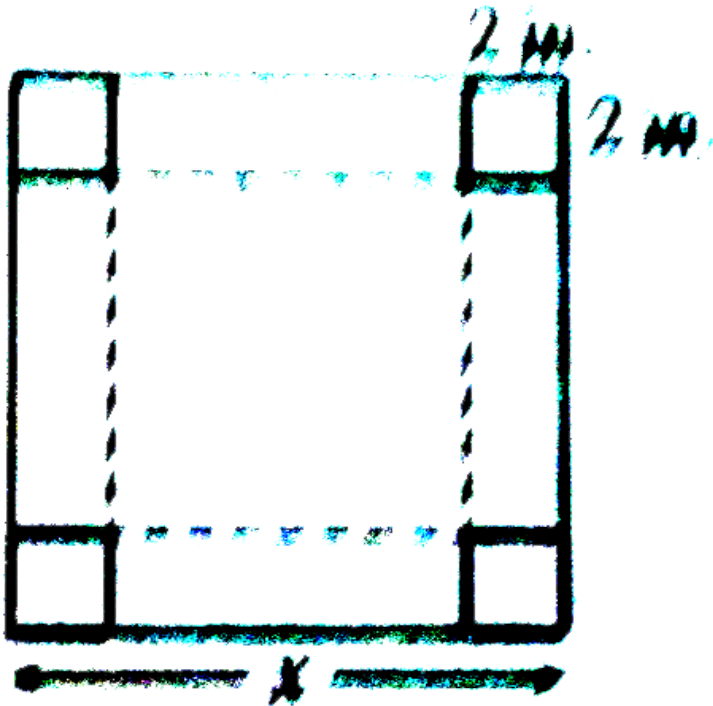
than for the original equation in order to break even.

D. if the equation for weekly profit is  $f(c) = 0.60c - 800$ , the store would need to sell fewer cookies than for the original equation in order to break even.

**Answer: C**



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10.

A square piece of cardboard measuring  $x$  inches by  $x$  inches is to be used to form an open box by cutting off 2-inch squares, and then folding the sides up along the dotted lines, as shown in the figure above.

If  $x$  is an integer, and the volume of the box must be

greater than 128 cubic inches , what is the smallest value of  $x$  that can be used ?

A. 6

B. 8

C. 10

D. 13

**Answer: D**



**Watch Video Solution**

**11.** If the line  $y+2x+3=0$  is parallel to the line  $2y-px-4=0$  , what is the value of  $p$  ?

A.  $-4$

B.  $-2$

C.  $2$

D.  $4$

**Answer: A**



**Watch Video Solution**

**12.** The original price of a shirt is  $x$  dollars. During a sale, the original price is marked down  $y$  percent. On the last day of the sale, an additional discount of  $z$  percent off the sale price is offered. Which of the

following represents the price of the shirt , in dollars ,  
after the additional discount ?

A.  $\frac{xyz}{(100)(100)}$

B.  $\frac{x(1 - y)(1 - z)}{100}$

C.  $x \left(1 - \frac{y}{100}\right) \left(1 - \frac{z}{100}\right)$

D.  $x \left(1 - \frac{y + z}{100}\right)$

**Answer: C**



**View Text Solution**

**13.** A certain radioactive element has a half-life of one year. This means that after 1 year, 1 gram of the

element has decayed to  $\frac{1}{2}$  gram, after 2 years the weight is  $\left(\frac{1}{2}\right)\left(\frac{1}{2}\right) = \left(\frac{1}{4}\right)$  grams, after 3 years the weight is  $\left(\frac{1}{4}\right)\left(\frac{1}{2}\right) = \left(\frac{1}{8}\right)$  grams, and so on.

Which of the following represents the weight of the sample as a function of time  $x$  ?

A.  $f(x) = \frac{1}{2}x$

B.  $f(x) = x^{-2}$

C.  $f(x) = 2^x$

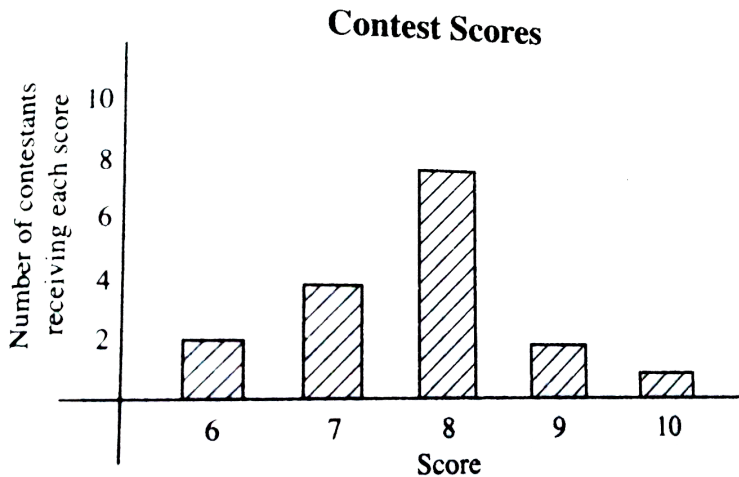
D.  $f(x) = 2^{-x}$

**Answer: D**



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14.

In a contest , each contestant could receive a score of 6,7,8,9, or 10. The bar graph above shows how many contestants received each score .

The score of 8 is described by which of the following measures ?

I.The average (arithmetic mean )

II.The median

III.The mode

A. I only

B. II only

C. III only

D. II and III only

**Answer: D**



**Watch Video Solution**

**15.** An office buys a photocopier for \$5,800 with a servicing fee of \$25 a month. Each copy costs 3 cents. The office makes about 8,000 copies per month. A formula for the approximate cost  $C$  of buying and using the copier for  $n$  months is

A.  $c=5,800+240n$

B.  $C=5,800+265 n$

C.  $C=5,800+2,400 n$

D.  $C=5,800+2.425 n$

**Answer: B**



**Watch Video Solution**

**16.** Hooke's law states that the force needed to keep a spring stretched  $x$  units beyond its natural length is directly proportional to  $x$ . if a spring has a natural length of 10 cm, and a force of 40 N (newtons) is required to keep the spring stretched to a length to 15

cm , what force , in newtons, will be needed to keep the spring stretched to a length of 14 cm ?

A. 8

B. 32

C. 37.3

D. 50

**Answer: B**



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**17.** The monthly cost  $C$  of driving a car depends on the number of miles driven  $D$ . Jo found that in November

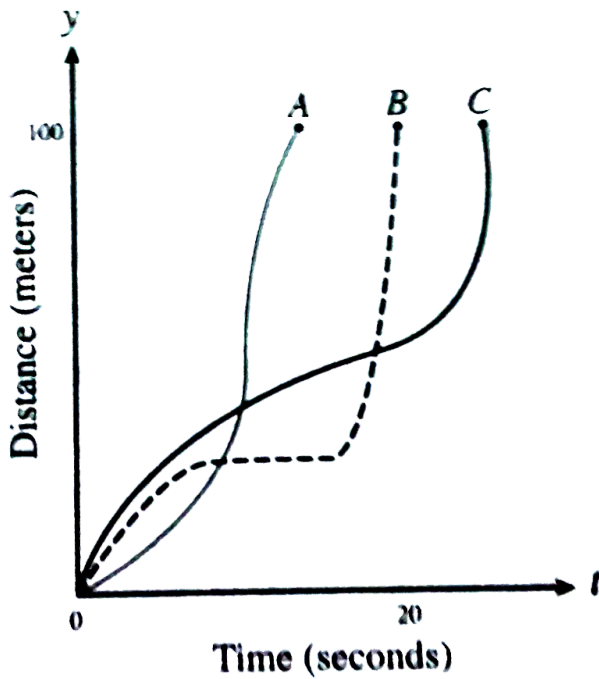
her cost of driving was \$380 for 480 miles, and in December her cost was \$460 for 800 miles. If the relationship between C and D is linear, what does the slope of the line, with C as a function of D, represent?

- A. The cost per mile
- B. The cost for 320 miles
- C. The distance driven per dollar
- D. The distance driven for \$80.

**Answer: A**



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18.

Three runners complete in a 100-meter obstacle race. The graph above depicts the distance run as a function of time for each runner . Which is not a valid conclusion ?

A. Runner A won the race

B. Runner B fell, then got up and completed the race

C. Each of the runners , A , B and C completed the race.

D. Runner C was ahead of runners A and B for a least half of the distance run.

**Answer: D**



**Watch Video Solution**

Price	Frequency
\$3.50–\$3.59	1
\$3.40–\$3.49	2
\$3.30–\$3.39	3
\$3.20–\$3.29	7
\$3.10–\$3.19	1
\$3.00–\$3.09	0
\$2.90–\$2.99	1

19.

The frequency chart above shows the prices of a gallon of milk in 15 stores in Tompkins County in 2010.

Which of the following is a true statement about the data ?

A. The mode of the milk prices is \$3.25

B. The median price of a gallon of milk is \$3.25



C. The median price of a gallon of milk is in the range \$3.20-\$3.29

D. The mean price of a gallon of milk of \$3.25

**Answer: C**



**View Text Solution**

**20.**  $0.06x + 0.045(100,000-x)=5,025$

The equation above represents the following situation: John inherits \$100,000 and invests it in two certificates of deposit. One pay 4.5% simple interest annually , and an investment with higher penalties for early withdrawal pays 6% simple interest annually.

John's total interest from these investments is \$5,025 at the end of the first year.

Suppose John invested  $x$  dollars at 6% . Which of the following describes what the expression  $0.045(100,000-x)$  represents in the equation ?

- A. The portion of the inheritance invested at 4.5%
- B. 4.5% of \$100,000
- C. The amount of interest earned from the 6% investment
- D. The amount of interest earned from the 4.5% investment

**Answer: D**



21. As dry air moves upward , it expands and cools. If the temperature on the ground is  $20^{\circ}$  C and the temperature at a height of 1 km is  $10^{\circ}$  C, which of the following linear models best describes the temperature  $t$  in degrees C at a height of  $h$  km above the ground ?

A.  $t = -\frac{1}{10}h + 20$

B.  $t = \frac{1}{10}h + 20$

C.  $t = -10h + 20$

D.  $t = 10h + 20$

**Answer: C**



**Watch Video Solution**

22. If the expression  $\frac{3x^2}{x+2}$  is written in the equivalent form  $\frac{12}{x+2} + A$ , what is A in terms of x?

A.  $3x-6$

B.  $3x+6$

C.  $3x^2$

D.  $3x^2 - 1$

**Answer: A**



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23. Because of anticipated heavy rain , the water level in a swimming pool must be lowered by 1 foot . Opening drain A lowers the level by 1 foot in 4 hours , whereas opening the smaller drain B does the job in 6 hours . How long will it take to lower the water level by 1 foot if both drains are opened ?

An equation that solves the problem is

A.  $\frac{1}{4} + \frac{1}{6} = \frac{1}{x}$

B.  $\frac{4}{x} + \frac{6}{x} = 1$

C.  $\frac{x}{4} + \frac{x}{6} = x - 1$

D.  $\frac{1}{4} + \frac{1}{6} = x$

Answer: A



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Flow Rate (%)	Mosquito Positive Rate (%)
0	22
10	16
40	12
60	11
90	6
100	2

24.

The table above shows the relative abundance of mosquitoes (as measured by the mosquito positive rate ) versus the flow rate (measured as a percentage

of maximum flow ) of a river in China .

Which of the following is a valid conclusion from the data ?

A. The faster the river flows , the greater the abundance of mosquitoes

B. When the flow rate of the river is about half its maximum , the mosquito positive rate is between 11 and 12 percent .

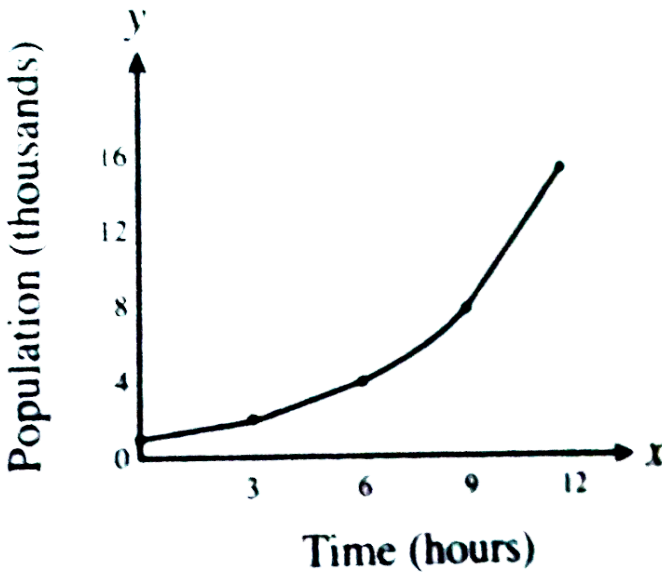
C. At minimum flow rate , the mosquito population is close to 0

D. At maximum flow rate , just 2 mosquitoes were observed.

Answer: B



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25.

The graph above shows the size of a certain population after time  $t$ . Which of the following equations correctly shows  $y$  as a function of  $t$ ?



A.  $y = t^3$

B.  $y = 1.000 - 2^{\frac{t}{3}}$

C.  $y = 3t^2$

D.  $y=1,000t-2,000$

**Answer: B**



**Watch Video Solution**

**26.** A circle with center (2,1) has a tangent to the circle at (3,6). The equation of the tangent is

A.  $5y-x=27$

B.  $y+5x=21$

C.  $x+5y=21$

D.  $5y+x=33$

**Answer: D**



**View Text Solution**

27. A research study was conducted to determine whether a certain electrical implant, I, is successful in improving hearing . From a large population of people with hearing loss, 400 participants were selected at random. Half were randomly selected to receive the implant and the other half did not receive the implant . The resulting data showed that people who received

the implant had significantly improved hearing compared to those who did not receive the implant.

Based on the study , which of the following is an appropriate conclusion ?

A. Electrical implant I is likely to improve the hearing of people who have hearing loss.

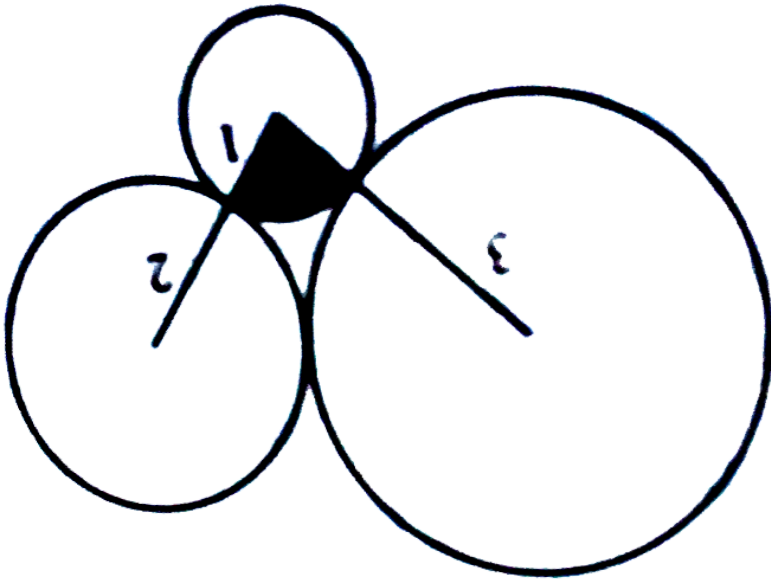
B. Electrical implant I is likely to improve the hearing of all people who have the implant.

C. Electrical implant I is better than other treatments for hearing loss.

D. Electrical implant I will cause a substantial improvement in hearing.

Answer: A

 Watch Video Solution



28.

Three circles with radii 1, 2 and 3 inches are externally tangent to one another, as shown in the figure above. The area, in square inches, of the sector of the circle

of radius 1 that is cut off by the line segments joining the center of that circle to the centers of the other two circles (the shaded area ) is

A.  $\pi$

B.  $\frac{\pi}{2}$

C.  $\frac{\pi}{3}$

D.  $\frac{\pi}{4}$

**Answer: D**



**Watch Video Solution**

29. If the value , to the nearest thousandth , of  $\tan \theta$  is -2.747, which of the following could be true about  $\theta$  ?

A.  $0 < \theta < \frac{\pi}{4}$

B.  $\frac{\pi}{4} < \theta < \frac{\pi}{2}$

C.  $\frac{\pi}{2} < \theta < \frac{3\pi}{4}$

D.  $\frac{5\pi}{4} < \theta < \frac{3\pi}{2}$

**Answer: C**



**Watch Video Solution**

**30.** The weight of an object on or beneath the surface of the moon varies directly as its distance from the center of the moon, assuming that the moon has uniform density . The radius of the moon is approximately 1,080 miles. If an object weighs 60 pounds on the surface of the moon, how far beneath the surface, in miles , would it have to be to weigh 50 pounds ?



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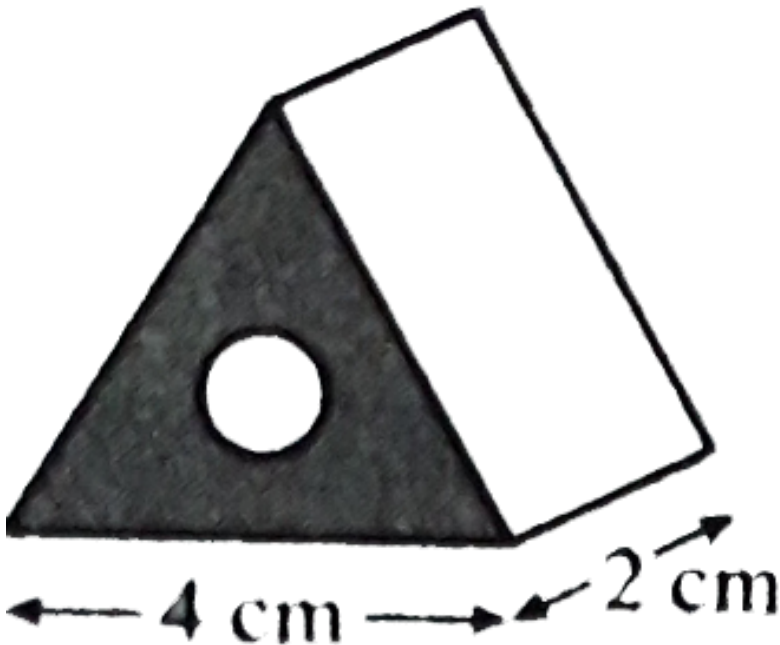
**31.** The function  $f$  is defined by

$$f(x) = \frac{1}{3}(x^3 + x^2 - 11x - 3) .$$

If  $p_1$ ,  $p_2$  and  $p_3$  are the zeros of  $f(x)$ . Find the product  $p_1p_2p_3$  to the nearest integer.



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32.

The figure above shows a metal triangular solid with



two equilateral triangle faces and a thickness of 2 cm. The length of each side of a triangular face is 4 cm. A hole with a diameter of 1 cm is drilled through the solid. The density of the metal is 6 grams per cubic centimeter . What is the mass of this solid to the nearest gram ? (Density is mass divided by volume ).



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**33.** For a new car, the gas mileage in terms of its speed  $x$  is modeled by the function  $G(x) = -\frac{1}{28}x^2 + 3x - 31$  , where  $15 \leq x \leq 90$ , and  $x$  is speed in miles per hour and  $G$  is miles per

gallon. At what speed, in miles per hour, does the car attain its best gas mileage ?



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**34.** Mrs. Yang spends \$3.00 a day on cookies for her family at a local supermarket . When the price of a cookie increased by 10 cents , the number of cookies she bought decreased by 1. What was the original price , in dollars , of a cookie ?



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												Total
Absences	10	9	8	7	6	5	4	3	2	1	0	
Frequency	2	1	4	8	5	15	12	18	26	37	12	140

35.

The student attendance record for a class in a one-semester course is shown above. If 2 students are chosen at random, what is the probability, to the nearest hundredth, that both students have fewer than 2 absences?



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36. A juice manufacturer advertises its apple drink as "natural". Even though it contains only 5% apple juice. A new regulation stipulates that to use "natural" on

the label , a drink must contain at least 10% fruit juice .

How many gallons of pure apple juice must this manufacturer add to 900 gallons of its apple drink to satisfy the new regulation ?



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**37.** A juice manufacturer advertises its apple drink as "natural" . Even though it contains only 5% apple juice . A new regulation stipulates that to use "natural" on the label , a drink must contain at least 10% fruit juice . The minimum daily requirement of Vitamin C for teenagers is 70 mg. If one ounce of pure apple juice contains 0.31 mg of Vitamin C , what percent of the

daily requirement does a teenager get by drinking an 8-ounce cup of the apple drink that contains 10% pure apple juice ?



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## EXERCISE

1. Which of the following expression is equivalent to

$$a(4 - a) - 5(a + 7)?$$

A.  $-2a - 35$

B.  $-2a + 7$

C.  $-a^2 - a - 35$

D.  $-a^2 - a + 7$

**Answer: C**



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2. Which of the following inequalities orders the numbers 0.2, 0.03 and  $\frac{1}{4}$  from least to greater?

A.  $0.2 < 0.03 < 1.4$

B.  $0.03 < 0.2 < \frac{1}{4}$

C.  $0.03 < \frac{1}{4} < 0.2$

D.  $\frac{1}{4} < 0.03 < 0.2$

**Answer: B**



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3. If  $x^2 + 4 = 29$ , then  $x^2 - 4 = ?$

A. 5

B.  $\sqrt{21}$

C. 21

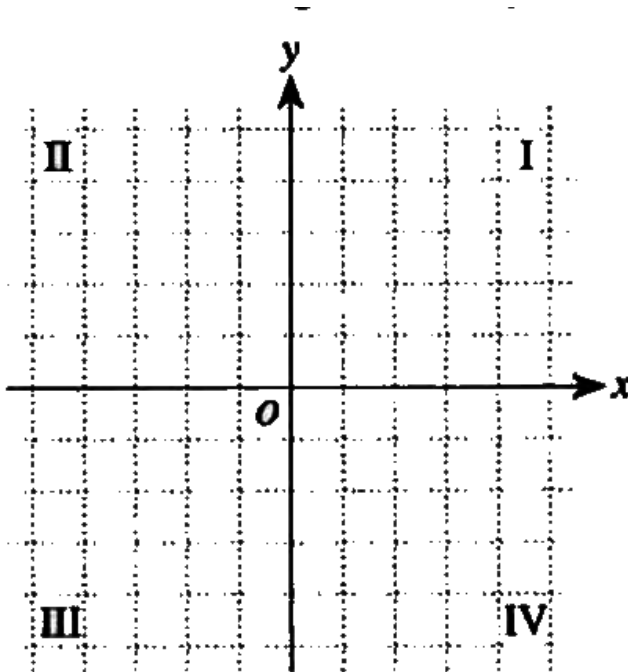
D. 25

**Answer: C**



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4. The vertices of a rectangle are  $(-1, -2)$ ,  $(4, 2)$ ,  $(4, 3)$  and  $(-1, 3)$ . When the rectangle is graphed in the standard  $(x, y)$  coordinate plane below, what percent of the total area of the rectangle lies in Quadrant III?





B. 0.12

C. 0.125

D. 0.32

**Answer: A**



**View Text Solution**

5. In 1985, the cost of clothing for a certain family was \$620. In 1995, 10 years later, the cost of clothing for this family was \$ 1,000. Assuming the cost increased linearly, what was the cost of this family's clothing in 1991?

A. \$908

B. \$848

C. \$812

D. \$810

**Answer: B**



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6. The square root of a certain number is approximately 9.2371. The certain number is between what 2 intergers?

A. 3 and 4

B. 4 and 5

C. 9 and 10

D. 81 and 99

**Answer: D**



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7. A bag contains 10 pieces of flavored candy: 4 lemon, 3 strawberry, 2 grape, and 1 cherry. One piece of candy will be randomly picked from the bag. What is the probability the candy picked is Not grape flavoured?

A.  $\frac{1}{5}$

B.  $\frac{1}{4}$

C.  $\frac{1}{2}$

D.  $\frac{4}{5}$

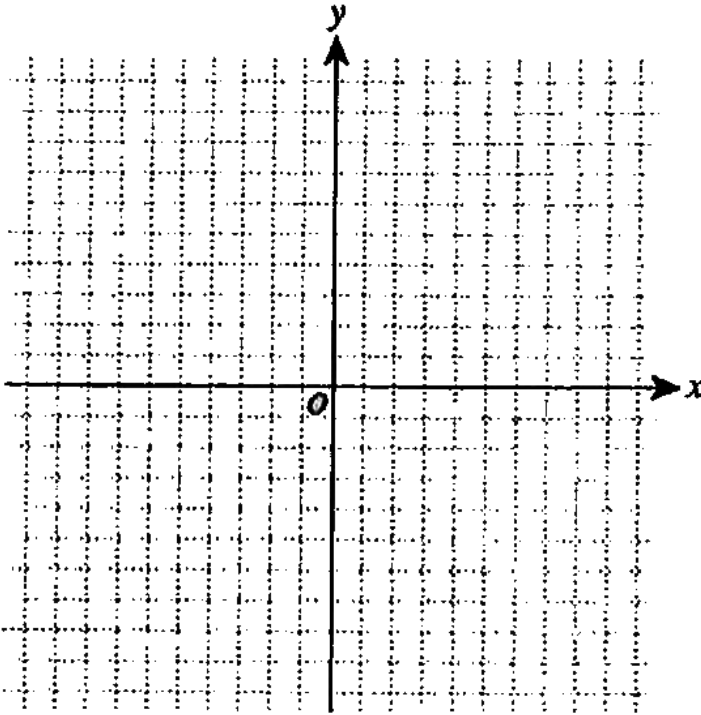
**Answer: D**



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8. When points A and B (-3, 4) are graphed in the standard (x,y) coordinate plane below, the midpoint of  $\overline{AB}$  will be (1, 2). What will be the coordinate of point

A?



$(-7, 6)$

A.  $(-7, 6)$

B.  $(-2, 1)$

C.  $(-1, 3)$

D.  $(5, 0)$

**Answer: D**



**View Text Solution**

9. Andrea manages a company that currently has 116 customers, which is 8 more than twice the number of customers the company had 1 year ago. How many customers did the company had 1 year ago. How many customers did the company have 1 year ago?

A. 50

B. 54

C. 62

D. 66

**Answer: B**



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**10.** Joseph will have a 200-foot-long fence installed around his yard. The A+ Fence Company charges a \$500.00 fee, plus a set amount per foot of fence. The A+ Fence Company has given Joseph an estimate of \$2,200.00 to install the fence around his yard. What is the set amount per foot of fence?

A. \$ 4.00

B. \$ 4.80

C. \$ 8.50

D. \$ 11.00

**Answer: C**



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**11.** For a math homework assignment, Kerla found the area and perimeter of a room of her house. She reported that the area of her rectangular living room is 180 square feet and that the perimeter is 54 feet. When drawing a sketch of her living room the next day, she realized that she had forgotten to write down the dimensions of the room. What are the dimensions of Karla's living room, in feet?



A. 9 by 20

B. 10 by 18

C. 12 by 15

D. 14 by 13

**Answer: C**



**View Text Solution**

**12.** Carrie's Chocolate shop and Tamika's Treat Shop both sell candy in boxes. The table below lists the price (the total amount the customer pays) of each box of candy sold at the shops. For each shop, there is a linear relationship between the price of a box of

candies and the number of candies in the box. These are the only numbers of candies that can be purchased at the shops.

Candies per box ( $n$ )	Price at Carrie's Chocolate Shop ( $c$ )	Price at Tamika's Treat Shop ( $t$ )
5	\$1.50	\$2.25
10	\$2.50	\$2.75
15	\$3.50	\$3.25
20	\$4.50	\$3.75
25	\$5.50	\$4.25
30	\$6.50	\$4.75

Jeremy has \$ 10.00 in quarters to spend on candy. What is the maximum number of quarters he would have left after paying for a box 25 candies at Tamika's treat Shop?

(Note: Each quarter is worth \$ 0.25)

A. 10

B. 17

C. 22

D. 23

**Answer: D**



**Watch Video Solution**

**13.** Carrie's Chocolate shop and Tamika's Treat Shop both sell candy in boxes. The table below lists the price (the total amount the customer pays) of each box of candy sold at the shops. For each shop, there is a linear relationship between the price of a box of candies and the number of candies in the box. These

are the only numbers of candies that can be purchased at the shops.

<b>Candies per box (<i>n</i>)</b>	<b>Price at Carrie's Chocolate Shop (<i>c</i>)</b>	<b>Price at Tamika's Treat Shop (<i>t</i>)</b>
5	\$1.50	\$2.25
10	\$2.50	\$2.75
15	\$3.50	\$3.25
20	\$4.50	\$3.75
25	\$5.50	\$4.25
30	\$6.50	\$4.75

At Tamika's Treat Shop. What is the average price per candy in a box of 20, to the nearest \$0.01 ?

- A. \$0.08
- B. \$0.19
- C. \$0.23
- D. \$0.30

**Answer: B**



**Watch Video Solution**

**14.** Carrie's Chocolate shop and Tamika's Treat Shop both sell candy in boxes. The table below lists the price (the total amount the customer pays) of each box of candy sold at the shops. For each shop, there is a linear relationship between the price of a box of candies and the number of candies in the box. These are the only numbers of candies that can be purchased at the shops.

Candies per box ( $n$ )	Price at Carrie's Chocolate Shop ( $c$ )	Price at Tamika's Treat Shop ( $t$ )
5	\$1.50	\$2.25
10	\$2.50	\$2.75
15	\$3.50	\$3.25
20	\$4.50	\$3.75
25	\$5.50	\$4.25
30	\$6.50	\$4.75

Which of the following equation gives the relationship between the price in dollars ,  $c$ , and the number of candies , $n$ , in a box of candies at Carrie's chocolate shop ?

A.  $c = 0.2n + 0.5$

B.  $c = 0.3n$

C.  $c = 0.5n + 1.5$

D.  $c = n - 3.5$

**Answer: A**



**Watch Video Solution**

**15.** Which of the following is a solution to the equation

$$x^2 - 36x = 0?$$

A. 72

B. 36

C. 18

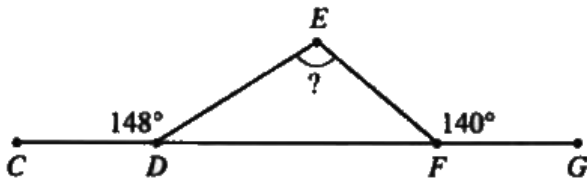
D. 6

**Answer: B**



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16. In the figure below, vertices  $D$  and  $F$  of  $\triangle DEF$  lie on  $\overline{CG}$ , the measure of  $\angle CDE$  is  $148^\circ$ , and the measure of  $\angle EFG$  is  $140^\circ$ . What is the measure of  $\angle DEF$ ?



- A.  $72^\circ$
- B.  $98^\circ$
- C.  $100^\circ$
- D.  $108^\circ$



**Answer: D**



**Watch Video Solution**

**17.** A company ships notepads in rectangular boxes that each have inside dimensions measuring 9 inches long, 9 inches wide, and 12 inches tall. Each notepad is in the shape of a cube with an edge length of 3 inches. What is the maximum number of notepads that will fit in 1 closed box?

A. 10

B. 11

C. 12

D. 36

**Answer: D**



**View Text Solution**

**18.** The function  $f$  is defined as  $f(x) = -4x^3 - 4x^2$ .

What is  $f(-4)$ ?

A.  $-320$

B.  $-192$

C.  $16$

D.  $192$

**Answer: D**



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**19.** Which of the following  $(x,y)$  pairs is the solution for the system of equations

$$x + 2y = 4 \text{ and } -2x + y = 7?$$

A.  $(-2,3)$

B.  $(-1,2,5)$

C.  $(1,1,5)$

D.  $(2,1)$

**Answer: A**



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20. Which of the following is a value of  $x$  that satisfies

$$\log_x 36 = 2?$$

A. 4

B. 6

C. 8

D. 16

**Answer: B**



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21. A 5-inch-by-7-inch photograph was cut to fit exactly into a 4-inches-by-6- inch frame. What is the area, in square inches, of the part of the photograph that was cut off?

A. 2

B. 10

C. 11

D. 12

**Answer: C**



**Watch Video Solution**

22. A line contains the points A,B,C and D. Point B is between points A and C. Point D is between points C and B. Which of the following inequalities must be true about lengths of these segments?

A.  $BC < AB$

B.  $BD < AB$

C.  $BD < CD$

D.  $CD < BC$

**Answer: D**



**Watch Video Solution**

23. If  $x$  and  $y$  are positive integers such that the greatest common factor of  $x^2y^2$  and  $xy^3$  is 45, then which of the following could  $y$  equal?

A. 45

B. 15

C. 9

D. 3



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24. To test a new medicine, each of 300 volunteers was assigned a distinct number from 1 to 300. Next, a

calculator was used to simulate drawing 150 balls from among 300 congruent balls. The balls were numbered the same way as the volunteers so that 150 volunteers to receive the new medication would be chosen without bias. The other volunteers received a placebo. Weeks later, the 2 groups were compared. Which of the following phrases best describes the company's testing?

- A. Randomized census
- B. Randomized experiments
- C. Nonrandomized experiments
- D. Randomized sample survey

**Answer: B**





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25. One cautions sign flashes every 4 second, and another caution sign flashes every 10 seconds. At a certain instant, the 2 signs flash at the same time. How many seconds elapse until the 2 sign next flash at the same time?

A. 6

B. 7

C. 14

D. 20

**Answer: D**



[View Text Solution](#)

26. For all nonzero values of  $a$  and  $b$ , the value of which of the following expressions is always negative?

A.  $a - b$

B.  $-a - b$

C.  $|a| + |b|$

D.  $-|a| - |b|$

**Answer: D**



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27. Graphed in the same standard  $(x,y)$  coordinate plane are a circle and a parabola. The circle has radius 3 and centre  $(0,0)$ . The parabola has vertex  $(-3,-2)$ , has a vertical axis of symmetry, and passes through  $(-2,-1)$ . The circle and the parabola intersect at how many points?

A. 0

B. 1

C. 2

D. 3

**Answer: C**



**Watch Video Solution**

28. 40% of 250 is equal to 60% of what number?

A. 150

B. 160

C.  $166\frac{2}{3}$

D. 270

**Answer: C**



**Watch Video Solution**

29. Which of the following inequalities is equivalent to

$$-2x - 6y > 2y - 4?$$

A.  $x < -4y + 2$

B.  $x > -4y + 2$

C.  $x < 2y + 2$

D.  $x < 4y + 2$

**Answer: A**



**Watch Video Solution**

30. For an angle with measure  $\alpha$  in a right triangle,

$\sin \alpha = \frac{40}{41}$  and  $\tan \alpha = \frac{40}{9}$ . What is the value of

$\cos \alpha$  ?

A.  $\frac{9}{41}$

B.  $\frac{41}{9}$

C.  $\frac{9}{40}$

D.  $\frac{9}{\sqrt{.519}}$

**Answer: A**



**View Text Solution**

31. The perimeter of rectangle ABCD is 96 cm. The ratio of the side lengths AB : BC is 3:5. What is the length, in centimeters of  $\overline{AB}$ ?

A. 6

B. 18

C. 30

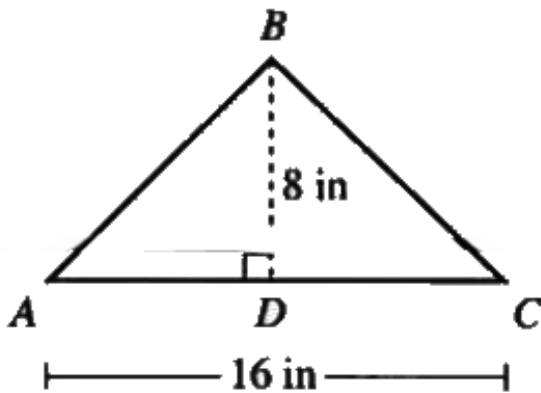
D. 36

**Answer: B**



**View Text Solution**

32. For  $\triangle ABC$  shown below, base  $\overline{AC}$  has a length of 16 inches and altitude  $\overline{BD}$  has a length of 8 inches. The area of a certain square is equal to the area of  $\triangle ABC$ . What is the length, in inches, of a side of the square?



- A. 6
- B. 8
- C. 12



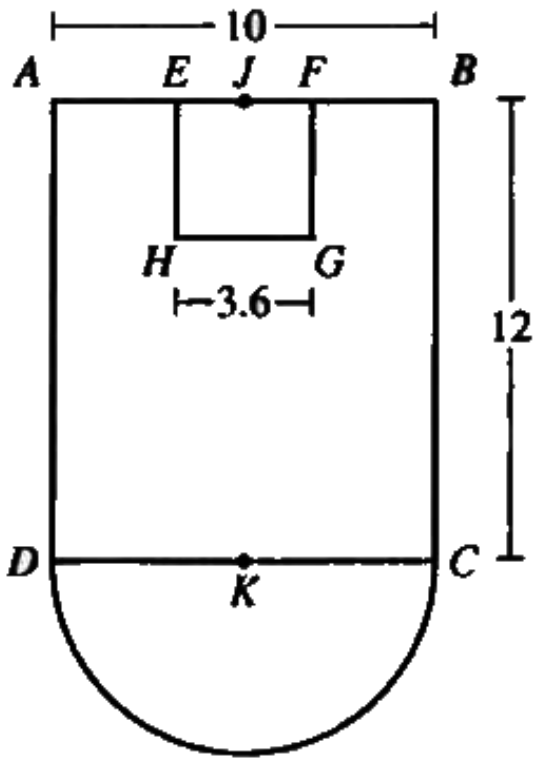
D. 16

**Answer: B**



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**33.** In the figure below,  $ABCD$  is a rectangle,  $EFGH$  is a square, and  $\overline{CD}$  is a diameter of a semicircle. Point  $K$  is the midpoint of  $\overline{CD}$ . Point  $J$  is the midpoint of both  $\overline{AB}$  and  $\overline{EF}$ . Points  $E$  and  $F$  lie on  $\overline{AB}$ . The 3 given lengths are in meters.



The length of  $\overline{EH}$  is what percent of the length of  $\overline{AD}$

?

A. 0.156

B. 0.3

C. 0.36

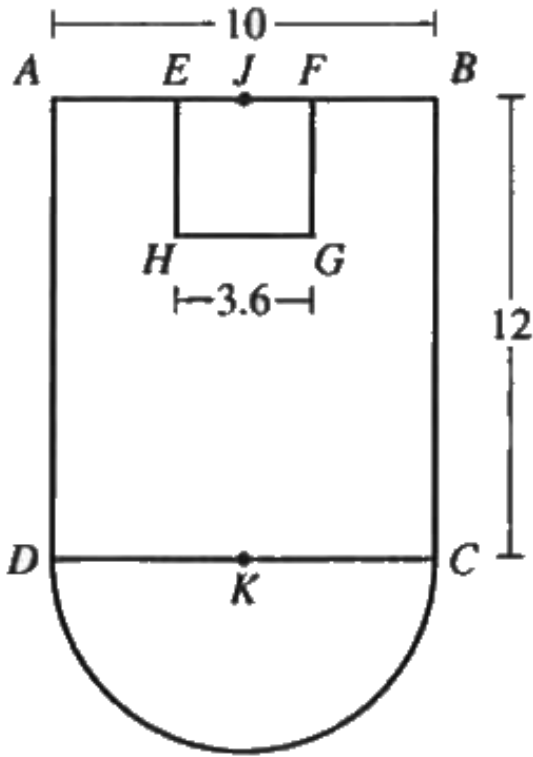
D. 0.432

**Answer: B**



**Watch Video Solution**

**34.** In the figure below,  $ABCD$  is a rectangle,  $EFGH$  is a square, and  $\overline{CD}$  is a diameter of a semicircle. Point  $K$  is the midpoint of  $\overline{CD}$ . Point  $J$  is the midpoint of both  $\overline{AB}$  and  $\overline{EF}$ . Points  $E$  and  $F$  lie on  $\overline{AB}$ . The 3 given lengths are in meters.



What is the length, in meters, of  $\overline{JD}$ ?

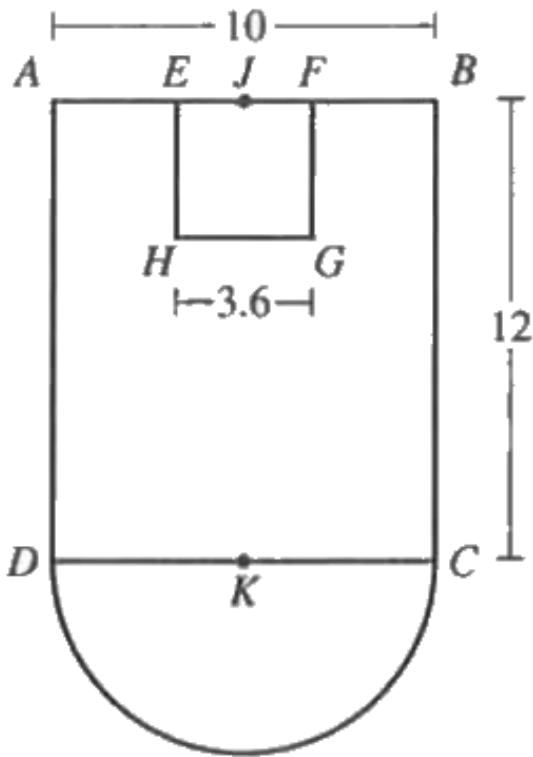
- A. 13
- B. 15.6
- C. 17
- D.  $\sqrt{44}$

**Answer: A**



**Watch Video Solution**

**35.** In the figure below,  $ABCD$  is a rectangle,  $EFGH$  is a square, and  $\overline{CD}$  is a diameter of a semicircle. Point  $K$  is the midpoint of  $\overline{CD}$ . Point  $J$  is the midpoint of both  $\overline{AB}$  and  $\overline{EF}$ . Points  $E$  and  $F$  lie on  $\overline{AB}$ . The 3 given lengths are in meters.



What is the length, in meters, of arc  $\overline{CD}$ ?

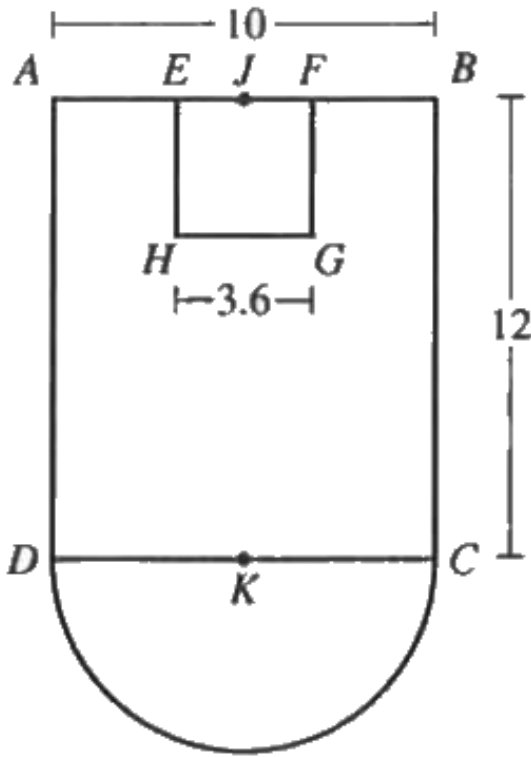
- A.  $2.5\pi$
- B.  $5\pi$
- C.  $6.25\pi$
- D.  $10\pi$

**Answer: B**



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**36.** In the figure below,  $ABCD$  is a rectangle,  $EFGH$  is a square, and  $\overline{CD}$  is a diameter of a semicircle. Point  $K$  is the midpoint of  $\overline{CD}$ . Point  $J$  is the midpoint of both  $\overline{AB}$  and  $\overline{EF}$ . Points  $E$  and  $F$  lie on  $\overline{AB}$ . The 3 given lengths are in meters.



The figure will be placed in the standard  $(x,y)$  coordinate plane so that  $K$  is at the origin,  $\overline{AB}$  is parallel to the  $x$ -axis, and 1 meter equal 1 coordinates unit. Which of the following values could be the  $y$ -coordinate of  $H$ ?

A. 1.8



B. 3.6

C. 8.4

D. 10

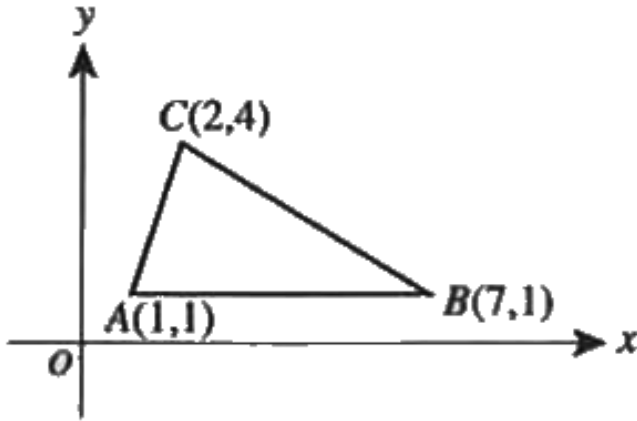
**Answer: C**



**Watch Video Solution**

**37.** What is the length in coordinate units, of the altitude from  $C$  to  $\overline{AB}$  in  $\triangle ABC$  shown in the

standard (x,y) coordinate plane below?



A. 3

B. 5

C. 6

D.  $\sqrt{10}$

**Answer: A**



**Watch Video Solution**

**38.** At a local post office, on average , 3 customers are in line when the post office closes each day. The probability  $P$ , that exactly  $n$  customers are in line when the post office closes can be modeled by the equation  $P = \frac{3^n e^{-3}}{n!}$ . Given that  $e^{-3} = 0.05$ . Which of the following values is closest to the probability that exactly 2 customers are in line when the post office closes?

A. 0.08

B. 0.11

C. 0.15

D. 0.23

**Answer: D**



**Watch Video Solution**

**39.** What is the amplitude of the function

$$f(x) = \frac{1}{2} \cos(3x + \pi)?$$

A.  $\frac{1}{3}$

B.  $\frac{1}{2}$

C.  $\frac{3}{2}$

D. 2

**Answer: B**



**Watch Video Solution**

40. License plates on cars in a certain state consist of 3 letters taken from the 26 letters, A through Z, followed by 3 digits taken from the 10 digits, 0 through 9. Which of the following expressions gives the number of distinct license plates that are possible given that repetition of both letters and digits is allowed?

A.  $10^3 \cdot 26^3$

B.  $(10 + 26)^3$

C.  $2(26!)^3(10!)^3$

D.  $(3 + 3)^{26+10}$

**Answer: A**



**View Text Solution**

**41.** For 20 quiz scores in a typing class, the table below gives the frequency of the scores in each score interval. Which score interval contains the median of the scores?

Score interval	Frequency
96–100	3
91–95	1
86–90	3
81–85	4
76–80	9

A. 96-100

B. 91-95

C. 86-90

D. 81-85

**Answer: D**



**Watch Video Solution**

**42.** In the complex numbers, where  $i^2 = -1$ .

A.  $i - 1$

B.  $1 + i$

C.  $1 - i$

D.  $\frac{1 - i}{2}$

**Answer: D**



**View Text Solution**

**43.** Temperature measured in degrees Fahrenheit (F) are related to temperature measured in degree Celcius (C) by the formula  $F = \frac{9}{5}C + 32$ . There is 1 value of  $x$  for which  $x$  degree Fahrenheit equls  $x$  degrees Celsius. What is that value?

A.  $-72$



B.  $-40$

C.  $-32$

D.  $0$

**Answer: B**



**Watch Video Solution**

**44.** The table below gives experimental data value for variables  $x$  and  $y$ . Theory predicts that  $y$  varies directly with  $x$ . Based on the experimental data, which of the following value is closest to the constant of variation?

(Note : The variable  $y$  varies directly with the variable  $x$  provided that  $y = kx$  for some nonzero constant  $k$ .)

called the constant of variation.)

$x$	$y$
2.75	0.140
8.50	0.425
14.75	0.750
16.75	0.850
21.00	1.050

A.  $-2.61$

B.  $0.05$

C.  $3.61$

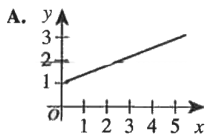
D.  $15.9$

Answer: B

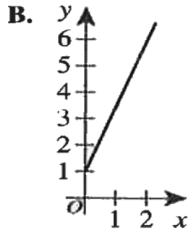


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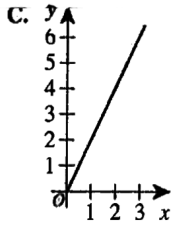
45. During a snowstorm, the relationship between the depth of accumulated snow,  $y$  inches, and the elapsed time,  $x$  hours, was modeled by the equation  $2x - 5y = -5$ . One of the following graphs in the standard  $(x,y)$  coordinate plane models the equation for positive values of  $x$  and  $y$ . Which one?



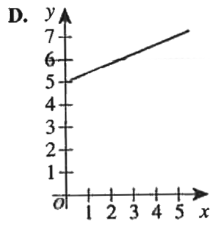
A.



**B.**



**C.**



**D.**

**Answer: A**



**Watch Video Solution**

46. Diana is baking bread, and the original recipe calls for  $1\frac{1}{2}$  teaspoons of yeast and  $2\frac{1}{2}$  cups of flour. Diana will use the entire contents of a packet that contains  $2\frac{1}{4}$  teaspoons of yeast and will use the same ratio of ingredients called for in the original recipe. How many cups of flour will Diana use?

A.  $1\frac{7}{8}$

B.  $3\frac{1}{4}$

C.  $3\frac{1}{2}$

D.  $3\frac{3}{4}$

**Answer: D**



Watch Video Solution

47. For all nonzero values of  $x$ ,  $\frac{12x^6 - 9x^2}{3x^2} = ?$

A.  $4x^3 - 3x$

B.  $4x^3 - 3$

C.  $4x^4 - 9x^3$

D.  $4x^4 - 3$

**Answer: D**



**Watch Video Solution**

**48.** Four matrices are given below.

$$W = \begin{bmatrix} 1 & 2 \\ 5 & 8 \end{bmatrix} X = \begin{bmatrix} 3 & 9 \\ 7 & 4 \end{bmatrix} Y = \begin{bmatrix} 1 & 3 & 7 \\ 4 & 2 & 6 \end{bmatrix} Z = \begin{bmatrix} 5 & 8 \\ 2 & 9 \\ 3 & 7 \end{bmatrix}$$

Which of the following matrix products is undefined?

A. WX

B. WY

C. YZ

D. XZ

**Answer: D**



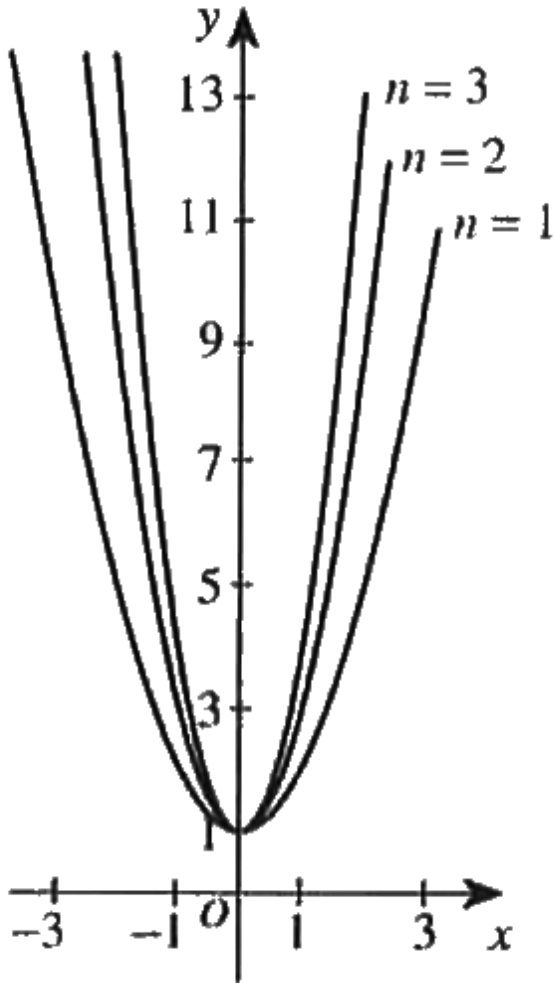
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**49.** The 3 parabola graphed in the standard  $(x,y)$  coordinate plane below are from a family of parabolas. A general equation that defines this family of parabolas contains the variable  $n$  in addition to  $x$  and  $y$ . For one of the parabolas shown,  $n = 1$ , for following could be a general equation that defines this family of



parabolas for all  $n \geq 1$ ?

— . . .



A.  $y = nx^2 + 1$

$$\text{B. } y = \frac{1}{n}x^2 + 1$$

$$\text{C. } y = x^2 + n$$

$$\text{D. } y = -nx^2 + 1$$

**Answer: A**



**Watch Video Solution**

**50.** After polling a class of 20 music students by a show of hands, you find that 8 students play the guitar and 9 students play the piano. Given that information, what is the minimum number of students in this music class who play both the guitar and the piano?

A. 0

B. 1

C. 8

D. 17

**Answer: A**



**Watch Video Solution**

**51.** A teacher assigns each of her 18 students a different interger from 1 through 18. The teacher forms pairs of study partners by using the rule that the sum of the pair of numbers is a perfect square. Assuming the 9 pairs of students follow this rule, the

student assigned which number must be paired with the student assigned the number 1?

A. 16

B. 15

C. 9

D. 8

**Answer: B**



**Watch Video Solution**

**52.** Lucky found \$8.25 in pennies, nickels, dimes, and quarters while walking home from school one week.

When she deposited this money in the bank, she noticed that she had twice as many nickels as pennies, 1 fewer dime than nickels, and 1 more quarter than nickels. How many quarters did Lucky find that week?

A. 3

B. 9

C. 16

D. 21

**Answer: D**



**Watch Video Solution**

53. Given  $10^{\frac{2x-1}{x}} = 1$ ,  $x = ?$

A.  $-\frac{1}{2}$

B.  $-\frac{1}{8}$

C.  $\frac{1}{2}$

D.  $\frac{10}{19}$

**Answer: C**



**Watch Video Solution**

54. The table below shows the results of a survey of 250 people who were asked whether they like to read

and whether they play a musical instrument.

	Play a musical instrument	Do NOT play a musical instrument	Total
Like to read	50	60	110
Do NOT like to read	40	100	140
Total	90	160	250

According to the results, what is the probability that a randomly selected person who was surveyed likes to read, given that the person plays a musical instrument?

- A.  $\frac{1}{5}$
- B.  $\frac{5}{9}$
- C.  $\frac{5}{11}$
- D.  $\frac{9}{25}$

**Answer: B**



**Watch Video Solution**

**55.** Mario was riding a bicycle with wheels 26 inches in diameter. During 1 minute of Mario's ride, the wheels made exactly 200 revolutions. At what average speed, in feet per second, was Mario riding during that minute?

A.  $\frac{65}{9}\pi$

B.  $\frac{65}{18}\pi$

C.  $\frac{130}{9}\pi$

D.  $\frac{845}{18}\pi$



**Answer: A**



**Watch Video Solution**

**56.** Whenever  $j$  and  $k$  are positive integers such that

$(\sqrt{3})^j = 27^k$ , what is the value of  $\frac{j}{k}$ ?

A.  $\frac{1}{6}$

B.  $\frac{3}{2}$

C. 3

D. 6

**Answer: D**



**Watch Video Solution**

57. A finite arithmetic sequence has 7 terms, and the first term is  $\frac{3}{4}$ . What is the difference between the mean and the median of the 7 terms?

A. 0

B.  $\frac{3}{4}$

C.  $\frac{4}{3}$

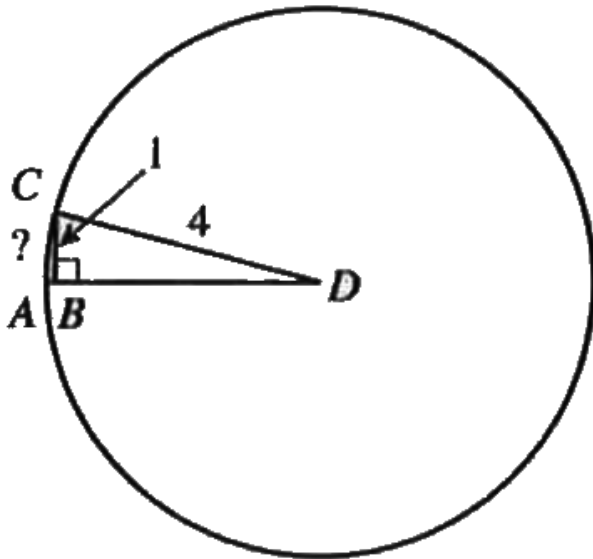
D. 3

**Answer: A**



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58. In the circle with center  $D$  shown below, the length of radius  $\overline{CD}$  is 4 cm, the length of  $\overline{BC}$  is 1 cm, and  $\overline{BC}$  is perpendicular to radius  $\overline{AD}$  at  $B$ . When  $\angle ADC$  is measured in degree, which of the following expressions represents the length, in centimeters, of  $\overline{AC}$ ?



A.  $\frac{\pi}{45} \left( \sin^{-1} \left( \frac{1}{4} \right) \right)$

B.  $\frac{\pi}{45} \left( \cos^{-1} \left( \frac{1}{4} \right) \right)$

C.  $\frac{2\pi}{45} \left( \sin^{-1} \left( \frac{1}{4} \right) \right)$

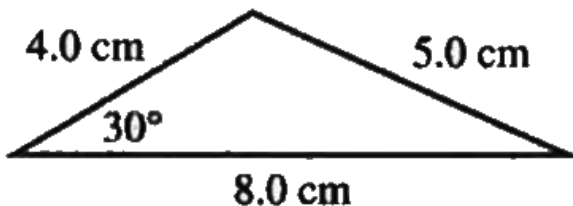
D.  $\frac{2\pi}{45} \left( \cos^{-1} \left( \frac{1}{4} \right) \right)$

**Answer: A**



**Watch Video Solution**

**59.** The lengths of the triangle shown below are rounded to the nearest 0.1 cm. What is the area, to the nearest  $1\text{cm}^2$  of the triangle?



Note: The area of any triangle with sides of length  $a$ ,  $b$  and  $c$  opposite angle of measure  $A$ ,  $B$ , and  $C$ , respectively, is given by  $\frac{1}{2}ab \sin C$ .

A. 4

B. 5

C. 8

D. 10

**Answer: C**



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**60.** The probability distribution of the discrete random variable  $X$  is shown in the table below. What is the

expected value of X?

$x$	Probability $P(X = x)$
0	$\frac{1}{6}$
1	$\frac{1}{12}$
2	$\frac{1}{4}$
3	$\frac{1}{12}$
4	$\frac{1}{12}$
5	0
6	$\frac{1}{3}$

A.  $\frac{1}{6}$

B.  $\frac{1}{3}$

C. 1

D.  $3\frac{1}{6}$

**Answer: D**



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**61.** A restaurant occupying the top floor of a skyscraper rotates as diners enjoy the view. Ling and Sarah notice that they began their meal at 7:00 p.m. Looking due north. At 7:45 p.m. they had rotated  $180^\circ$  to a view



that was due south. At this rate, how many degrees will degrees will be restaurent rotate in 1 hour?

A.  $90^\circ$

B.  $180^\circ$

C.  $240^\circ$

D.  $270^\circ$

**Answer: C**



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**62.** The cost of a gym membership is a onetime fee of \$140, plus a monthly fee of \$ 40. Brendan wrote a \$500

check to pay his gym membership for a certain number of months, including the onetime fee. How many months of membership did he pay for?

A. 3

B. 4

C. 9

D. 12

**Answer: C**



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**63.** A museum offers a 2-hour guided tour. For groups with fewer than 25 people the cost is \$9.25 per person, for groups with 25 people or more the cost is \$8.50 per person. The 27 people in the 9:00 a.m. tour group each paid \$ 9.25 in advance. What is the total refund that the museum owes the 9:00 a.m. group?

- A. \$12.50
- B. \$13.00
- C. \$ 18.75
- D. \$ 20.25

**Answer: D**



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**64.** The 13-member math club needs to choose a student government representative. They decide that the representative, who will be chosen at random, CANNOT be any of the 3 officers of the club. What is the probability that Samara, who is a member of club but NOT an officer, will be chosen?

A. 0

B.  $\frac{1}{13}$

C.  $\frac{1}{10}$

D.  $\frac{3}{13}$

Answer: C



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**65.** Mela earned scores of 75, 70, 92, 95 and 97 points (a total of 429 points) on the first 5 tests in Economics II. Solving which of the following equations for  $s$  gives the score he needs to earn on the 6th test to average exactly 85 points for all 6 tests?

A.  $\frac{429}{5} + s = 85$

B.  $\frac{429}{6} + s = 85$

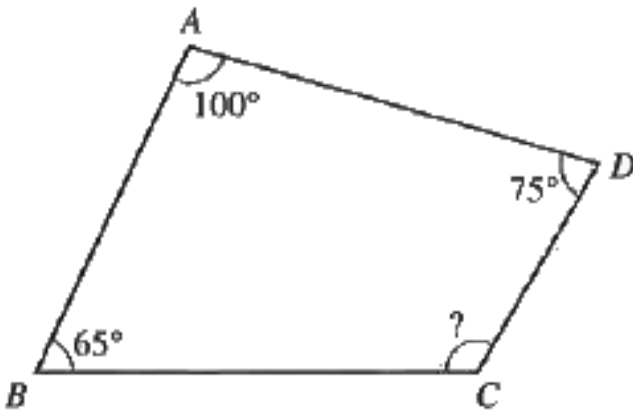
C.  $\frac{s + 429}{5} = 85$

D.  $(s + 429)/6 = 85$

Answer: D

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66. The figure below shows quadrilateral ABCD. What is the measure of  $\angle C$ ?



A.  $120^\circ$

B.  $115^\circ$

C.  $105^\circ$

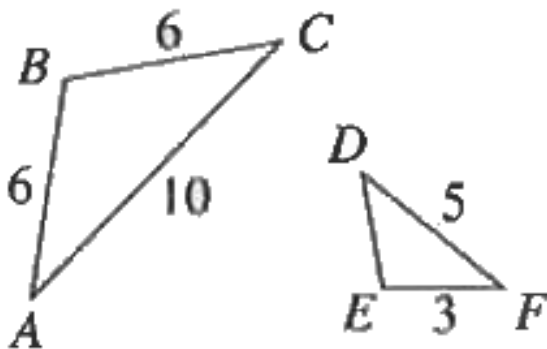
D.  $100^\circ$

**Answer: A**

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**67.** In the figure below,  $\triangle ABC$  and  $\triangle DEF$  are similar triangles with the given side lengths in meters.

What is the perimeter, in meters, of  $\triangle DEF$  ?



A. 3

B. 8

C. 11

D. 12

**Answer: C**



**Watch Video Solution**

**68.**  $|3(-2) + 4| = ?$

A.  $-2$

B. 2



C. 5

D. 9

**Answer: B**



**Watch Video Solution**

**69.** What are the values for  $x$  that satisfy the equation

$$(x + a)(x + b) = 0?$$

A.  $-a$  and  $-b$

B.  $-a$  and  $b$

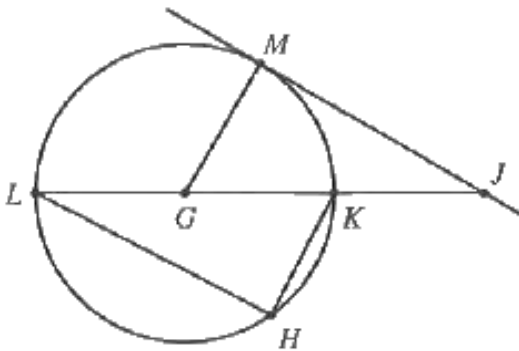
C.  $-ab$

D.  $a$  and  $-b$

Answer: A

 Watch Video Solution

70. In the figure below,  $G$  is the center of the circle,  $\overline{LK}$  is a diameter,  $H$  lies on the circle,  $J$  lies outside the circle on  $\overline{LK}$  and  $\overline{JM}$  is tangent to the circle at  $M$ . Which of the following angles or minor area has the greatest degree measure?



A.  $\overline{LM}$

B.  $\overline{MK}$

C.  $\angle JMG$

D.  $\angle LHK$

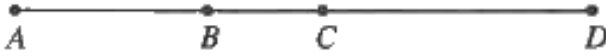
**Answer: A**



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71. Points B and C lie on  $\overline{AD}$  as shown below. The length of  $\overline{AD}$  is 30 units,  $\overline{AC}$  is 16 units long, and  $\overline{BD}$  is 20 units long. How many units long, if it can be

determined, is  $\overline{BC}$  ?



A. 4

B. 6

C. 10

D. 14

**Answer: B**



**Watch Video Solution**

72. If  $12x = -8(10 - x)$ , then  $x = ?$

A. 20

B. 8

C.  $7\frac{3}{11}$

D.  $-20$

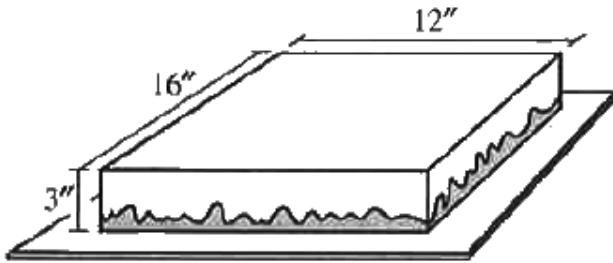
**Answer: D**



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**73.** Ken baked, frosted, and decorated a rectangular cake for the last Math Club meeting. The cake was 3 inches high, 12 inches wide, and 16 inches long. He centered the cake on a piece of cardboard whose rectangular top surface had been covered with

aluminum foil, as shown in the figure below.



Ken used a piece of cardboard large enough to allow the cardboard to extend 2 inches beyond the cake on all sides. What is the area, in square inches, of the aluminum foil that is exposed on the top surface of the cardboard?

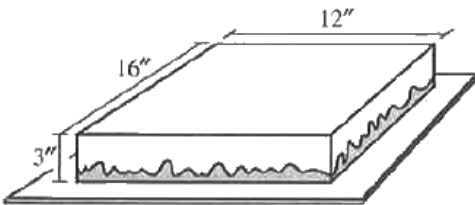
- A. 60
- B. 64
- C. 88
- D. 128

Answer: D



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74. At the Math Club meeting, Principal Gonzales cut the entire cake into pieces. Each piece is 2 inches wide, 2 inches long, and 3 inches high. What is the number of pieces Principal Gonzales cut the cake into?



A. 16

B. 20

C. 28

D. 48

**Answer: D**

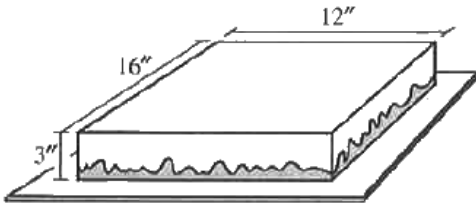


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**75.** The Math Club will pay Ken \$5.00 for preparing the cake and will also pay him for the cost of the cake mix at \$1.73, the frosting mix at \$2.67, and the sales tax of 5% on these 2 items. What is the total amount the



Math Club will pay Ken?



- A. \$4.67
- B. \$9.40
- C. \$9.45
- D. \$9.62

**Answer: D**



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**76.** What is the y-intercept of the line in the standard (x,y) coordinate plane that goes through the points (-3,6) and (3,2) ?

A. 0

B. 2

C. 4

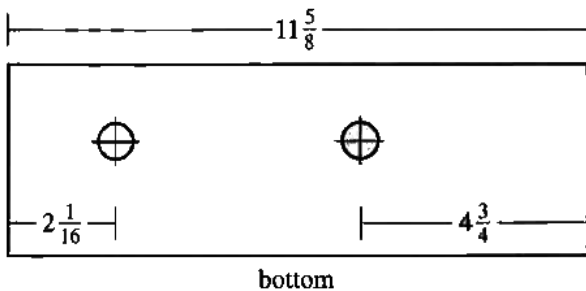
D. 6

**Answer: C**



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77. A machine part is diagrammed in the figure below with the dimensions given in inches. If the centers of the circles lie on the same line parallel to the bottom of the part, what is the distance, in inches, between the centers of the 2 holes in the machine part?



- A.  $5\frac{3}{16}$
- B.  $5\frac{1}{16}$
- C. 5
- D.  $4\frac{13}{16}$

**Answer: D**



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**78.** The depth of a pond is 180 cm and is being reduced by 1 cm per week. The depth of a second pond is 160 cm and is being reduced by  $\frac{1}{2}$  cm per week. If the depths of both ponds continue to be reduced at these constant rates, in about how many weeks will the ponds have the same depth?

A. 10

B. 20

C. 40

D. 80

**Answer: C**



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**79.** When graphed in the standard  $(x, y)$  coordinate plane, which of the following equations does NOT represent a line?

A.  $x = 4$

B.  $3y = 6$

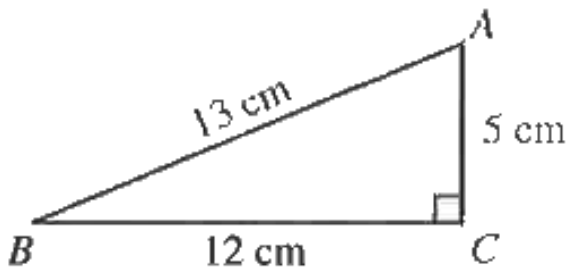
C.  $x - y = 1$

D.  $x^2 + y = 5$

Answer: D

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80. In the right triangle shown below, which of the following statements is true about  $\angle A$ ?



A.  $\cos A = \frac{12}{13}$

B.  $\sin A = \frac{12}{13}$

C.  $\tan A = \frac{12}{13}$

$$D. \cos A = \frac{13}{12}$$

**Answer: B**

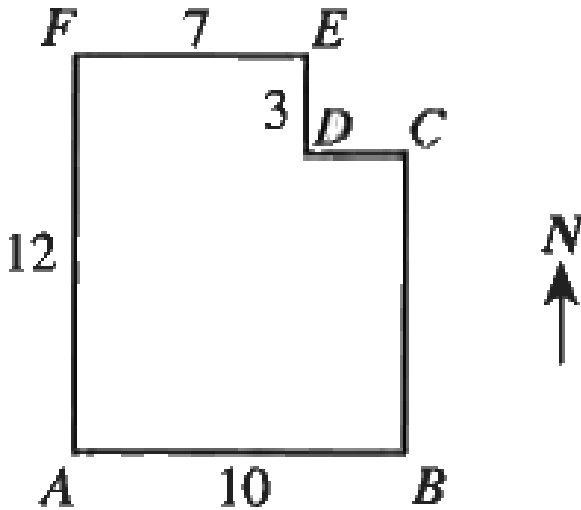


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**81.** A park has the shape and dimensions in blocks given below. A water fountain is located halfway between point B and point D. Which of the following is the location of the water fountain from point A?

(Note: The park's borders run east-west or north-

south.)



A.  $3\frac{1}{2}$  blocks east and 6 blocks north

B. 5 blocks east and  $4\frac{1}{2}$  blocks north

C. 5 blocks east and 6 blocks north

D.  $8\frac{1}{2}$  block east and  $4\frac{1}{2}$  block north

**Answer: D**





**82.** The braking distance,  $y$  feet, for Damon's car to come to a complete stop is modeled by  $y = \frac{3(x^2 + 10x)}{40}$ , where  $x$  is the speed of the car in miles per hour. According to this model, which of the following is the maximum speed, in miles per hour, Damon can be driving so that the braking distance is less than or equal to 150 feet?

A. 10

B. 30

C. 40

D. 50

**Answer: C**



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**83.** If  $f(x) = x^2 + x + 5$  and  $g(x) = \sqrt{x}$ , then what is the value of  $\frac{g(4)}{f(1)}$ ?

A.  $\frac{2}{7}$

B.  $\frac{25}{7}$

C.  $\frac{2}{25}$

D. 2

**Answer: A**



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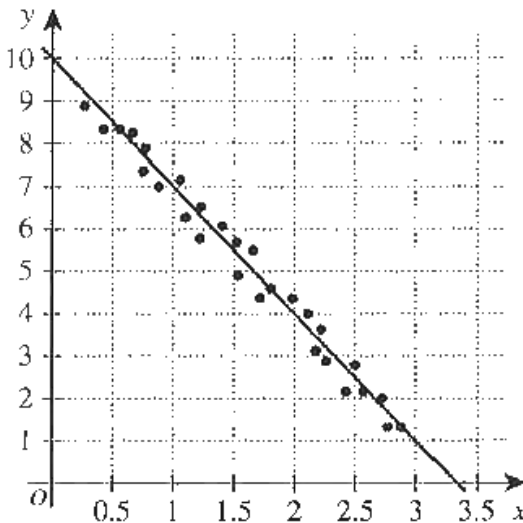
**84.** At a school picnic, 1 junior and 1 senior will be selected to lead the activities. If there are 125 juniors and 100 seniors at the picnic, how many different 2 person combinations of 1 junior and 1 senior are possible?

- A. 25
- B. 100
- C. 125
- D. 12500

**Answer: D**



85. The scatterplot in the standard  $(x,y)$  coordinate plane below contains data points showing a strong linear correlation between the variables  $x$  and  $y$ . Mia drew the line shown to model the data. One of the following equations represents Mia's line. Which one?



A.  $y = -3x + 8$

B.  $y = -3x + 10$

C.  $y = -2x + 10$

D.  $y = 2x + 10$

**Answer: B**



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**86.** The temperature,  $t$ , in degrees Fahrenheit, in a certain town on a certain spring day satisfies the inequality  $|t - 24| \leq 30$ . Which of the following temperatures, in degrees Fahrenheit, is NOT in this range?

A.  $-10$

B.  $-6$

C.  $-5$

D.  $0$

**Answer: A**



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**87.** If 5 times a number  $n$  is subtracted from 15, the result is negative, Which of the following gives the possible value(s) for  $n$ ?

A. 0 only

B. 3 only

C. 10 only

D. All n gt 3

**Answer: D**



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88. For all  $x > 21$ ,  $\frac{(x^2 + 8x + 7)(x - 3)}{(x^2 + 4x - 21)(x + 1)} = ?$

A. 1

B.  $\frac{9}{7}$

C.  $\frac{x - 3}{x + 3}$

D.  $\frac{2(x - 3)}{x + 1}$

**Answer: A**



**Watch Video Solution**

**89.** The median of a set of data containing 9 items was found. Four data items were added to the set. Two of these items were greater than the original median, and the other 2 items were less than the original median. Which of the following statements must be true about the median of the new data set?

A. It is the average of the 2 new lower values



B. It is the same as the original median .

C. It is the average of the 2 new higher values.

D. It is greater than the original median.

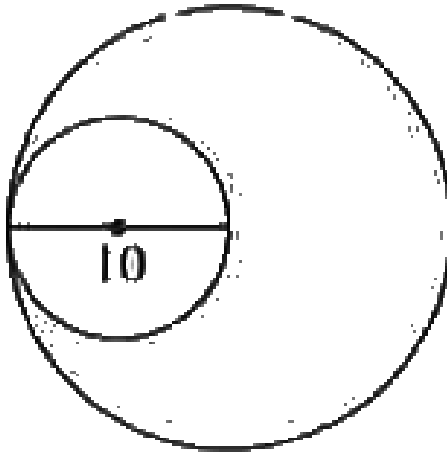
**Answer: B**



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**90.** The figure below shows 2 tangent circles such that the 10-centimeter diameter of the smaller circle is equal to the radius of the larger circle. What is the

area, in square centimeters, of the shaded region?



- A. 10
- B. 75
- C.  $5\pi$
- D.  $75\pi$

**Answer: D**



Watch Video Solution

91. The sign of  $a$  is positive. The sign of  $b$  is negative. If it can be determined, what is the sign of the mean of  $a$  and  $b$ ?

A. Positive

B. Negative

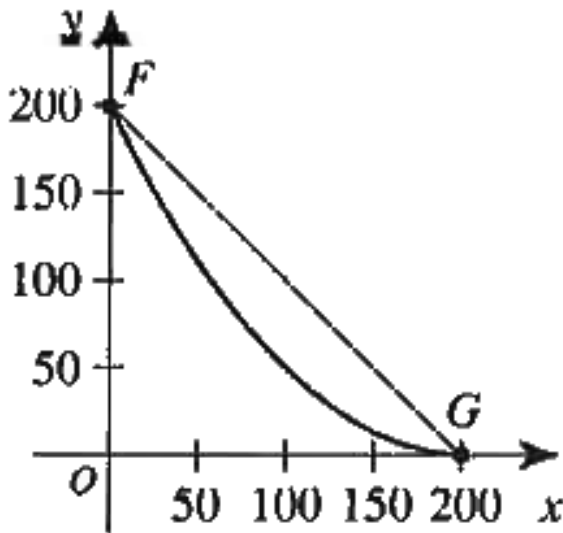
C. Both positive and negative

D. Cannot be determined from the given information.

**Answer: D**



92. The curve  $y = 0.005x^2 - 2x + 200$  for  $0 \leq x \leq 200$  and the line segment from  $F(0, 200)$  to  $G(200, 0)$  are shown in the standard  $(x,y)$  coordinate plane below.



What is the y-coordinate for the point on the curve with x-coordinate 20?

A. 160

B. 162

C. 164

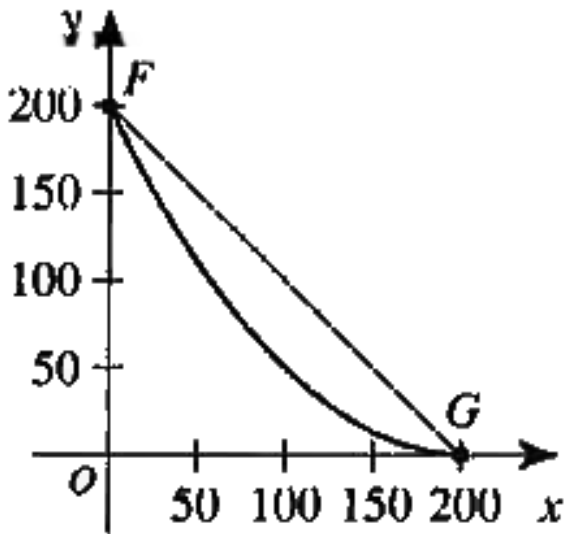
D. 166

**Answer: B**



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**93.** The curve  $y = 0.005x^2 - 2x + 200$  for  $0 \leq x \leq 200$  and the line segment from  $F(0,200)$  to  $G(200, 0)$  are shown in the standard  $(x,y)$  coordinate plane below.



The length of this curve is longer than  $\overline{FG}$ . About how many coordinate units long is  $\overline{FG}$ ?

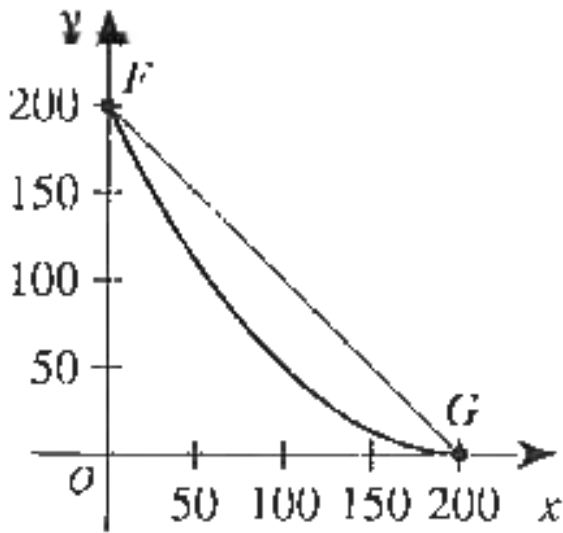
- A. 20
- B. 141
- C. 200
- D. 283

**Answer: D**



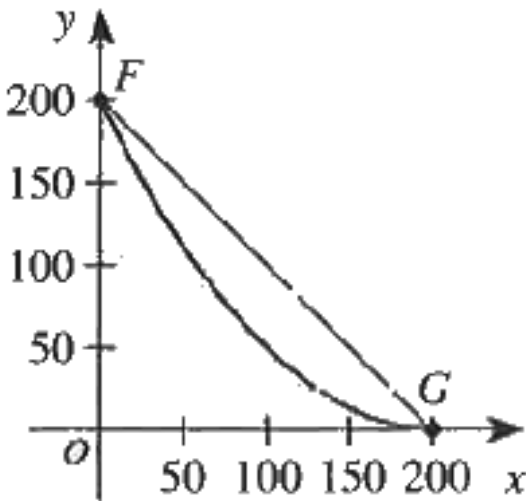
**Watch Video Solution**

**94.** The curve  $y = 0.005x^2 - 2x + 200$  for  $0 \leq x \leq 200$  and the line segment from  $F(0,200)$  to  $G(200, 0)$  are shown in the standard  $(x,y)$  coordinate plane below.



Tran wants to approximate the area underneath the curve  $y = 0.005x^2 - 2x + 200$  for  $0 \leq x \leq 200$ , shown shaded in the graph below.





He finds an initial estimate,  $A$ , for the shaded area by using  $\overline{FG}$  and computing

$$A = \frac{1}{2}(200\text{units})(200\text{units}) = 20,000 \text{ square units.}$$

The area of the shaded region is:

A. less than 20,000 square units, because the curve

lies under  $\overline{FG}$ .

B. less than 20,000 square units, because the curve

lies over  $\overline{FG}$ .

C. equal to 20,000 square units.

D. greater than 20,000 square units, because the curve lies under  $\overline{FG}$ .

**Answer: A**

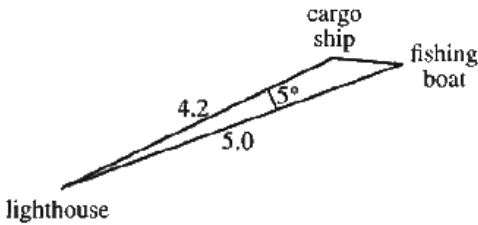


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**95.** A cargo ship is 4.2 miles from a lighthouse, and a fishing boat is 5.0 miles from the lighthouse, as shown below. The angle between the straight lines from the lighthouse to the 3 vessels is  $5^\circ$ . The approximate distance in miles, from the cargo ship to the fishing boat is given by which of the following expressions?

(Note: The law of cosines states that for any triangle with vertices A, B and C and the sides opposite those vertices with length a, b, and c, respectively.

$$c^2 = a^2 + b^2 - 2ab \cos C).$$



A.  $\sqrt{(5.0)^2 - (4.2)^2}$

B.  $\sqrt{(4.2)^2 + (5.0)^2 - 2 \cdot 4.2 \cdot 5.0 \cos 5^\circ}$

C.  $\sqrt{(4.2)^2 + (5.0)^2 + 2 \cdot 4.2 \cdot 5.0 \cos 5^\circ}$

D.  $\sqrt{(4.2)^2 + (5.0)^2 - 2 \cdot 4.2 \cdot 5.0 \cos 85^\circ}$

**Answer: B**

96. Which of the following equations expresses  $c$  in terms of  $a$  for all real numbers  $a$ ,  $b$  and  $c$  such that  $a^3 = b$  and  $b^2 = c$ ?

A.  $c = a^6$

B.  $c = a^5$

C.  $c = 2a^3$

D.  $c = \frac{1}{2}a$

**Answer: A**



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97. After visiting Florida State University during spring break, Francisco rents a car for 2 days to travel around Florida. He has \$255 to spend on car rental for the 2 days. Sea horse Car Rental charges \$50 per day and \$0.25 per mile. Ocean Blue Car Rental charges \$60 per day and \$0.20 per mile. Which company, if either, allows him to travel more miles for the 2 days, and how many miles more?

(Note: Taxes are already included in the rental charges)

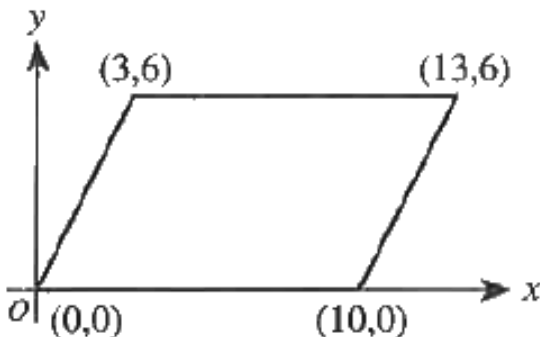
- A. Sea-Horse, 20
- B. Ocean Blue, 55
- C. Ocean Blue, 100

D. Sea Horse, 135`

Answer: B

 Watch Video Solution

98. In the standard  $(x,y)$  coordinate plane below, the points  $(0,0)$ ,  $(10,0)$ ,  $(13,6)$  and  $(3,6)$  are the vertices of a parallelogram. What is the area, in square coordinate units, of the parallelogram?



A. 30

B. 60

C.  $30\sqrt{3}$

D.  $30\sqrt{5}$

**Answer: B**



**Watch Video Solution**

**99.** For every pair of natural number  $n$  and  $m$ , to which of the following sets must  $n + m$  belong?

I. The natural numbers

II. The intergers

III. The rational numbers

IV. The real numbers

V. The complex numbers

A. I,II and III only

B. II, III and IV only

C. III, IV and V only

D. I,II,III,IV and V

**Answer: D**



**Watch Video Solution**

**100.** A certain perfect square has exactly 4 digits (that is, it is an integer between 1,000 and 9,999). The



positive square root of the perfect square must have  
how many digits?

A. 1

B. 2

C. 3

D. 4

**Answer: B**



**Watch Video Solution**

**101.** A certain hotel has 80 rooms. Based on many previous years' occupancy rates, the owners of the

hotel constructed the table below showing the daily occupancy rates and their probabilities of occurring for the coming summer season. Based on the probability distribution in the table, to the nearest whole number, what is the expected number of rooms that will be occupied on any day during the coming summer season?

Occupancy rate	Probability
0.60	0.20
0.70	0.40
0.80	0.30
0.90	0.10

A. 20

B. 25

C. 58

D. 60

Answer: C



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102. What is the matrix product  $\begin{bmatrix} a \\ 2a \\ 3a \end{bmatrix} [1 \ 0 \ -1]$ ?

A.  $\begin{bmatrix} a & 0 & -a \\ 2a & 0 & -2a \\ 3a & 0 & -3a \end{bmatrix}$

B.  $\begin{bmatrix} a & 2a & 3a \\ 0 & 0 & 0 \\ -a & -2a & -3a \end{bmatrix}$

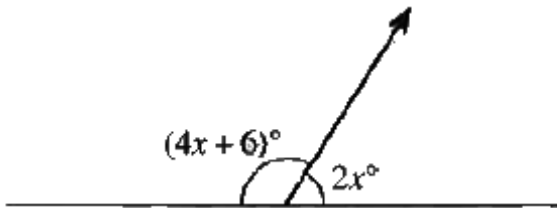
C.  $[2a \ 0 \ -2a]$

D.  $[6a \ 0 \ -6a]$

Answer: A

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103. What is the degree measure of the smaller of the 2 angles formed by the line and the ray shown in the figure below?



A.  $14^\circ$

B.  $28^\circ$

C.  $29^\circ$

D.  $58^\circ$

**Answer: D**



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**104.** Let  $a$  equal  $2b + 3c - 5$ . What happens to the value of  $a$  if the value of  $b$  decreases by 1 and the value of  $c$  increases by 2?

- A. It increases by 4
- B. It is increases by 2
- C. It increases by 1
- D. It is unchanged

**Answer: A**



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**105.** Shima will mix 1 fluid ounce of fertilizer in water for every 40 square feet of soil. At this rate, which of the following expressions gives the number of gallons of fertilizer that Shima will mix in water for 0.5 acres of soil?

(Note : 1 acre = 43,560 square feet, 1 gallon = 128 fluid ounces)

A.  $\frac{0.5(40)(128)}{43,560}$

B.  $\frac{40(128)}{0.5(43,560)}$

C.  $\frac{0.5(43,560)}{40(128)}$

D.  $\frac{43,560}{0.5(40)(128)}$

**Answer: C**



**Watch Video Solution**

**106.** A restaurant has 10 booths that will seat up to 4 people each. If 20 people are seated in booths, and NO booths are empty, what is the greatest possible number of booths that could be filled with 4 people?

A. 0

B. 1

C. 2

D. 3

**Answer: D**



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**107.** Let  $A$  and  $B$  be independent events. Denote  $P(A)$  as the probability that Event  $A$  will occur, and denote  $P(A \cap B)$  as the probability that Events  $A$  and  $B$  will both occur. Which of the following equations must be true?

A.  $P(A) = P(B)$



B.  $P(A) = 1 - P(B)$

C.  $P(A \cap B) = P(A) + P(B)$

D.  $P(A \cap B) = P(A) \cdot P(B)$

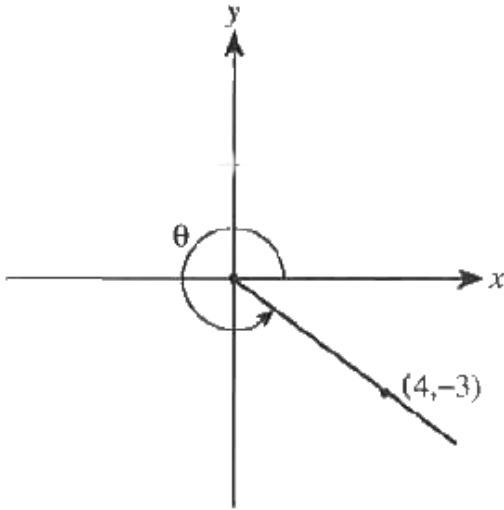
**Answer: D**



**Watch Video Solution**

**108.** In the standard  $(x,y)$  coordinate plane below, an angle is shown whose vertex is the origin. One side of this angle with measure  $\theta$  passes through  $(4, -3)$ , and the other side include the positive  $x$ -axis. What is the

cosine of  $\theta$ ?



A.  $-\frac{4}{3}$

B.  $-\frac{3}{4}$

C.  $-\frac{3}{5}$

D.  $\frac{4}{5}$

**Answer: D**



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**109.** Which of the following expressions, if any, are equal all real number  $x$ ?

I  $\sqrt{(-x)^2}$

II  $|-x|$

III  $-|x|$

A. I and II only

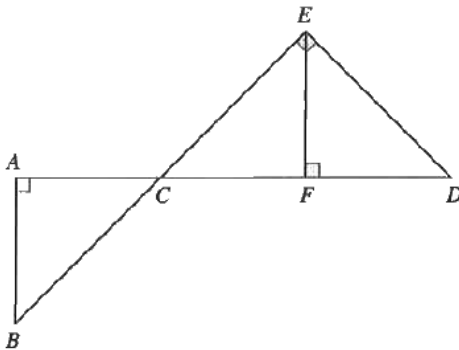
B. I and III only

C. II and III only

D. I, II and III

**Answer: A**

110. In the figure below, A, C, F and D are collinear, B, C and E are collinear, and the angles at A, E, and F are right angles, as marked. Which of the following statements is NOT justifiable from the given information?



A.  $\overleftrightarrow{AB}$  is parallel to  $\overleftrightarrow{EF}$

B.  $\overline{DE}$  is perpendicular to  $\overline{BE}$

C.  $\angle ACB$  is congruent to  $\angle FCE$

D.  $\overline{CE}$  is congruent to  $\overline{ED}$

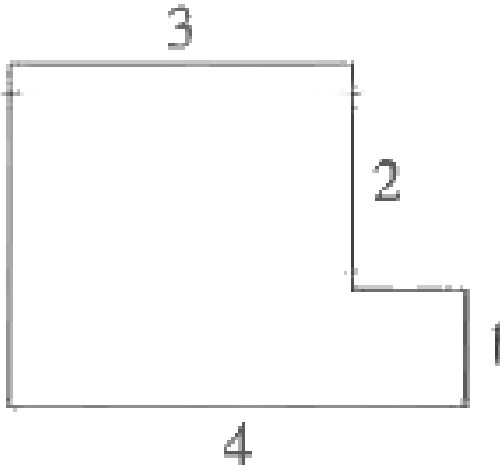
**Answer: D**



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**111.** In the figure below, all line segments are either horizontal or vertical and the dimensions given are in

inches. What is the perimeter, in inches, of the figure?



A. 10

B. 12

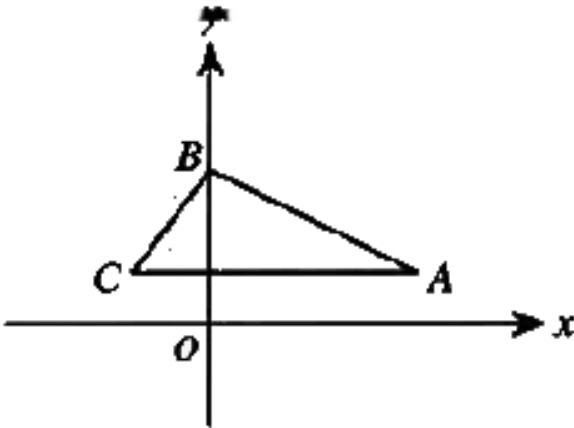
C. 13

D. 14

**Answer: D**



112. Triangle  $\triangle ABC$  has vertices  $A(8,2)$ ,  $B(0,6)$ , and  $C(-3,2)$ . Point  $C$  can be moved along a certain line, with points  $A$  and  $B$  remaining stationary, and the area of  $\triangle ABC$  will not change. What is the slope of that line?



A.  $-\frac{1}{2}$

B.  $-\frac{3}{4}$

C. 0

D.  $\frac{4}{3}$

**Answer: A**



**Watch Video Solution**

**113.** On his first day as a telemarketer, Marshall made 24 calls. His goal was to make 5 more calls on each successive day than he had made the day before. If Marshall met, but did not exceed, his goal, how many calls had he made in all after spending exactly 20 days making calls as a telemarketer?



A. 670

B. 690

C. 974

D. 1430

**Answer: D**



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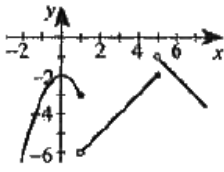
**114.** Which of the following is the graph of the functions

$f(x)$  defined below?

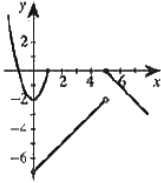
$$x^2 - 2 \quad \text{for } x \leq 1$$

$$f(x) = x - 7 \quad \text{for } 1 < x < 5$$

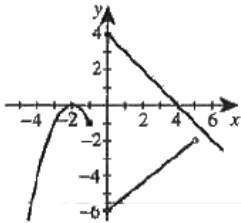
$$4 - 7 \quad \text{for } x \geq 5$$



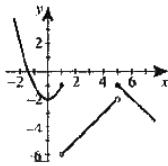
A.



B.



C.



D.

**Answer: D**



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**115.** Which of the following expressions given the number of permutations of 15 objects taken 5 at a time?

A.  $15(5)$

B.  $(15 - 5)!$

C.  $\frac{15!}{5!}$

D.  $\frac{15!}{(15 - 5)!}$

**Answer: D**



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**116.** For all  $x > 0$ , which of the following expressions is equivalent to  $\frac{i}{\sqrt{x} - i}$ , where  $i = \sqrt{-1}$ ?

A.  $i$

B.  $\frac{\sqrt{x}}{x}$

C.  $\frac{\sqrt{x} - 1}{x + 1}$

D.  $\frac{i\sqrt{x} - 1}{x + 1}$

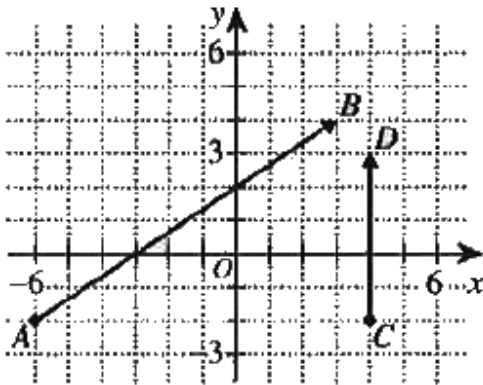
**Answer: D**



**Watch Video Solution**

117. Vectors  $\overrightarrow{AB}$  and  $\overrightarrow{CD}$  are shown in the standard (x,y) coordinate plane below. One of the following is the unit vector notation of the vector  $\overrightarrow{AB} + \overrightarrow{CD}$ .

Which one?



A.  $-6i + 3j$

B.  $3i + 1j$

C.  $3i + 9j$

D.  $9i + 11j$

**Answer: D**



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**118.** A simple pendulum consists of a small mass suspended from a string that is fixed at its upper end and has negligible mass. The length of time,  $t$  second, for complete swing of a simple pendulum can be modeled by the equation  $t = 2\pi\sqrt{\frac{L}{32}}$ , where  $L$  is the length, in feet, of the string. If the time required for a complete swing of Pendulum 1 is triple the time required for a complete swing of Pendulum 2, the length of Pendulum 1's string is how many times the length of Pendulum 2's string?

A.  $\frac{1}{3}$

B. 3

C. 6

D. 9

**Answer: D**



**Watch Video Solution**

**119.** If  $\log_e x = s$  and  $\log_e y = t$ , then

$$\log_e (xy)^2 = ?$$

A.  $2(s + t)$

B.  $s + t$

C.  $4st$

D.  $2st$

**Answer: A**



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**120.** Jennifer's best long jump distance increased by 10 % from 1990 to 1991 and by 20% from 1991 to 1992. By what percent did her best long jump distance increase from 1990 to 1992?

A. 0.32

B. 0.3



C. 0.2

D. 0.15

**Answer: A**



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**121.** On level ground, a vertical rod 12 feet tall casts a shadow 4 feet long, and at the same time a nearby vertical flagpole casts a shadow 12 feet long. How many feet tall is the flagpole?

A. 4

B. 8

C. 12

D. 36

**Answer: D**



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**122.** Kalino earned 85, 95, 93 and 80 points on the 4 tests, each worth 100 points, given so far this term. How many points must he earn on his test, also worth 100 points, to average 90 points for the 5 tests given this term?

A. 87

B. 88

C. 90

D. 97

**Answer: D**



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**123.** If  $x = -5$ , what is the value of  $\left(\frac{x^2 - 1}{x + 1}\right)$ ?

A.  $-6$

B.  $-4$

C.  $4$

D.  $5\frac{4}{5}$

**Answer: A**



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**124.** Kaya ran  $1\frac{2}{5}$  miles on Monday and  $2\frac{1}{3}$  miles on Tuesday. What was the total distance, in miles, Kaya ran during those 2 days?

A.  $3\frac{11}{15}$

B.  $3\frac{3}{8}$

C.  $3\frac{2}{5}$

D.  $3\frac{7}{15}$

**Answer: A**



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**125.** Consider the 3 statements below to be true

All insects that are attracted to honey are ants.

Insect I is not an ant.

Insect J is attracted to honey.

Which of the following statement is necessarily true?

A. Insect I is ant not attracted to honey

B. Insect I is an ant attracted to honey

C. Insect I is attracted to honey

D. Insect J is an ant

**Answer: D**



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**126.** What is the value of the expression  $\sqrt{\frac{m}{x-3}}$  when  $x = -1$  and  $m = -16$ ?

A.  $-2$

B.  $2$

C.  $2\sqrt{2}$

D.  $2i$

**Answer: B**



**Watch Video Solution**

**127.** Tickets for a community theater production cost \$6 each when bought in advance and \$8 each when bought at the door. The theater group's goal is at least \$2,000 in ticket sales for opening night. The theater group sold 142 opening-night tickets in advance. What is the minimum number of tickets they need to sell at the door on opening night to make their goal

A. 143

B. 144

C. 192

D. 250

**Answer: B**



**Watch Video Solution**

**128.** Mark and Juanita own a sandwich shop. They offer 3 kinds of bread, 5 kinds of meat, and 3 kinds of cheese. Each type of sandwich has combination of exactly 3 ingredients: 1 bread, 1 meat and 1 cheese. How many types of sandwiches are possible?

A. 11

B. 15



C. 30

D. 45

**Answer: D**



**Watch Video Solution**

**129.** If  $12(x - 11) = -15$ , then  $x = ?$

A.  $-\frac{49}{4}$

B.  $-\frac{13}{6}$

C.  $-\frac{5}{4}$

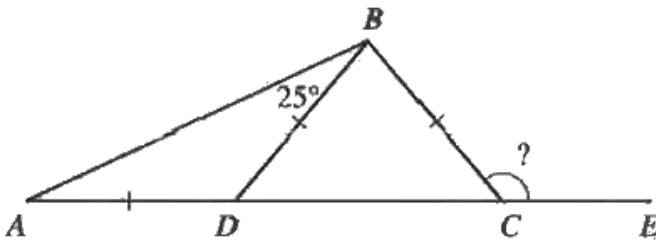
D.  $\frac{39}{4}$

Answer: D



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130. In the figure below,  $A, D, C$  and  $E$  are collinear.  $\overline{AD}$ ,  $\overline{BD}$ , and  $\overline{BC}$  are all the same length, and the angle measure of  $\angle ABD$  is as marked. What is the degree measure of  $\angle BCE$ ?



A.  $50^\circ$

B.  $100^\circ$

C.  $105^\circ$

D.  $130^\circ$

**Answer: D**



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**131.** If  $f(x) = 9x^2 + 5x - 8$ , then  $f(-2) = ?$

A.  $-54$

B.  $-18$

C.  $18$

D.  $36$

**Answer: C**



**Watch Video Solution**

**132.** What is the least common multiple of 30, 20 and 70?

- A. 40
- B. 42
- C. 120
- D. 420

**Answer: D**



**Watch Video Solution**

**133.** While doing a problem on his calculator, Tom meant to divide a number by 2, but instead he accidentally multiplied the number by 2. Which of the following calculations could Tom then do to the result on the calculator screen to obtain the result he originally wanted?

A. Subtract the original number

B. Multiply by 2

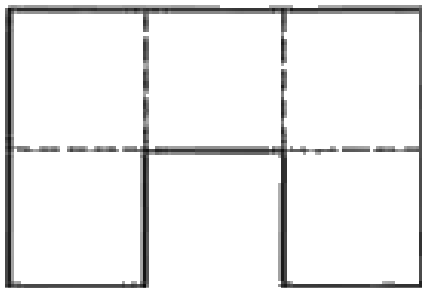
C. Multiply by 4

D. Divide by 4

Answer: D

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**134.** The 8-sided figure below is divided into 5 congruent squares. The total area of the 5 squares is 125 square inches. What is the perimeter, in inches, of the figure?



A. 25

B. 60

C. 80

D. 100

**Answer: B**



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**135.** Hai has \$100 available to buy USB drives to back up data for his business computers. Each USB drive has a price of \$8, and Hai will pay a sales tax of 7% of the total prices of the USB drives. What is the maximum number of USB drives Hai can buy?

A. 11

B. 12

C. 13

D. 14

**Answer: A**



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**136.** A certain computer performs  $1.5 \times 10^8$  calculations per second. How many seconds would it take this computer to perform  $6.0 \times 10^{16}$  calculations?



A.  $2.5 \times 10^{-9}$

B.  $9.0 \times 10^0$

C.  $4.0 \times 10^2$

D.  $4.0 \times 10^8$

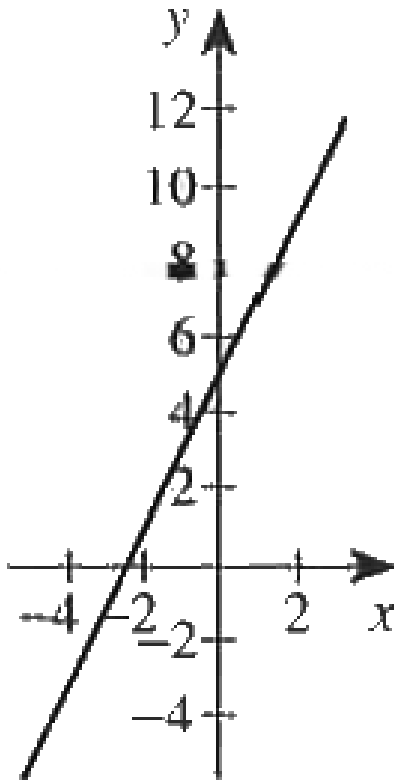
**Answer: D**



**Watch Video Solution**

**137.** One of the following is an equation of the linear relation shown in the standard  $(x, y)$  coordinate plane

below. Which equation is it?



A.  $y = 5x$

B.  $y = 2x$

C.  $y = 5x + 2$

$$D. y = 2x + 5$$

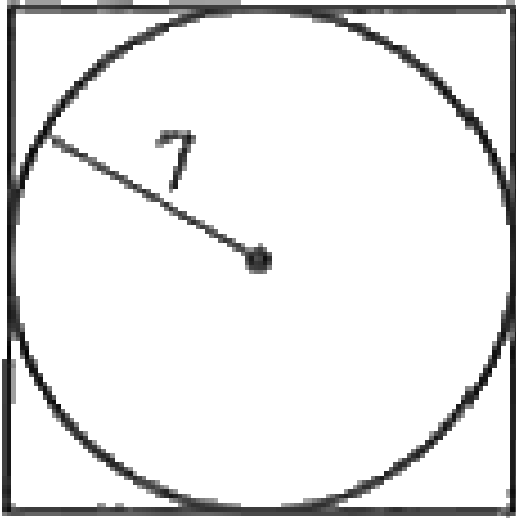
**Answer: D**



**Watch Video Solution**

**138.** A square is circumscribed about a circle of 7-foot radius, as shown below. What is the area of the square

in square feet?



A. 49

B. 56

C. 98

D. 196

**Answer: D**



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**139.** Two workers were hired to begin work at the same time. Worker A's contract called for a starting salary of \$20,000 with an increase of \$800 after each year of employment. Worker B's contract called for a starting salary of \$15,200 with an increase of \$2,000 after each year of employment. If  $x$  represents the number of full years employment (that is, the number of yearly increases each worker has received), which of the number of years until B's yearly salary equals A's yearly salary?

A.  $20,000 + 800x = 15,200 + 2,000x$

B.  $20,000 + 2,000x = 15,200 + 800x$

C.  $(20,000 + 800)x = (15,200 + 2,000)x$

D.  $(2,000 + 800)x = 20,000 - 15,200$

**Answer: A**

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**140.** A ramp for loading trucks is 13 feet long and covers 12 feet along the level ground, as shown below.

How many feet high is the highest point on the ramp?



A. 1

B. 2

C. 4

D. 5

**Answer: D**



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**141.** The expression  $7(x + 3) - 3(2x - 2)$  is equivalent to :

A.  $x + 1$

B.  $x + 15$

C.  $x + 19$

D.  $x + 27$

**Answer: D**



**Watch Video Solution**

**142.** If 115% of a number is 460, what is 75% of the number?

A. 280

B. 300

C. 320

D. 345



**Answer: B**



**Watch Video Solution**

**143.** When  $(2x - 3)^2$  is written in the form  $ax^2 + bx + c$  where  $a$ ,  $b$  and  $c$  are integers,  $a + b + c =$  ?

A.  $-17$

B.  $-5$

C.  $1$

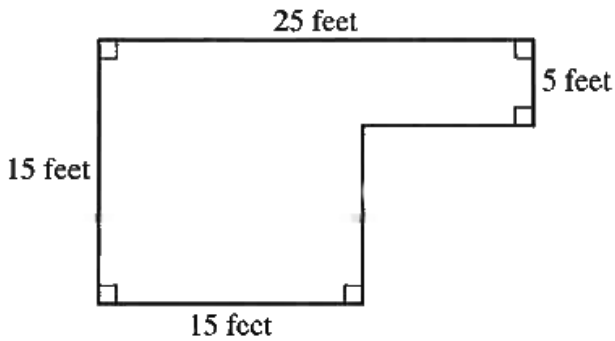
D.  $-1$

**Answer: C**



Watch Video Solution

144. What is the area, in square feet, of the figure below?



- A. 60
- B. 80
- C. 275
- D. 375

**Answer: C**



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**145.** Barb is going to cover a rectangular area 8 feet by 10 feet with rectangular paving blocks that are 4 inches by 8 inches by 2 inches to make a flat patio. What is the minimum number of paving blocks she will need if all the paving blocks will face the same direction?

(Note: Barb will not cut any of the paving blocks.)

A. 80

B. 360

C. 601

D. 960

**Answer: B**



**Watch Video Solution**

**146.** What is the slope of the line represented by the equation  $6y - 14x = 5$ ?

A.  $-14$

B.  $\frac{5}{6}$

C.  $\frac{7}{3}$

D.  $6$

**Answer: C**



**Watch Video Solution**

**147.** Let  $m$  and  $n$  be 2 positive integers, such that  $m < n$ . Which of the following compound inequalities must be true?

A.  $0 < \sqrt{mn} < m$

B.  $1 < \sqrt{mn} < m$

C.  $m < \sqrt{mn} < n$

D.  $\sqrt{m} < \sqrt{mn} < \sqrt{n}$

**Answer: C**



Watch Video Solution

**148.** Two similar triangles have perimeters in the ratio 3:5. The sides of the smaller triangle measure 3 cm, 5 cm, and 7 cm, respectively. What is the perimeter, in centimeters, of the larger triangle?

A. 15

B. 18

C. 20

D. 25

**Answer: D**

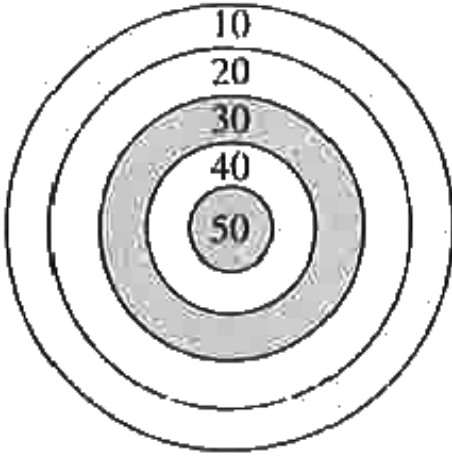


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**149.** Thomas and Jonelle are playing darts in their garage using the board with the point value for each region shown below. The radius of the outside circle is 10 inches, and each of the other circles has a radius 2 inches smaller than the next larger circle. All of the circles have the same center. Thomas has only 1 dart left to throw and needs at least 30 points to win the game. Assuming that his last dart hits at a random point within a single region on the board, what is the

percent chance that Thomas will win the game?



A. 36 %

B. 0.3

C. 0.16

D. 0.09

**Answer: A**



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**150.** When asked his age, the algebra teacher said, " if you square my age, then subtract 23 times my age, the result is 50." How old is he?

A. 23

B. 25

C. 27

D. 46

**Answer: B**



**Watch Video Solution**

**151.** The distance,  $d$ , an acceleration rate, in meters per second per second. If a car accelerates from a stop at the rate of 20 meters per second per second and travels a distance of 80 meters, about how many seconds did the car travel?

A. Between 1 and 2

B. Between 2 and 3

C. Between 3 and 4

D. 4

**Answer: B**



**Watch Video Solution**

**152.** Which of following is the set of all real numbers  $x$  such that  $x + 3 > x + 5$ ?

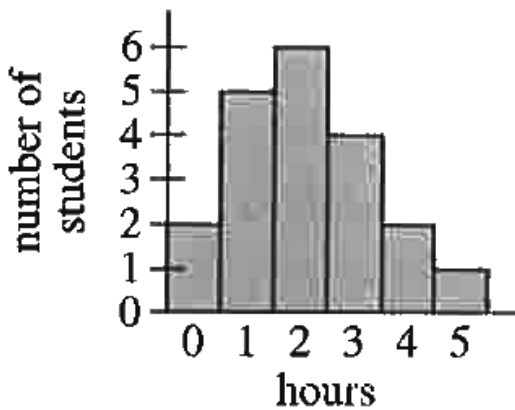
- A. The empty set
- B. The set containing all real numbers
- C. The set containing all nonnegative real numbers
- D. The set containing all positive real numbers

**Answer: A**



**Watch Video Solution**

**153.** A survey in a study skills class asked the 20 students enrolled in the class how many hours (rounded to the nearest hour) they had spent studying on the previous evening. The 20 responses are summarized by the histogram below.



What fraction of the students responded that they had spent less than 3 hours studying?

A.  $\frac{13}{100}$

B.  $\frac{1}{5}$

C.  $\frac{3}{10}$

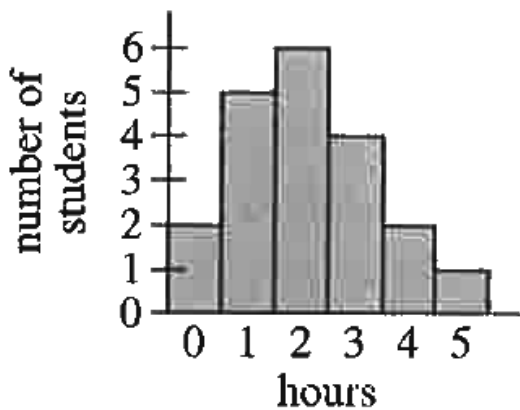
D.  $\frac{13}{20}$

**Answer: D**



**Watch Video Solution**

**154.** A survey in a study skills class asked the 20 students enrolled in the class how many hours (rounded to the nearest hour) they had spent studying on the previous evening. The 20 responses are summarized by the histogram below.



The teacher decides to show the data in a circle graph (pie chart). What should be the measure of the central angle of the sector for 3 hours?

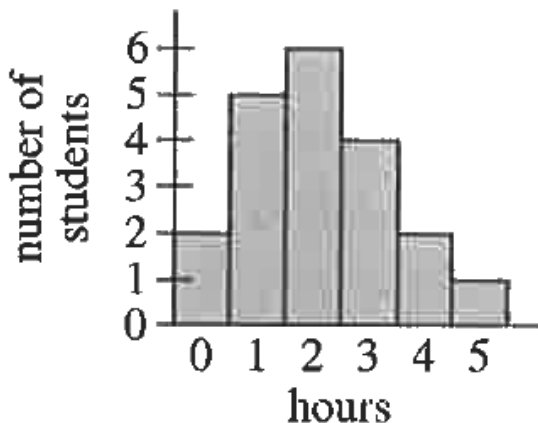
- A.  $18^\circ$
- B.  $20^\circ$
- C.  $36^\circ$
- D.  $72^\circ$

Answer: D



Watch Video Solution

**155.** A survey in a study skills class asked the 20 students enrolled in the class how many hours (rounded to the nearest hour) they had spent studying on the previous evening. The 20 responses are summarized by the histogram below.



To the nearest tenth of an hour, what is the average number of hours for the 20 survey responses?

A. 2.0

B. 2.1

C. 2.3

D. 2.5

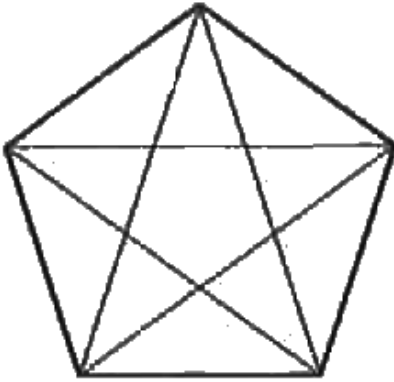
**Answer: B**



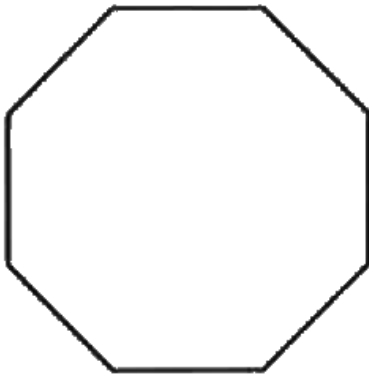
**Watch Video Solution**



156. Pentagons have 5 diagonals, as illustrated below.



How many diagonals does the octagon below have?



A. 8

B. 16

C. 20

D. 30

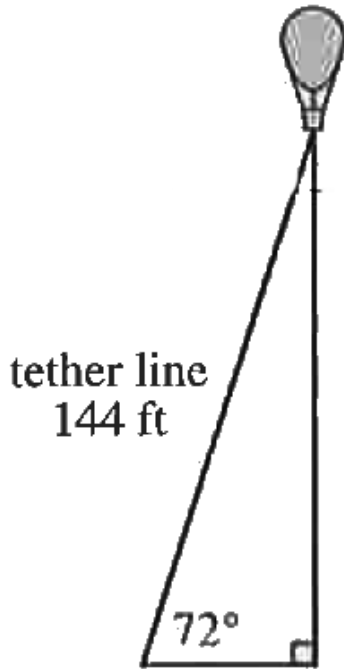
**Answer: C**



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**157.** The bottom of the basket of a hot-air balloon is parallel to the level ground. One taut tether line 144 feet long is attached to the centre of the bottom of the basket and is anchored to the ground at an angle of  $72^\circ$ , as shown in the figure below. Which of the following expressions gives the distance, in feet, from

the center of the bottom of the basket to the ground?



A.  $\frac{144}{\cos 72^\circ}$

B.  $\frac{144}{\sin 72^\circ}$

C.  $144 \tan 72^\circ$

D.  $144 \sin 72^\circ$

Answer: D



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158. The coordinates of the endpoints of  $\overline{GH}$ , in the standard  $(x,y)$  coordinate plane, are  $(-8, -3)$  and  $(2,3)$ .

What is the  $x$ -coordinate of the midpoint of  $\overline{GH}$ ?

A.  $-6$

B.  $-3$

C.  $0$

D.  $3$



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159. Let  $2x + 3y = 4$  and  $5x + 6y = 7$ . What is the value of  $8x + 9y$ ?

A.  $-10$

B.  $-1$

C.  $2$

D.  $10$

**Answer: D**



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**160.** What are the value of  $\theta$ , between 0 and  $2\pi$ , when  $\tan \theta = -1$ ?

- A.  $\frac{\pi}{4}$  and  $\frac{3\pi}{4}$  only
- B.  $\frac{3\pi}{4}$  and  $\frac{5\pi}{4}$  only
- C.  $\frac{3\pi}{4}$  and  $\frac{7\pi}{4}$  only
- D.  $\frac{5\pi}{4}$  and  $\frac{7\pi}{4}$  only

**Answer: C**



**View Text Solution**

**161.** For the complex number  $i$  and an integer  $x$ , which of the following is a possible value of  $i^x$ ?

A. 0

B. 1

C. 2

D. 3

**Answer: B**



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**162.** A can of soda pop has the shape of a right circular cylinder with an inside height of 6 inches and an inside diameter of 2 inches. When you pour the soda pop from the full can into a cylindrical glass with an inside diameter of 3 inches, about how many inches high is the soda pop in the glass?

(Note: The volume of a right circular cylinder is  $\pi r^2 h$ )

A.  $2\frac{2}{3}$

B. 4

C. 5

D.  $6\frac{2}{3}$

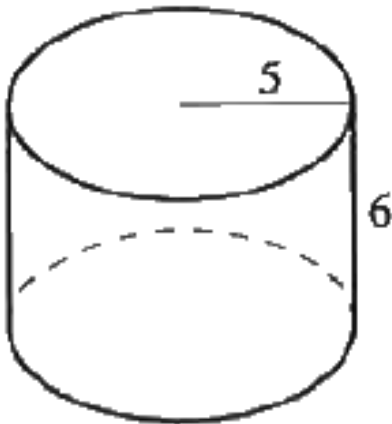
**Answer: A**





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**163.** The height and radius of the right circular cylinder below are given in meters. What is the volume, in cubic meters, of the cylinder?



A.  $30\pi$

B.  $31\pi$

C.  $150\pi$

D.  $180\pi$

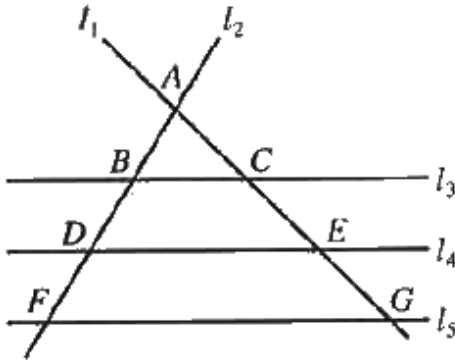
**Answer: C**



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**164.** Lines  $l_1$  and  $l_2$  intersect each other and 3 parallel lines,  $l_3, l_4$  and  $l_5$ , at the points shown in the figure below. The ratio of the perimeter of  $\triangle ABC$  to the perimeter of  $\triangle AFG$  is 1:3 . The ratio of DE to FG is

2:3. What is the ratio of AC to CE?



A. 1 : 1

B. 1 : 2

C. 1 : 3

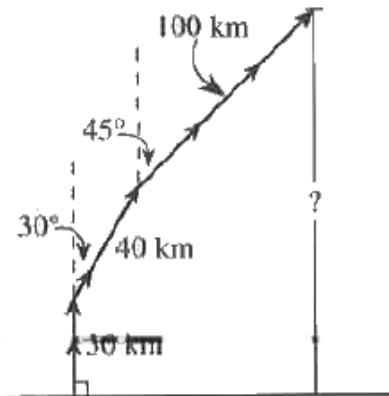
D. 2 : 1

**Answer: A**



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**165.** A rocket lifted off from a launch pad and traveled vertically 30 kilometers, then traveled 40 kilometers at  $30^\circ$  from the vertical, and then traveled 100 kilometers at  $45^\circ$  from the vertical, as shown in the figure below. At that point, the rocket was how many kilometers above the height of the launched pad?



- A. 100
- B. 170

C. 190

D.  $30 + 20\sqrt{3} + 50\sqrt{2}$

**Answer: D**



**View Text Solution**

**166.** Machine A produces 500 springs a day. The number of defective springs produced by this machine each day is recorded for 60 days. Based on the distribution given below. What is the expected value of the number of defective springs produced by Machine

A in any single day?

Number, $n$ , of defective springs produced	Probability that $n$ defective springs are produced in any single day
0	0.70
1	0.20
2	0.05
3	0.05

A. 0.00

B. 0.45

C. 0.70

D. 1.00

**Answer: B**



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**167.** The height above the ground,  $h$  units, of an object  $t$  seconds after being thrown from the top of a building is given by the equation  $h = -2t^2 + 10t + 48$ . An equivalent factored form of this equation shows that the object:

- A. starts at a point 2 units off the ground
- B. reaches a maximum height of 3 units
- C. reaches a maximum height of 8 units.
- D. reaches the ground at 8 seconds.

**Answer: D**



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**168.** For all positive values of  $g$  and  $h$ , which of the following expressions is equivalent to

$$g^2 \sqrt{g^5} \cdot h^2 \sqrt[4]{h^5} ?$$

A.  $g^2 h^2 \sqrt[5]{g^2 h^2}$

B.  $g^3 h \sqrt[4]{g^2 h^3}$

C.  $g^4 h^3 \sqrt[4]{g^2 h}$

D.  $g^4 h^4 \sqrt[4]{g^2 h}$

**Answer: C**



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**169.** The value of  $\log_e \left( 5^{\frac{13}{2}} \right)$  is between which of the following pairs of consecutive integers?

A. 0 and 1

B. 4 and 5

C. 5 and 6

D. 6 and 7

**Answer: D**



**View Text Solution**

**170.** A storage facility is currently offering a special rate to customers who sign contracts for 6 months or more. According to this special rate, the first month's rent is \$1, and for each month after the first month, customers pay the regular monthly rental rate. The table below shows the storage unit sizes available, the floor dimensions, and the regular monthly rental rate. All the units have the same height.

Size	Floor dimensions, in meters	Regular monthly rental rate
1	2 × 4	\$ 30
2	4 × 4	\$ 60
3	4 × 8	\$100
4	8 × 8	\$150
5	8 × 16	\$200

Daria will sign a contract to rent a Size 3 unit for 12 months at the current special rate. The amount Daria

will pay for 12 months at the current special rate represents what decrease from the regular rental rate for 12 months?

A. 0.0825

B. 0.0833

C. 0.0842

D. 0.09

**Answer: A**



[View Text Solution](#)

**171.** A storage facility is currently offering a special rate to customers who sign contracts for 6 months or more. According to this special rate, the first month's rent is \$1, and for each month after the first month, customers pay the regular monthly rental rate. The table below shows the storage unit sizes available, the floor dimensions, and the regular monthly rental rate. All the units have the same height.

Size	Floor dimensions, in meters	Regular monthly rental rate
1	2 × 4	\$ 30
2	4 × 4	\$ 60
3	4 × 8	\$100
4	8 × 8	\$150
5	8 × 16	\$200

Size 5 units can be subdivided to form other sizes of

units. What is the greatest number of Size 1 units that can be formed from a single size 5 unit?

A. 2

B. 4

C. 8

D. 16

**Answer: D**



[View Text Solution](#)

**172.** A storage facility is currently offering a special rate to customers who sign contracts for 6 months or

more. According to this special rate, the first month's rent is \$1, and for each month after the first month, customers pay the regular monthly rental rate. The table below shows the storage unit sizes available, the floor dimensions, and the regular monthly rental rate. All the units have the same height.

Size	Floor dimensions, in meters	Regular monthly rental rate
1	2 × 4	\$ 30
2	4 × 4	\$ 60
3	4 × 8	\$100
4	8 × 8	\$150
5	8 × 16	\$200

Janelle, the owner of the storage facility, is considering building new units that have floor dimensions larger than size 5 units. She will use the floor area to determine the heating requirements of these larger units. For this calculation, Janelle will use the same

relationship between the unit size number and the respective floor area for sizes 1 through 5, which of the following expressions gives the floor area, in square meters, of a Size  $x$  storage unit?

A.  $2^3 \cdot x$

B.  $2^{3x}$

C.  $2^{2+x}$

D.  $2(x + 1)^2$

**Answer: C**



**View Text Solution**

**173.** The component forms of vectors  $u$  and  $v$  are given by  $u = \langle 5, 3 \rangle$  and  $v = \langle 2, -7 \rangle$ . Given that  $2u + (-3v) + w = 0$ , what is the component form of  $w$ ?

A.  $\langle -16, 15 \rangle$

B.  $\langle -4, -27 \rangle$

C.  $\langle 3, 10 \rangle$

D.  $\langle 4, 27 \rangle$

**Answer: B**



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174. For how many integers  $x$  is the equation

$$3^{x+1} = 9^{x-2} \text{ true?}$$

A. 0

B. 1

C. 2

D. 3

**Answer: B**



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175. Which of the following expressions gives the number of distinct permutations of the letters in

PEOPLE?

A.  $6!$

B.  $4(4!)$

C.  $\frac{6!}{4!}$

D.  $\frac{6!}{(2!)(2!)}$

**Answer: D**



[View Text Solution](#)

**176.** Which of the following expressions is equivalent

to  $49x^2 + 81$  ?

A.  $(7x + 9)^2$

B.  $(7x + 9i)^2$

C.  $(7x - 9i)^2$

D.  $(7x - 9i)(7x + 9i)$

**Answer: D**



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**177.** The top surface of a rectangular table has an area of 100 square feet and a width of 5 feet. What is the length, in feet, of the surface?

A. 10

B. 15

C. 20

D. 95

**Answer: C**



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**178.** A wallet containing 2 five-dollar bills, 9 ten-dollar bills, and 5 twenty-dollar bills is found and returned to its owner. The wallet's owner will reward the finder with 1 bill drawn randomly from the wallet. What is the probability that the bill drawn will be a twenty-dollar bill?

A.  $\frac{1}{16}$

B.  $\frac{1}{10}$

C.  $\frac{1}{5}$

D.  $\frac{5}{16}$

**Answer: D**



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**179.** In his costume supplies, Elmo the clown has 4 noses, 3 pair of lips, and 2 wigs. A clown costume consists of 1 nose, 1 pair of lips, and 1 wig. How many different clown costume can Elmo make?

A. 3

B. 9

C. 12

D. 24

**Answer: D**



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**180.** Esteban and his family are making care packages to send to children at summer camp. Each complete care package contains 5 pens, 2 notebooks, 3 envelopes, 12 cookies, and 5 candy bars. Esteban and his family have already made 7 complete care packages and the

following materials remain:

3 boxes of pens (10 pens per box)

4 boxes of notebooks (5 notebooks per box)

2 boxes of envelopes (12 envelopes per box)

84 cookies

$4\frac{1}{2}$  boxes of candy bars (10 candy bars per box)

How many additional complete care packages can Esteban and his family make with the remaining materials?

A. 6

B. 7

C. 8

D. 10

**Answer: A**



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**181.** A formula for the volume of a right circular cone is

$V = \frac{1}{3}\pi r^2 h$ , where  $r$  is the radius of the base and  $h$  is

the height of the cone. Using  $\frac{22}{7}$  as an approximate

value for  $\pi$ , which of the following values is closest to

the volume, in cubic inches, of a cone with height 28

inches and radius 6 inches?

A. 264

B. 352

C. 1056

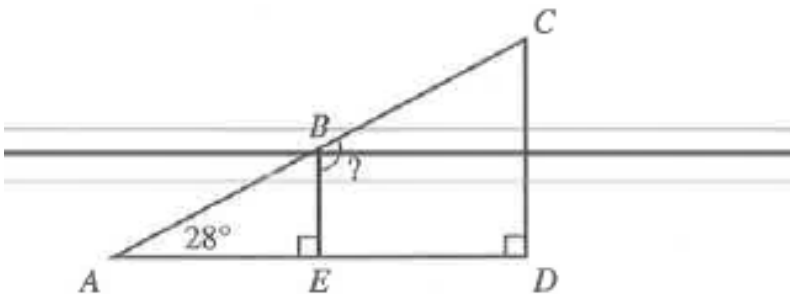


D. 4224

Answer: C

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182. In  $\triangle ACD$  below,  $B$  is on  $\overline{AC}$ ,  $E$  is on  $\overline{AD}$ , the measure of  $\angle CAD$  is  $28^\circ$ , and  $\overline{AD}$  is perpendicular to both  $\overline{BE}$  and  $\overline{CD}$ . What is the measure of  $\angle CBE$ ?



A.  $104^\circ$

B.  $118^\circ$

C.  $124^\circ$

D.  $146^\circ$

**Answer: B**



**Watch Video Solution**

**183.** What is the sum of

$0.1x^2 + 3x + 80$  and  $0.5x^2 - 2x + 60$  for all  $x$ ?

A.  $-0.4x^2 + 5x + 20$

B.  $0.6x^2 + x + 140$

C.  $0.6x^2 + 5x + 140$

$$D. x^2 + 5x + 140$$

**Answer: B**



**Watch Video Solution**

**184.** Student studying motion observed a cart rolling at a constant rate along a straight line. The table below gives the distance,  $d$  feet, the cart was from a reference point at 1-second intervals from  $t = 0$  seconds to  $t = 5$  seconds.

$t$	0	1	2	3	4	5
$d$	15	18	21	24	27	30

Which of the following equations represents this relationship between  $d$  and  $t$ ?

A.  $d = t + 15$

B.  $d = 3t + 12$

C.  $d = 3t + 15$

D.  $d = 15t + 3$

**Answer: C**



**Watch Video Solution**

**185.** Dimitry bought a pair of pants at the discounted price of \$30. The original price of the pants was \$40.

What was the percent of the discount?

A. 0.04

B. 0.1

C. 0.25

D.  $33\frac{1}{3}\%$

**Answer: C**



[View Text Solution](#)

**186.** What is the value of  $|-6| - |7 - 41|$ ?

A.  $-40$

B.  $-28$

C.  $28$

D.  $40$

**Answer: B**



**View Text Solution**

**187.** Samantha, Nyla, and Jerry own shares of stock in the Triumph Hotels company. The shares of stock that they own have a combined value of \$6,880. Samantha owns 70 shares, Nyla owns 50 shares, and Jerry owns 40 shares. What is the value of the shares Samantha owns?

A. \$ 98

B. \$ 301

C. \$3,010

D. \$4,816

**Answer: C**



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**188.** A new club wants to attract customers who are at least 18 but less than 30 years of age. One of the number lines below illustrates the range of ages, in years, of the customers the club wants to attract. Which number line is it?



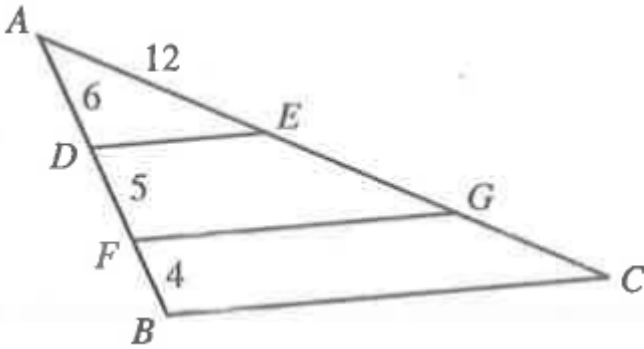
**Answer: A,B**

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**189.** In the figure shown below, E and G lie on  $\overline{AC}$ , D and F lie on  $\overline{AB}$ ,  $\overline{DE}$  and  $\overline{FG}$  are parallel to  $\overline{BC}$ , and the given lengths are in feet. What is the length of  $\overline{AC}$



, in feet?



A. 9

B. 18

C. 21

D. 30

**Answer: D**



**Watch Video Solution**

190. Which of the following integers is closest to  $\frac{\sqrt{50}}{2}$ ?

A. 3

B. 4

C. 5

D. 13

**Answer: B**



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191. The ratio of Jane's age to her daughter's age is 9:2.

The sum of their ages is 44. How old is Jane?

A. 22

B. 33

C. 35

D. 36

**Answer: D**



**View Text Solution**

**192.** For the next school year, a college will use  $\frac{1}{9}$  of the money in its operating budget for library books and  $\frac{1}{6}$  of the money in its operating budget for scholarships. What fraction of the operating budget remains for other uses?

A.  $\frac{1}{18}$

B.  $\frac{5}{18}$

C.  $\frac{13}{18}$

D.  $\frac{20}{27}$

**Answer: C**



**Watch Video Solution**

**193.** What value of  $x$  makes the proportion below true?

$$\frac{10}{10 + x} = \frac{35}{42}$$

A. 2

B. 7

C. 12

D. 17

**Answer: A**

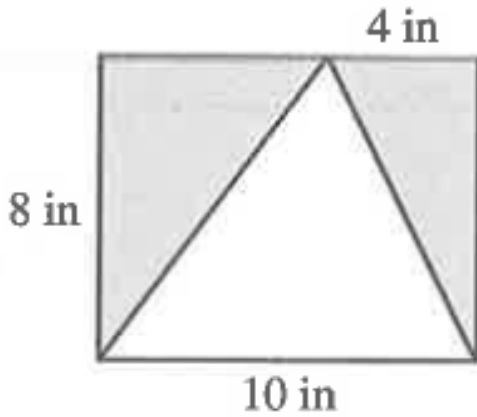


**View Text Solution**

**194.** The rectangle shown in the figure below is partitioned into 3 triangles, 2 of which are shaded.

What is the total area, in square inches, of the 2

shaded regions?



A. 20

B. 24

C. 32

D. 40

**Answer: D**



[View Text Solution](#)

**195.** Which of the following ordered pairs in the standard (x,y) coordinate plane satisfies the system of inequalities below?

$$x > 2$$

$$y > 0$$

$$x + y < 5$$

A. (1,3)

B. (2,2)

C. (3,1)

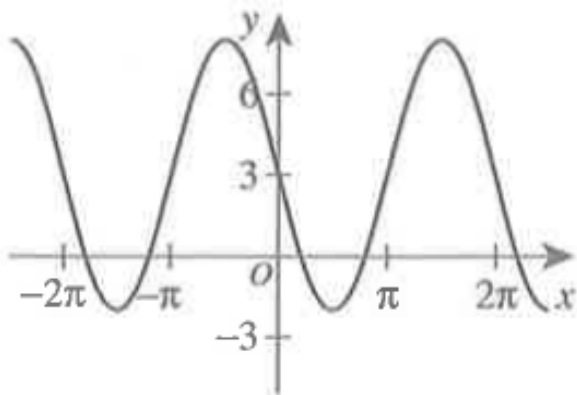
D. (3,2)

**Answer: C**



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196. The graph of  $y = 3 - 5 \sin(x - \pi)$  is shown in the standard  $(x, y)$  coordinate plane below. What is the range of  $y$ ?



- A.  $-5 \leq y \leq 5$
- B.  $-2 \leq y \leq 2$
- C.  $-2 \leq y \leq 8$
- D.  $3 \leq y \leq 8$



**Answer: C**



**View Text Solution**

**197.** Given functions  $f(x) = 2x + 1$  and  $g(x) = x^2 - 4$ , what is the value of  $f(g(-3))$ ?

A.  $-29$

B.  $-25$

C.  $-19$

D.  $11$

**Answer: D**



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**198.** A fabric store sells flannel and calico fabrics. Joan pays \$25 for 3 yards of flannel and 4 yards of calico. Chris pays \$11 for 1 yard of flannel and 2 yards of calico. What is the price of 1 yard of calico?

A. \$3

B. \$4

C. \$5

D. \$6

**Answer: B**



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**199.** The scores given below were earned by 10 students on a recent biological test. What is the median score?

71, 94, 86, 77, 88, 94, 88, 80, 78, 94

A. 85

B. 86

C. 87

D. 88

**Answer: D**



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**200.** A parallelogram has a perimeter of 84 inches, and 1 of its sides measures 16 inches. If it can be determined, what are the lengths, in inches, of the other 3 sides.

A. 16,16,36

B. 16,18,18

C. 16,26,26

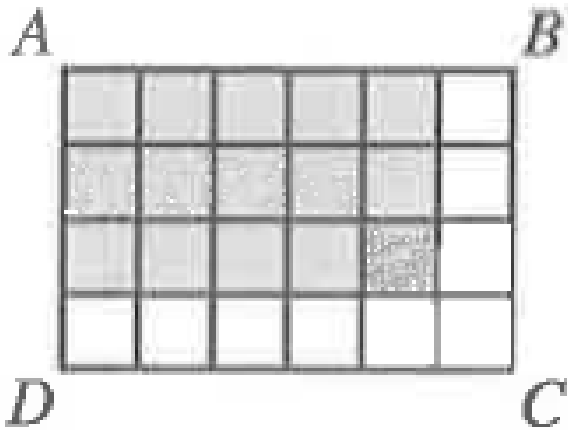
D. 16,34,34

**Answer: C**



**Watch Video Solution**

201. In the figure below, all of the small square are equal in area, and the area of rectangle ABCD is 1 square unit. Which of the following expressions represents the area, in square units, of the shaded region?



A.  $\frac{1}{6} \cdot \frac{1}{4}$

B.  $\frac{1}{6} \cdot \frac{3}{4}$

C.  $\frac{1}{6} \cdot \frac{5}{6}$

D.  $\frac{5}{6} \cdot \frac{3}{4}$

**Answer: D**



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**202.** A bag contains 16 red marbles, 7 yellow marbles, and 19 green marbles. How many additional red marbles must be added to the 42 marbles already in the bag so that probability of randomly drawing a red marble is  $\frac{3}{5}$ ?

A. 18

B. 23

C. 37

D. 42

**Answer: B**



**Watch Video Solution**

**203.** For all  $a > 0$ , which of the following expression is equal to  $a^{-2}$ ?

A.  $-2a$

B.  $-a^2$

C.  $\frac{1}{2a}$

D.  $\frac{1}{a^2}$

**Answer: D**



**View Text Solution**

**204.** Jamie claims, "If a triangle is in Set A, then it is not isosceles." Later, Jamie discovers that  $\triangle MNP$  is a counter example proving this claim false. Which of the following statements must be true about  $\triangle MNP$ ?

- A. It is isosceles and in Set A
- B. It is scalene and in Set A.
- C. It is obtuse and not in Set A.



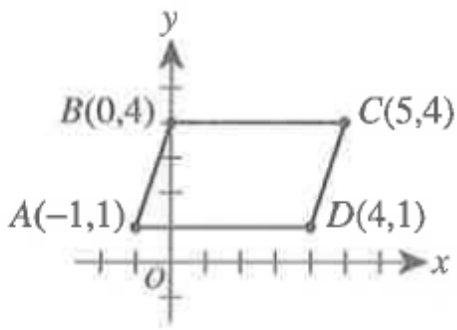
D. It is scalene and not in Set A.

**Answer: A**



**Watch Video Solution**

**205.** Parallelogram ABCD is graphed in the standard (x,y) coordinate plane below. Sides  $\overline{AB}$  and  $\overline{CD}$  are each  $\sqrt{10}$  coordinate units long. Sides  $\overline{AD}$  and  $\overline{BC}$  are each 5 coordinate unit long. The distance between  $\overline{AD}$  and  $\overline{BC}$  is 3 coordinate units.



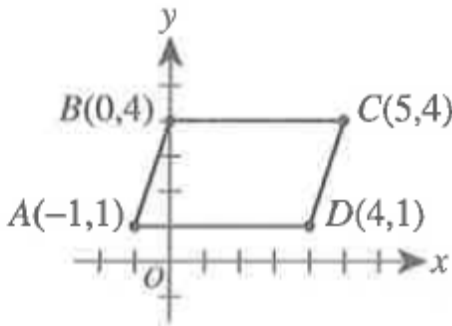
What is the area, in square coordinate units, of ABCD ?

- A. 5
- B. 7.5
- C. 10
- D. 15

**Answer: D**

 [Watch Video Solution](#)

206. Parallelogram ABCD is graphed in the standard (x,y) coordinate plane below. Sides  $\overline{AB}$  and  $\overline{CD}$  are each  $\sqrt{10}$  coordinate units long. Sides  $\overline{AD}$  and  $\overline{BC}$  are each 5 coordinate unit long. The distance between  $\overline{AD}$  and  $\overline{BC}$  is 3 coordinate units.



What is the distance, in coordinate units, from B to D?

A. 3

B. 4

C. 5

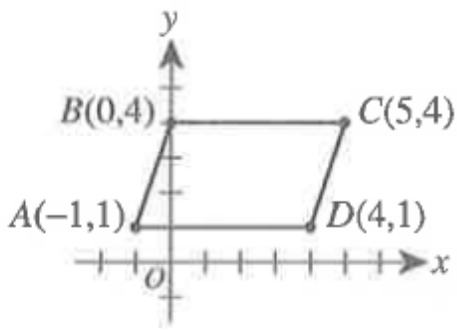
D.7

**Answer: C**



**Watch Video Solution**

**207.** Parallelogram ABCD is graphed in the standard (x,y) coordinate plane below. Sides  $\overline{AB}$  and  $\overline{CD}$  are each  $\sqrt{10}$  coordinate units long. Sides  $\overline{AD}$  and  $\overline{BC}$  are each 5 coordinate unit long. The distance between  $\overline{AD}$  and  $\overline{BC}$  is 3 coordinate units.



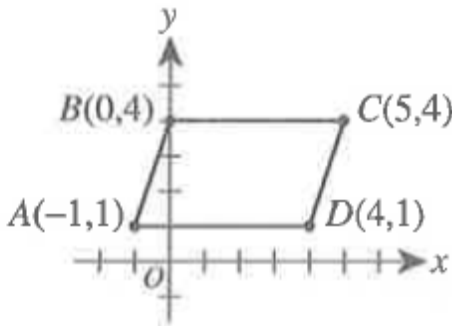
What is the slope of  $BC$   $\leftrightarrow$  ?

- A. 0
- B. 1
- C. 4
- D. 5

**Answer: A**

 [Watch Video Solution](#)

**208.** Parallelogram ABCD is graphed in the standard (x,y) coordinate plane below. Sides  $\overline{AB}$  and  $\overline{CD}$  are each  $\sqrt{10}$  coordinate units long. Sides  $\overline{AD}$  and  $\overline{BC}$  are each 5 coordinate unit long. The distance between  $\overline{AD}$  and  $\overline{BC}$  is 3 coordinate units.



Parallelogram ABCD will be reflected over the y-axis.

what will be the coordinates of the image of A?

A. (-4, 1)

B. (-1, -1)

C. (1, -1)

D. (1,1)

**Answer: D**



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**209.** Which of the following is equivalent to  $8^2 \cdot 4^{0.5}$ ?

A.  $2^7$

B.  $4^{4.5}$

C.  $8^{2.5}$

D.  $16^2$

**Answer: A**



**View Text Solution**

**210.** A school admissions office accepts 2 out of every 7 applicants. Given that the school accepted 630 student. How many applicants were NOT accepted?

A. 140

B. 180

C. 490

D. 1575

**Answer: D**





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211. What is the value of  $\log_2 \sqrt{8}$ ?

A.  $\frac{1}{2}$

B.  $\frac{3}{2}$

C.  $\sqrt{2}$

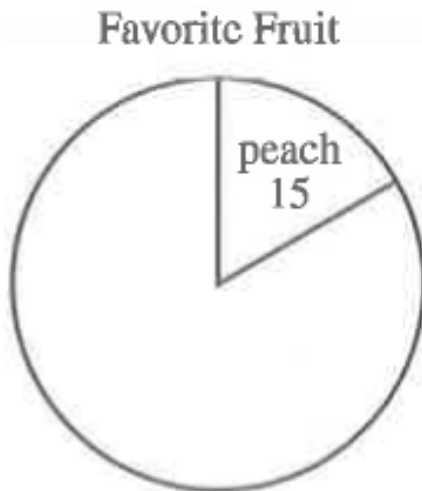
D. 1

**Answer: B**



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212. Jie asked 90 students to choose 1 favourite fruit from 4 options. Jie has begun to represent the results in the circle graph below. Peaches were chosen as the favourite of 15 students. Apples, bananas, and strawberries were each chosen as favourite by an equal number of the remaining students. What must be the measure of the central angle in the circle graph for banana?



A.  $100^\circ$

B.  $102^\circ$

C.  $105^\circ$

D.  $112.5^\circ$

**Answer: A**



**Watch Video Solution**

**213.** For all real number  $x$  such that

$$x \neq 0, \frac{4}{5} + \frac{7}{x} = ?$$

A.  $\frac{11}{5x}$

B.  $\frac{28}{5x}$

C.  $\frac{11}{5 + x}$

D.  $\frac{4x + 35}{5x}$

**Answer: D**



[View Text Solution](#)

**214.** The Harrisburg Recreation Center recently changed its hours to open 1 hour later and close 3 hours later than it had previously. Residents of Harrisburg age 16 or older were given a survey and 560 residents replied. The survey asked each resident his or her student status (high school, college, or nonstudent) and what he or she thought about the

change in hour (approve, disapprove, or no opinion).

The results are summarized in the table below.

Student status	Approve	Disapprove	No opinion
High school	30	4	11
College	14	10	6
Nonstudent	85	353	47
Total	129	367	64

What fraction of these nonstudent residents replied they disapproved of the change in hours?

A.  $\frac{1}{3}$

B.  $\frac{4}{45}$

C.  $\frac{14}{75}$

D.  $\frac{353}{485}$

**Answer: D**



**Watch Video Solution**

**215.** The Harrisburg Recreation Center recently changed its hours to open 1 hour later and close 3 hours later than it had previously. Residents of Harrisburg age 16 or older were given a survey and 560 residents replied. The survey asked each resident his or her student status (high school, college, or nonstudent) and what he or she thought about the change in hour (approve, disapprove, or no opinion).

The results are summarized in the table below.

Student status	Approve	Disapprove	No opinion
High school	30	4	11
College	14	10	6
Nonstudent	85	353	47
Total	129	367	64

Suppose a person will be chosen at random from

these 560 residents. Which of the following values is closest to the probability that the person chosen will NOT be a high student and will NOT have replied with no opinion?

A. 0.06

B. 0.09

C. 0.44

D. 0.83

**Answer: D**



**Watch Video Solution**

**216.** The Harrisburg Recreation Center recently changed its hours to open 1 hour later and close 3 hours later than it had previously. Residents of Harrisburg age 16 or older were given a survey and 560 residents replied. The survey asked each resident his or her student status (high school, college, or nonstudent) and what he or she thought about the change in hour (approve, disapprove, or no opinion).

The results are summarized in the table below.

Student status	Approve	Disapprove	No opinion
High school	30	4	11
College	14	10	6
Nonstudent	85	353	47
Total	129	367	64

After constructing the table, it was discovered that the student status of 15 residents who replied that they



approved had been incorrectly classified as nonstudents. After correcting the errors, exactly 60% of the college students had replied that they approved. To the nearest 1%, what percent of high school students replied that they approved?

A. 0.6

B. 0.67

C. 0.7

D. 0.75

**Answer: C**



[View Text Solution](#)

217. Set A and Set B each consist of 5 distinct numbers. The 2 sets contain identical numbers with the exception of the number with the least value in each set. The number with the least value in Set B is greater than the number with the least value in Set A. The value of which of the following measures must be greater for Set B than for Set  $\Delta$ ?

- A. Mean only
- B. Median only
- C. Mode only
- D. Mean and median only

**Answer: A**

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**218.** For all  $x$  such that  $0 \leq x \leq 90$ , which of the following expression is NOT equal to  $\sin x^\circ$ ?

A.  $-\sin(-x^\circ)$

B.  $\sin(-x^\circ)$

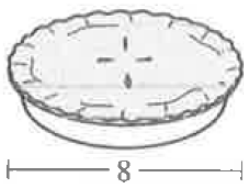
C.  $\cos(90 - x)^\circ$

D.  $\cos(x - 90)^\circ$

**Answer: B**

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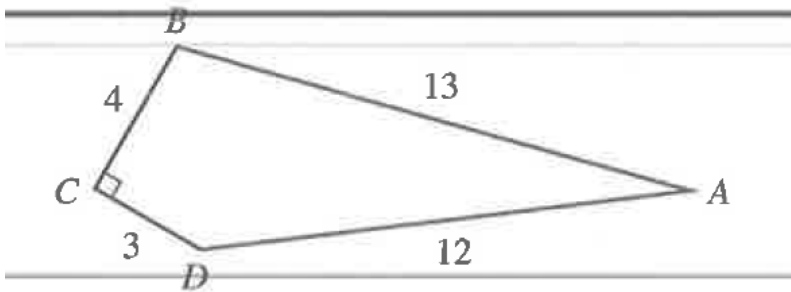
219. A 3-inch-tall rectangular box with a square base is constructed to hold a circular pie that has a diameter of 8 inches. Both are shown below. What is the volume, in cubic inches, of the smallest such box that can hold this pie?



- A. 24
- B. 64
- C. 72
- D. 192

**Answer: D**

220. Quadrilateral ABCD is shown in the figure below with the lengths of the 4 sides given in meters. The measure of  $\angle C$  is  $90^\circ$ . What is  $\tan A$ ?



- A.  $\frac{4}{12}$
- B.  $\frac{5}{12}$
- C.  $\frac{4}{13}$
- D.  $\frac{5}{13}$

**Answer: B**



**Watch Video Solution**

**221.** Given today is Tuesday, what day of the week was it 200 days ago?

A. Monday

B. Tuesday

C. Wednesday

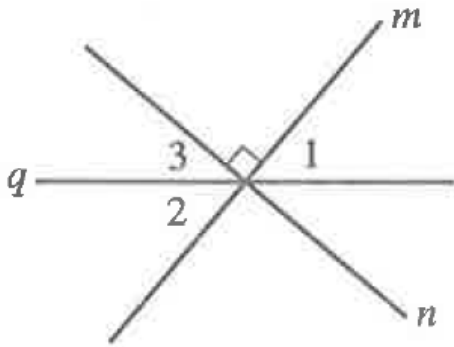
D. Friday

**Answer: D**



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222. In the figure below, line  $m$  is perpendicular to line  $n$ , and both lines intersect line  $q$  at the same point. The measure of  $\angle 1$  is  $(3x - 10)^\circ$ , and the measure of  $\angle 2$  is  $(2x + 10)^\circ$ . What is the measure of  $\angle 3$ ?



A.  $36^\circ$

B.  $40^\circ$

C.  $44^\circ$

D.  $45^\circ$

**Answer: B**



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**223.** The greatest common factor of 2 whole numbers is 10. The least common multiple of these same 2 numbers is 120. What are the 2 numbers?

A. 6 and 20

B. 10 and 12

C. 10 and 20



D. 30 and 40

**Answer: D**



[View Text Solution](#)

**224.** The side lengths of a certain triangle are 4, 5, and 7 centrimeters. Which of the following descriptions best classifies this triangle?

- A. Scalene acute
- B. Scalene right
- C. Scalene obtuse
- D. Isosceles obtuse

**Answer: C**



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**225.** A professional baseball will play 1 game Saturday and 1 game Sunday. A sports writer estimates the team has a 60% chance of winning on Saturday but only a 35% chance of winning on Sunday. Using the sportswriter's estimates, what is the probability that the team will lose both games ?

(Note : Neither game can result in a tie.)

A. 14 %

B. 21 %

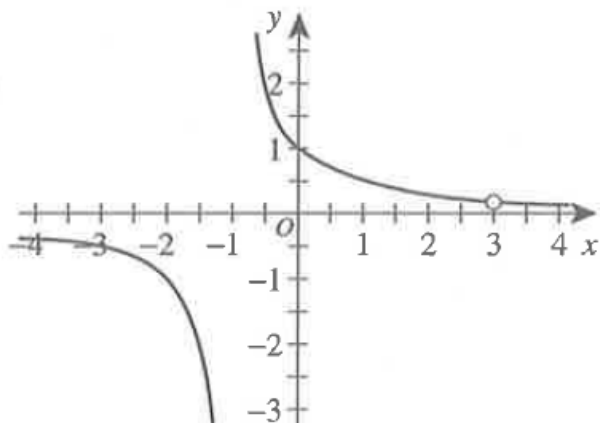
C. 25 %

D. 26 %

**Answer: D**

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226. The graph of  $f(x) = \frac{x - 3}{x^2 - 2x - 3}$  is shown below. What is the domain of  $f(x)$  ?



A.  $\{x \mid x \neq -1\}$

B.  $\{x \mid x \neq 2\}$

C.  $\{x \mid x \neq 3\}$

D.  $\{x \mid x \neq -1 \text{ and } x \neq 3\}$

**Answer: D**



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**227.** Get - A - Read Books is adding a new phone line. The phone company says that the first 3 digits of the phone number must be 555, but the remaining 4 digits, where each digit is a digit from 0 through 9, can

be chosen by Get-A-Great-Read Books. How many phone numbers are possible?

A.  $5(9^4)$

B.  $5^3(9^4)$

C.  $5^3(10^4)$

D.  $10^4$

**Answer: D**



**Watch Video Solution**

**228.** In the standard  $(x,y)$  coordinate plane, the circle centered at  $(1,3)$  that passes through  $(4,7)$  is the set of

all points that are:

- A. 5 coordinate units from (1,3)
- B. 5 coordinate units from both (1,3) and (4,7)
- C. 5 coordinate units from the line segment with endpoints (1,3) and (4,7)
- D. equidistant from (1,3) and (4,7)

**Answer: A**



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**229.** Which of the following values is the x-coordinate of the point in the standard (x,y) coordinate plane

where the graph of the line  $y = 7$  intersects the graph of the function  $y = \ln(x - 2) + 3$ ?

A. 6

B.  $e^4 + 2$

C.  $4e + 2$

D.  $\ln(4) + 2$

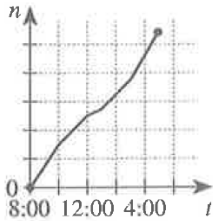
**Answer: B**



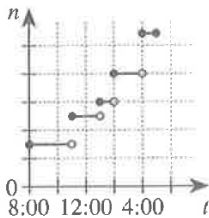
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**230.** Three copy machines- A,B and C- copy at the same rate and will all be used to make copies of a report. At

8:00 a.m., all 3 machines begin copying Machine A breaks down at 10:00 a.m. And is back in service at 1:00 p.m. Machine B breaks down at 12:00 p.m. (noon) and begins copying again at 3:00 p.m. All 3 machines finish copying at 5:00 p.m. when the copying of the report is complete. One of the following graphs shows  $n$ , the numbers of copies made, as a function of  $t$ , the time at any given point during the copying. Which graph is it?

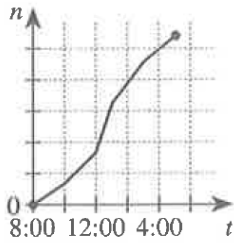


A.

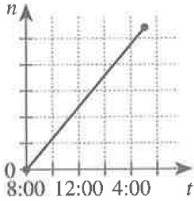


B.





C.



D.

**Answer: A**



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**231.** A sporting-goods store sells baseball caps for \$22 each. At this price, 40 caps are sold per week. For every \$1 decrease in price, the store will sell 4 more caps per week. The store will adjust the price to maximize

revenue. What will be the maximum possible revenue for 1 week?

(Note : The revenue equals the number of caps sold times the price per cap.)

A. \$880

B. \$ 882

C. \$924

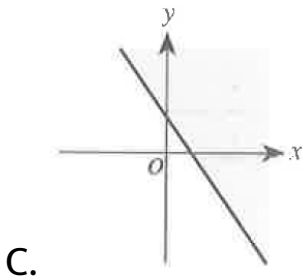
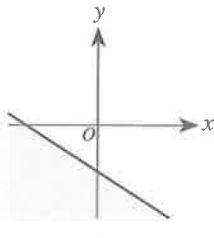
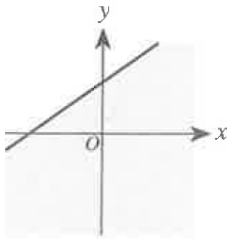
D. \$ 1,024

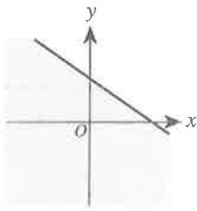
**Answer: D**



**Watch Video Solution**

**232.** Each of the following graphs in the standard  $(x,y)$  coordinate plane has the same scale on both axes. One graph is the graph of  $ax + by \leq c$ , where  $0 < a < b < c$ . Which one is it?





D.

**Answer: D**



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**233.** The art club designed and made banners of the school colors, blue and white, for their fund-raiser. Each banner required  $\frac{1}{4}$  yard of blue material and  $\frac{3}{8}$  yard of white material. The club originally planned to purchase exactly enough material to make 500 banners, but found the material to be cheaper if purchased in full bolts - the blue material in 10 yard

bolts and the white material in 12-yard bolts. How many extra banners was the club able to make if they purchased enough full bolts to make at least 500 banners?

A. 12

B. 13

C. 15

D. 16

**Answer: A**



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**234.** For all real number  $x$  and the imaginary number  $i$ , which of the following expressions is equivalent to  $(x - 3i)^3$ ?

A.  $x^3 - 9x^2i - 27x + 27i$

B.  $x^3 + 9x^2i - 27x - 27i$

C.  $x^3 + 3x^2i - 9x - 27i$

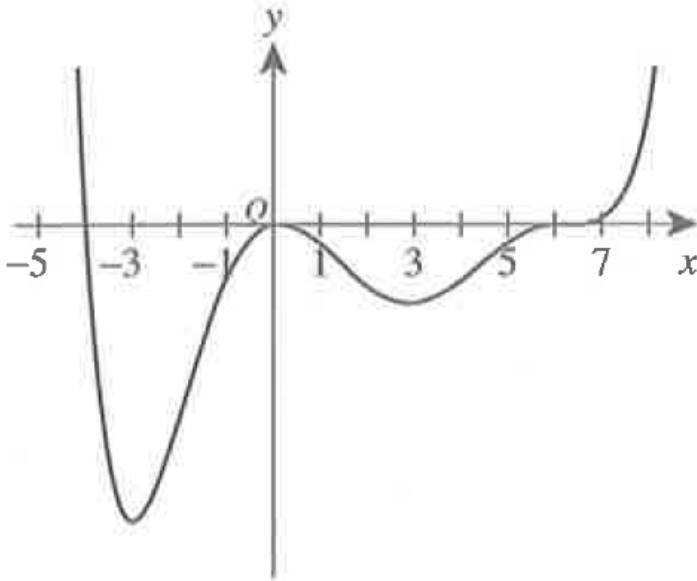
D.  $x^3 - 3x^2i - 9x + 27i$

**Answer: A**



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235. The graph in the standard  $(x,y)$  coordinate plane below is the graph of one of the following functions, which one?



A.  $g(x) = x(x - 6)(x + 4)$

B.  $h(x) = x^2(x + 6)(x - 4)$

C.  $n(x) = x^2(x + 6)^3(x - 4)$

$$D. p(x) = x^2(x - 6)^3(x + 4)$$

Answer: D



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236. The table below shows the numbers of rows and columns in each of 5 matrices.

Matrix	Number of rows	Number of columns
A	$m$	$n$
B	$m$	$m$
C	$k$	$n$
D	$m$	$k$
E	$n$	$m$

For distinct values of  $k$ ,  $m$ , and  $n$ , which of the following matrix products is NOT possible?

A. ED



B. DC

C. CE

D. AC

**Answer: D**



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**237.** A marble will be randomly selected from a bag of solid-colored marbles. The probability of selecting a red marble is  $\frac{5}{19}$ . The probability of selecting a blue marble is  $\frac{4}{19}$ . What is the probability of selecting a red marble or a blue marble?

A.  $\frac{1}{19}$

B.  $\frac{9}{19}$

C.  $\frac{9}{38}$

D.  $\frac{20}{38}$

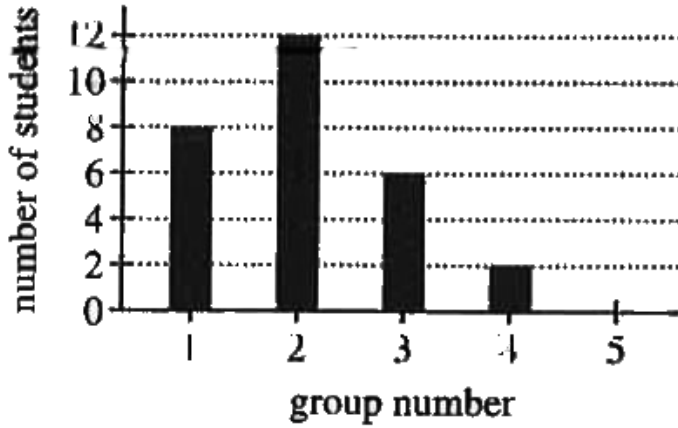
**Answer: B**



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**238.** The graph below shows the number of students who were present on Thursday from each of the 5 groups in Ms. Meagan's class. What is the probability that a student selected at random from the class on

Thursday is in Group 4?



A.  $\frac{1}{28}$

B.  $\frac{1}{14}$

C.  $\frac{1}{5}$

D.  $\frac{1}{4}$

**Answer: B**



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239. Consider the equation  $k = \frac{7}{5}j + 54$ . For what value of  $j$  is the value of  $k$  equal to 40 ?

A.  $-10$

B.  $-\frac{98}{5}$

C.  $\frac{178}{7}$

D.  $\frac{200}{7}$

**Answer: A**



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240. What is  $|3 - x|$  when  $x = 8$  ?

A.  $-11$

B.  $-5$

C.  $5$

D.  $8$

**Answer: C**



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241. When Tyrese fell asleep one night, the temperature was  $24^{\circ}F$ . When Tyrese awoke the next

morning, the temperature was  $-16^{\circ}F$ . Letting  $+$  denote a rise in temperature and  $-$  denotes a drop in temperature, what was the change in temperature from the time Tyrese fell asleep until the time he awoke?

A.  $-40^{\circ}F$

B.  $-8^{\circ}F$

C.  $+4^{\circ}F$

D.  $+8^{\circ}F$

**Answer: A**



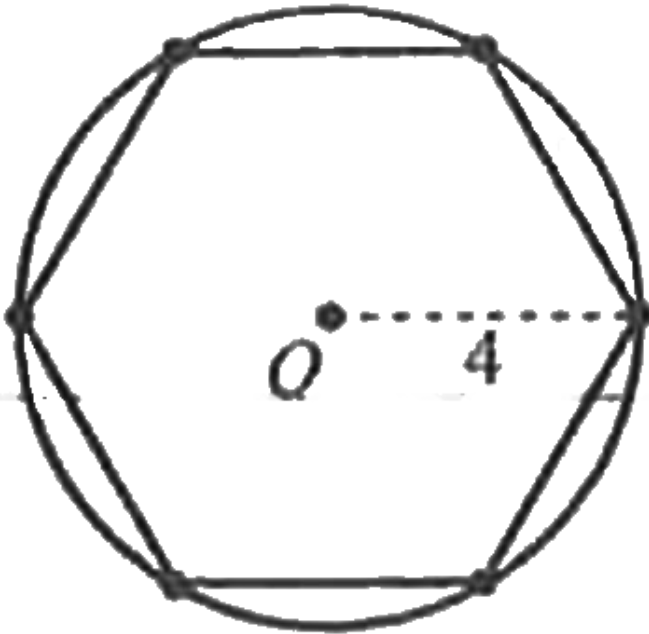
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**242.** Ming purchased a car that had a purchase price of \$5,400, which included all other costs and tax. She paid \$1,000 as a down payment and got a loan for the rest of the purchase price. Ming paid off the loan by making 28 payments of \$200 each. The total of all her payments, including the down payment, was how much more than car's purchase price?

- A. \$ 200
- B. \$ 1,200
- C. \$4,400
- D. \$5,600

**Answer: B**

**243.** Shown below is a regular hexagon inscribed in a circle whose radius is 4 inches . What is the perimeter, in inches, of the hexagon?



A.  $8\pi$



B.  $12\sqrt{3}$

C. 18

D. 24

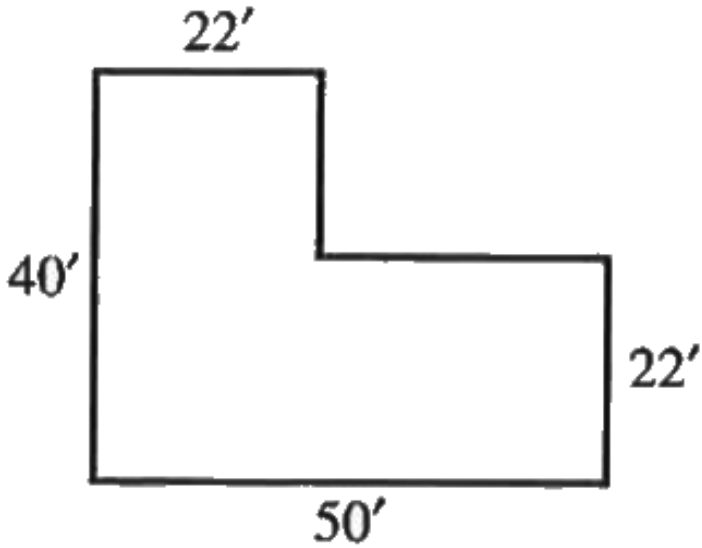
**Answer: D**



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**244.** The floor plan for an L-shaped storage building is shown below with distances marked in feet. What is the floor area of the building, in square feet?

(Note: Walls in this building meet only at right angles.)



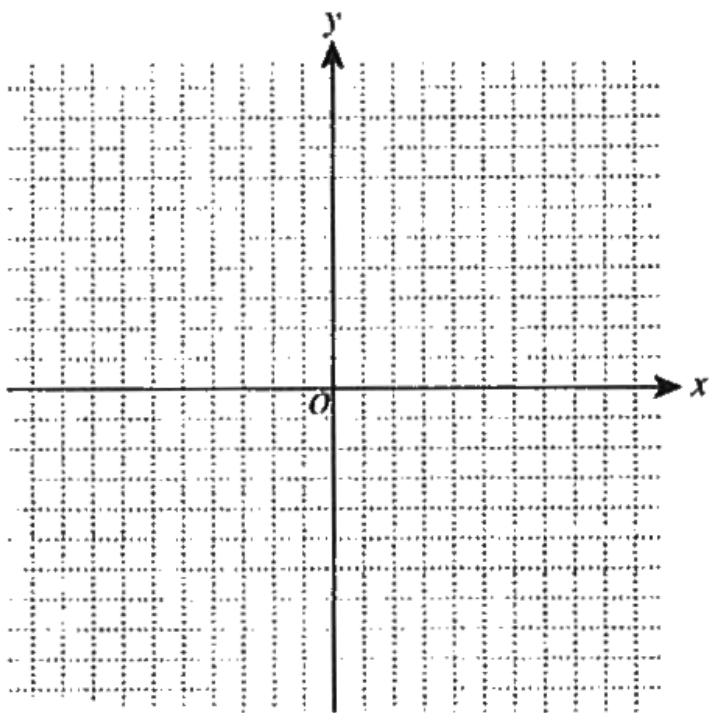
- A. 190
- B. 504
- C. 1, 232
- D. 1, 496

**Answer: D**



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**245.** Quadrilateral ABCD with vertices A (-2, 0), B(0,4), C(5,5), and D(8,2) will be graphed in the standard (x, y) coordinate plane below.



Which of the following is a type of quadrilateral determined by these vertices?

A. Kite

B. Parallelogram

C. Trapezoid

D. Rectangle

**Answer: C**



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**246.** Given that  $f(x) = 3x + 7$  and  $g(x) = \frac{x^2}{2}$ , what is the value of  $f(g(4))$ ?

A. 8

B. 19

C. 31

D. 152

**Answer: C**



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**247.** At her hot dog stand, Juile sells hot dogs for \$2 each Purchasing hot dogs and other supplies costs \$200 per month. The solution of which of the following inequalities models the numbers of hot dogs,  $h$ , Julie can sell per month and make a profit?

A.  $h - 200 > 0$

B.  $h - 200 < 0$

C.  $h + 200 > 0$

D.  $2h - 200 > 0$

**Answer: D**



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**248.** In the standard  $(x,y)$  coordinate plane, what is the slope of the line  $3x + 8y = 5$ ?

A.  $-3$

B.  $-\frac{3}{8}$

C.  $\frac{3}{5}$

D. 3

**Answer: B**



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**249.** Which of the following  $(x,y)$  pairs is the solution for the system of equations  $x + 2y = 2$  and  $-2x + y = 16$ ?

A.  $(-6, 4)$

B.  $(-1, 1, 5)$

C.  $(1, 0, 5)$

D. (0, 1)

**Answer: A**



**Watch Video Solution**

**250.** On a map,  $\frac{1}{4}$  inch represents 16 actual miles. Two towns are  $2\frac{3}{4}$  inches apart on this map are how many actual miles apart?

A. 11

B. 16

C. 44

D. 176



**Answer: D**



**Watch Video Solution**

**251.** Which of the following matrices is equal to

$$4 \begin{bmatrix} -1 & 2 \\ 0 & -4 \end{bmatrix} ?$$

A.  $[-4 \quad -8]$

B.  $\begin{bmatrix} 4 \\ -16 \end{bmatrix}$

C.  $\begin{bmatrix} 3 & 6 \\ 4 & 0 \end{bmatrix}$

D.  $\begin{bmatrix} -4 & 8 \\ 0 & -16 \end{bmatrix}$

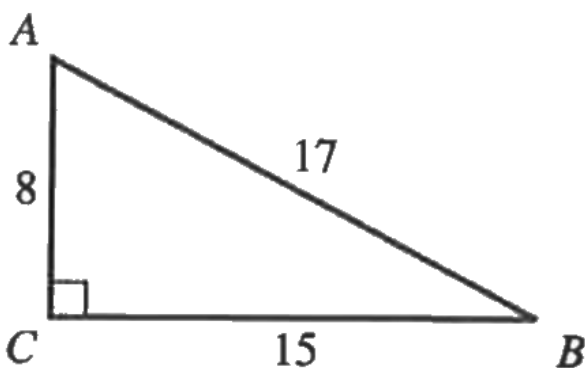
**Answer: D**



**Watch Video Solution**

252. What is the value of  $\tan A$  in right triangle

$\triangle ABC$  below?



- A.  $\frac{8}{17}$
- B.  $\frac{8}{15}$
- C.  $\frac{15}{17}$
- D.  $\frac{15}{8}$

**Answer: D**



**Watch Video Solution**

**253.** Tina runs at a rate of 8 miles per hour. At that rate, how many miles will she run in 12 minutes?

A.  $\frac{5}{8}$

B.  $\frac{2}{3}$

C.  $1\frac{1}{2}$

D.  $1\frac{3}{5}$

**Answer: D**



**Watch Video Solution**

254. A function  $f(x)$  is defined as  $f(x) = -6x^2$ . What is  $f(-3)$ ?

A.  $-324$

B.  $-54$

C.  $54$

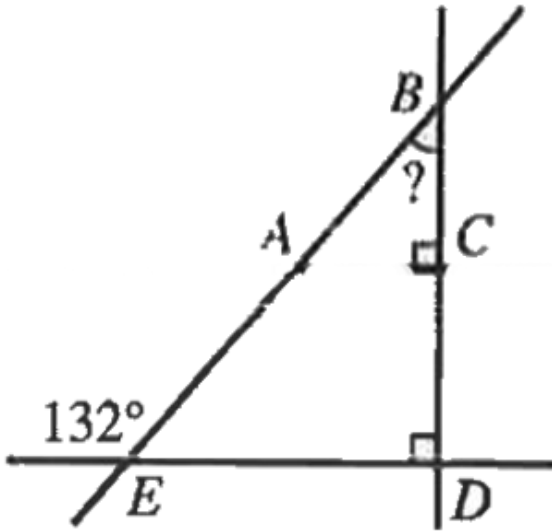
D.  $108$

**Answer: B**



**Watch Video Solution**

255. In the figure below,  $A$  is on  $(BE)^{\leftrightarrow}$  and  $C$  is on  $(BD)^{\leftrightarrow}$ . What is the measure of  $\angle ABC$ ?



- A.  $24^\circ$
- B.  $42^\circ$
- C.  $45^\circ$
- D.  $48^\circ$

**Answer: B**



**Watch Video Solution**

**256.** Marcos programs his calculator to evaluate a linear function, but he doesn't say what the function is. When 5 is entered, the calculator displays the value 2. When 15 is entered, the calculator displays the value 6. Which of the following expressions explains what the calculator will display when any number,  $n$ , is entered?

A.  $\frac{2}{5}n$

B.  $\frac{5}{2}n$

C.  $n - 3$

D.  $n - 9$

**Answer: A**



**Watch Video Solution**

**257.** On Friday, the temperature at 8:00 a.m. Was  $49^\circ F$  and rose at a constant rate of  $\frac{1}{2}^\circ F$  per hour until noon. A cold front passed through at noon, and the temperature then fell at a constant rete of  $1^\circ F$  per hour. The temperature first fell below  $49^\circ F$  between:

A. noon and 1 p.m.

B. 1 p.m. And 2 p.m.

C. 2 p.m. And 3 p.m.

D. 3 p.m. And 4 p.m.

**Answer: C**



**Watch Video Solution**

**258.** Letter grades in Hugo's math class are based on the percent of the total possible points on 4 unit exams (each worth 100 points) and the final exam (worth 200 points) and are assigned according to the chart below.



Range	Course grade
At least 90%	A
80%–89%	B
70%–79%	C
60%–69%	D
Less than 60%	F

The number of points Hugo scored on the unit exams this term were 82, 88, 91 and 83. When course grades were posted, Hugo's course grade was listed as a B. Which of the following could NOT have been the number of points he scored on the final exam?

A. 136

B. 156

C. 166

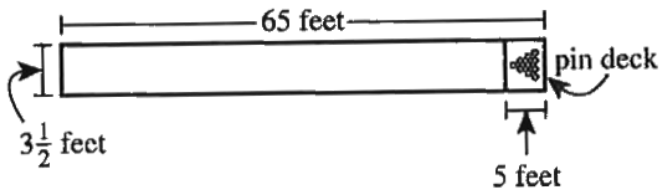
D. 196

**Answer: D**

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**259.** Halle is bowling a series of 3 games. She has bowled 2 of 3 games with scores of 148 and 176. The figure below is a top view of the bowling lane. The dimensions for the bowling lane are given in the figure. The pin deck is the rectangular area within the bowling lane where the bowling pins are set up.

(Note: The figure is not drawn to scale.)



The diameter of each pin at its base is 2.25 in. When all of the pins are set up, which of the following values is closest to the area, in square inches, that is covered by the bases of the pins?

- A. 40
- B. 71
- C. 111
- D. 125

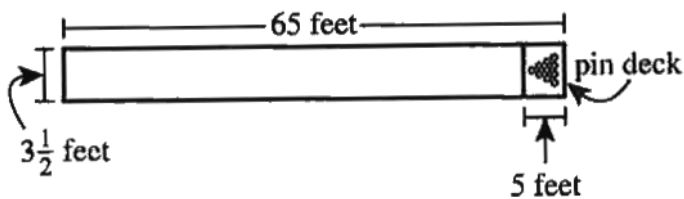
**Answer: A**



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**260.** Halle is bowling a series of 3 games. She has bowled 2 of 3 games with scores of 148 and 176. The figure below is a top view of the bowling lane. The dimensions for the bowling lane are given in the figure. The pin deck is the rectangular area within the bowling lane where the bowling pins are set up.

(Note: The figure is not drawn to scale.)



What is the ratio of the total area of the bowling lane to the area of the pin deck?

A. 12: 1

B. 13: 1

C. 13: 12

D. 127: 17

**Answer: B**

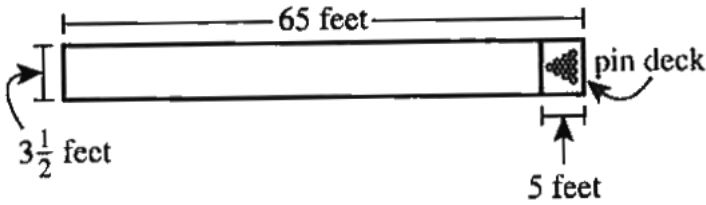


**Watch Video Solution**

**261.** Halle is bowling a series of 3 games. She has bowled 2 of 3 games with scores of 148 and 176. The figure below is a top view of the bowling lane. The dimensions for the bowling lane are given in the figure. The pin deck is the rectangular area within the

bowling lane where the bowling pins are set up.

(Note: The figure is not drawn to scale.)



What score will Halle need to earn in her 3rd game to have an average score of 172 for the 3 games?

- A. 165
- B. 172
- C. 182
- D. 192

**Answer: D**



Watch Video Solution

**262.** The area of a rectangle is 300 square meters, and its length is 3 times its width. How many meters wide is the rectangle?

A. 10

B. 30

C. 50

D. 100

**Answer: A**



Watch Video Solution

**263.** A parallelogram has a perimeter of 96 inches, and 1 of its sides measures 16 inches. If it can be determined. What are the lengths, in inches, of the other 3 sides?

A. 16, 16, 48

B. 16, 24, 24

C. 16, 32, 32

D. 16, 40, 40

**Answer: C**



**Watch Video Solution**



**264.** Elmhurst Street is a two-way street. In each direction. It has one 12-foot-wide lane for car traffic, one 6-foot-wide bike lane, and one 8-foot-wide parking lane. How many feet wide is Elmhurst Street?

A. 26

B. 38

C. 52

D. 60

**Answer: C**



**Watch Video Solution**

**265.** At Central High Scholl, 4 out of every 10 students ride the bus to and from scholl, and 3 out of every 8 who ride the bus are 2,500 students at Central, how many of the students are freshmen who ride the bus?

A. 375

B. 412

C. 428

D. 561

**Answer: A**



**Watch Video Solution**

266. If  $90^\circ < \theta < 180^\circ$  and  $\sin \theta = \frac{20}{29}$ , then  $\cos \theta = ?$

A.  $\frac{29}{20}$

B.  $\frac{20}{21}$

C.  $-\frac{21}{29}$

D.  $-\frac{29}{21}$

Answer: C



Watch Video Solution

267. Given  $f(x) = \frac{2}{x+1}$ , what is(are) the real value(s) of  $t$  for which  $f(t) = t$ ?

A.  $-1$  only

B.  $2$  only

C.  $-2$  and  $1$  only

D.  $-1$  and  $2$  only

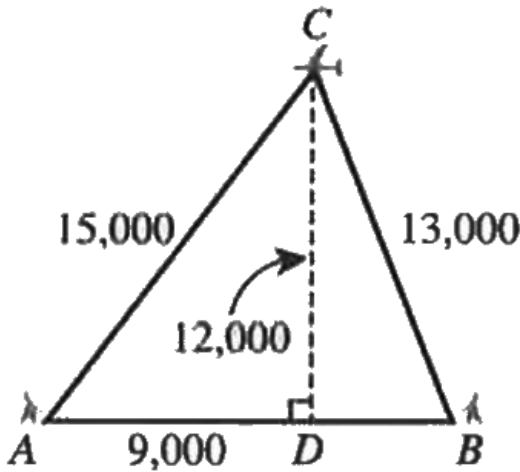
**Answer: C**



**Watch Video Solution**

**268.** In the figure below, a highway rest area (at D) and radar stations (at A and B) lie on a level east-west line, A is 9,000 feet due west of D. An airplane (at C) is shown directly above the rest area, flying due west at a constant speed of 300 feet per second and at a

constant altitude of 12,000 feet. The airplane is located at a straight-line distance of 15,000 feet from the radar station at A and 13,000 feet from the radar station at B.



Which of the following values is closest to the distance, in feet, between the 2 radar stations?

A. 5,000

B. 10,000

C. 145000

D. 15000

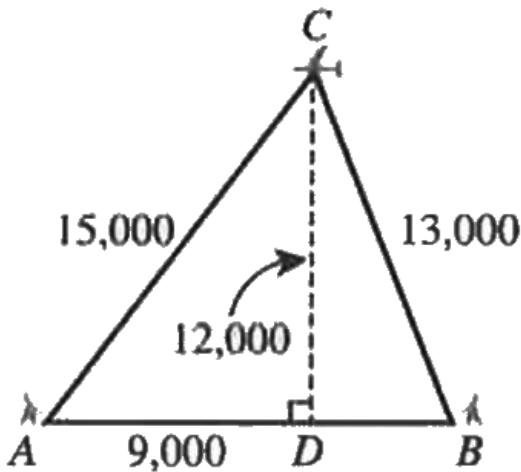
**Answer: D**



[View Text Solution](#)

**269.** In the figure below, a highway rest area (at D) and radar stations (at A and B) lie on a level east-west line, A is 9,000 feet due west of D. An airplane (at C) is shown directly above the rest area, flying due west at a constant speed of 300 feet per second and at a constant altitude of 12,000 feet. The airplane is located at a straight-line distance of 15,000 feet from

the radar station at A and 13,000 feet from the radar station at B.



Let A, C and D lie in the standard  $(x,y)$  coordinate plane such that A is at  $(0,0)$  and D is at  $(9,000, 0)$ . Which of the following equations represents the line along which the airplane is flying?

A.  $x = 9,000$

B.  $x = 15,000$

C.  $y = 12,000$

D.  $y = 13,000$

**Answer: C**

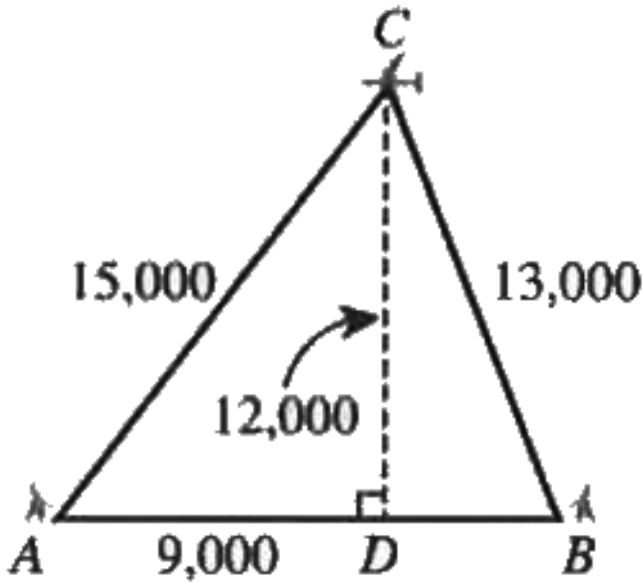


**Watch Video Solution**

**270.** In the figure below, a highway rest area (at D) and radar stations (at A and B) lie on a level east-west line, A is 9,000 feet due west of D. An airplane (at C) is shown directly above the rest area, flying due west at a constant speed of 300 feet per second and at a constant altitude of 12,000 feet. The airplane is located at a straight-line distance of 15,000 feet from



the radar station at A and 13,000 feet from the radar station at B.



Which of the following values is closest to the number of seconds it will take for the airplane to fly from C to the point directly above the radar station at A?

A. 17

B. 30

C. 40

D. 43

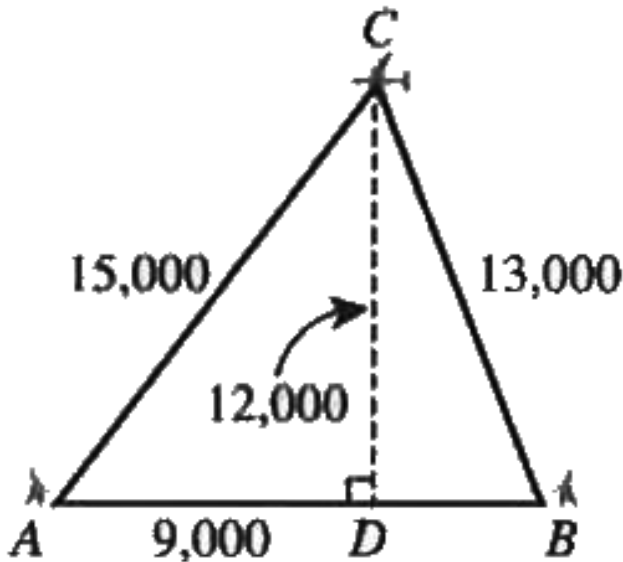
**Answer: B**



**Watch Video Solution**

**271.** In the figure below, a highway rest area (at D) and radar stations (at A and B) lie on a level east-west line, A is 9,000 feet due west of D. An airplane (at C) is shown directly above the rest area, flying due west at a constant speed of 300 feet per second and at a constant altitude of 12,000 feet. The airplane is

located at a straight-line distance of 15,000 feet from the radar station at A and 13,000 feet from the radar station at B.



When considering the changing triangle formed by A, B and the moving airplane (C), which of the angles below increases in measure as the airplane flies due west beyond the point directly above A?

I.  $\angle A$

II.  $\angle B$

III.  $\angle C$ .

A. I only

B. II only

C. I and II only

D. I and III only

**Answer: A**



**View Text Solution**

**272.** Troy made a rectangular poster that is 4 feet long and 2 feet wide. The poster is too large to fit in the

available display space, so Troy is going to make a new poster that will have an area that is 50% of the area of the original poster. The length of Troy's new poster will be  $\frac{3}{4}$  the length of the original poster. How many feet wide will the new poster be?

A.  $\frac{3}{4}$

B.  $1\frac{1}{3}$

C.  $1\frac{1}{2}$

D. 3

**Answer: B**



**Watch Video Solution**

**273.** What is the solution set of the equation

$$x + 6 = 2(x + 3) - x?$$

- A. The empty set (no solution)
- B. {0}
- C. {2}
- D. The set of all real numbers

**Answer: D**



**Watch Video Solution**

**274.** Steve plans to use 28 feet of fencing to enclose region of his yard for a pen for his pet rabbit. What is

the area, in square feet, of the largest rectangular region Steve can enclose?

A. 40

B. 45

C. 48

D. 49

**Answer: D**



**Watch Video Solution**

**275.** There are exactly 5 people in a bookstore at 12:00 p.m. Each person earns an annual income that is

between \$ 30,000 and \$35,000. No one enters or leaves the bookstore until 12:15 p.m., when a professional athlete with an annual income of more than \$ 1,000,000 enters the bookstore and joins the other 5 people. The mean, median, range and standard deviation of the annual incomes of the 5 people in the bookstore at 12:00 p.m., are calculated and compared to the same 4 statistics of the annual incomes of the 6 people in the bookstore at 12:15 p.m. If it can be determined, which of the 4 statistics changed the least?

A. Range

B. Mean

C. Median



## D. Standard deviation

**Answer: C**



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**276.** Ana and Amy started a landscaping job together.

When Ana stopped, she had completed  $\frac{2}{5}$  of the job.

When Amy stopped, she had completed  $\frac{1}{3}$  of the job.

Then Ruben complete the rest of the job in 2 hours.

Assume that Ana, Amy and Ruben all worked at the same rate. Which of the following values is closest to the number of hours it would have taken 1 of them to complete the entire job alone?

A. 0.37

B. 1.27

C. 2.73

D. 7.50

**Answer: D**



**Watch Video Solution**

**277.** If  $a$  and  $b$  positive real numbers, which of the

following is equivalent to  $\frac{(2a^{-1}\sqrt{b})^4}{ab^{-3}}$ ?

A.  $8a^2b^4$

B.  $\frac{8b^6}{a^4}$

C.  $\frac{16b^5}{a^5}$

D.  $\frac{16b^4}{a^5}$

**Answer: C**



**Watch Video Solution**

**278.** To become a contestant on a quiz show, a person must correctly order 4 rock stars by age, from youngest to oldest. The contestant knows which one is the oldest rock star, but randomly guesses at the order of the other 3 rock stars. What is the probability the contestant will get all 4 in the correct order?

A.  $\frac{1}{24}$

B.  $\frac{1}{6}$

C.  $\frac{1}{4}$

D.  $\frac{1}{3}$

**Answer: B**



**Watch Video Solution**

**279.** Which of the following expressions is equivalent

to  $\frac{\frac{x}{3} + \frac{1}{2}}{\frac{2}{3} - \frac{1}{4}}$ ?

A.  $\frac{-x - 1}{5}$

B.  $\frac{2x + 6}{5}$

C.  $\frac{4x + 3}{5}$

D.  $\frac{4x + 6}{5}$

**Answer: D**



**Watch Video Solution**

**280.** An automobile license plate number issued by a certain state has 6 character positions. Each of the first 3 positions contains a single digit from 0 through 9. Each of the last 3 positions contains 1 of the 26 letters of the alphabet. Digits and letters of the alphabet can such license plate number can be made?

A. 36

B. 46, 656

C. 1, 000, 000

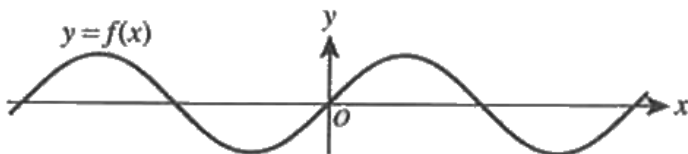
D. 17, 576, 000

**Answer: D**



**Watch Video Solution**

**281.** The function  $y = f(x)$  is graphed in the standard  $(x, y)$  coordinate plane below.



The points on the graph of the function  $y = 3 + f(x - 1)$  can be obtained from the points on  $y = f(x)$  by a shift of:

- A. 1 unit to the right and 3 unit up.
- B. 1 unit to the right and 3 unit down.
- C. 3 unit to the right and 1 unit up.
- D. 3 unit to the right and 1 unit down.

**Answer: A**



**Watch Video Solution**

**282.** When  $\log_5 x = -2$ , what is  $x$ ?

A.  $-32$

B.  $-25$

C.  $-10$

D.  $\frac{1}{25}$

**Answer: D**



**Watch Video Solution**

**283.** Which of the following lists those integer value of

D for which the fraction  $\frac{2}{D}$  lies between  $\frac{1}{5}$  and  $\frac{1}{3}$ ?

A. 4 only

B. 3,4 and 5



C. 8 only

D. 7, 8, and 9

**Answer: D**



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**284.** For all real number  $a$ ,  $b$  and  $c$  such that  $a > b$  and  $c < 0$ . Which of the following inequalities must be true?

A.  $\frac{a}{c} < \frac{b}{c}$

B.  $\frac{a}{c} > \frac{b}{c}$

C.  $ac > bc$

D.  $a + c < b + c$

**Answer: A**

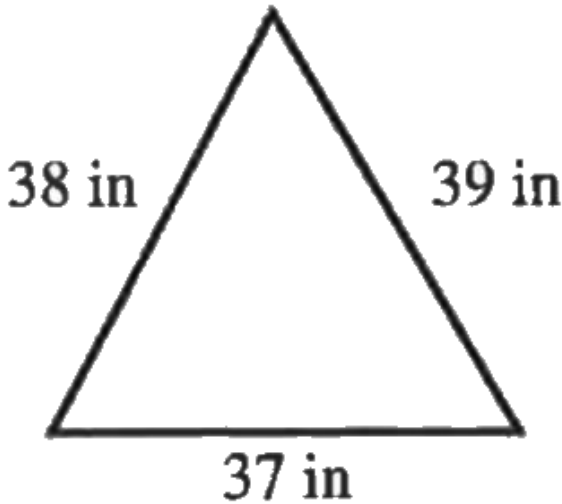


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**285.** The triangle shown below has side lengths 37, 38 and 39 inches. Which of the following expression gives the measure of the largest angle of the triangle?

(Note : For every triangle with sides of length  $a$ ,  $b$  and  $c$  that are opposite  $\angle A$ ,  $\angle B$ , and  $\angle C$ , respectively.

$$c^2 = a^2 + b^2 - 2ab \cos C.)$$



A.  $\cos^{-1} \left( -\frac{37^2 - 38^2 - 39^2}{2(38)(39)} \right)$

B.  $\cos^{-1} \left( -\frac{39^2 - 37^2 - 38^2}{2(37)(38)} \right)$

C.  $\cos^{-1} (37^2 - 38^2 - 39^2 + 2(38)(39))$

D.  $\cos^{-1} (38^2 - 37^2 - 39^2 + 2(37)(39))$

**Answer: B**



**286.** Pete has an average score exactly  $x$  points on 4 equally weighted tests. How many points higher than  $x$  must Pete score on the 5th equally weighted test to raise his average score after the 5th test to  $x + 2$  points?

A. 2

B. 4

C. 5

D. 10

**Answer: D**



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**287.** The intersection of lines  $l$  and  $m$  forms the 4 angles  $\angle A$ ,  $\angle B$ ,  $\angle C$ , and  $\angle D$ . The measure of  $\angle B$  is  $3\frac{1}{2}$  times the measure of  $\angle A$ . Which of the following values is closest to the measure of  $\angle A$ ?

A.  $20^\circ$

B.  $26^\circ$

C.  $35^\circ$

D.  $40^\circ$

**Answer: D**



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**288.** A sequence is defined for all positive integers by

$$s_n = 2s_{n-1} + n + 1 \text{ and } s_1 = 3. \text{ What is } s_4?$$

A. 9

B. 18

C. 22

D. 49

**Answer: D**



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**289.** If  $a$  is an integer less than  $-1$ . Which of the following orders the expressions  $|a|$ ,  $-a^2$ , and  $-\frac{1}{a}$  from least value to greatest value?

A.  $-\frac{1}{a} < -a^2 < |a|$

B.  $-\frac{1}{a} < |a| < -a^2$

C.  $|a| < -\frac{1}{a} < -a^2$

D.  $-a^2 < -\frac{1}{a} < |a|$

**Answer: D**



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**290.** At the school carnival. Ann is playing a game involving a stack of 10 index cards. Each card has a single number written on it: 1 card has a 1, 2 cards have a 2, 3 cards have a 3, and 4 cards have a 4. Ann will choose 1 card at random, and she will be awarded the number of points equal to the number written on the card. Let the random variable  $X$  represent the number of points Ann receives on any 1 draw. What is the expected value of  $X$ ?

A. 0.4

B. 1

C. 2.5

D. 3



**Answer: D**



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**291.** Which of the following is equivalent to the sum of any 3 consecutive odd integers,  $x$ ,  $y$ , and  $z$ , such that  $x < y < z$ ?

A.  $3z$

B.  $3y$

C.  $3x$

D.  $3x + 2$

**Answer: B**



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**292.** The mean of the set of 5 numbers  $\{42, 3, 11, 27, x\}$  is 24, and the median of the set of 4 numbers  $\{53, 8, 29, y\}$  is 38. If it can be determined, which of the following values is equal to  $x - y$ ?

A.  $-38$

B.  $-10$

C. 10

D. 38

**Answer: B**



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**293.** Consider all rectangles such that the rectangle's length is greater than the rectangle's width and the length and width are whole numbers of inches. Which of the following perimeters, in inches, is NOT possible for such a rectangle with an area of 144 square inches?

A. 48

B. 60

C. 80

D. 102

**Answer: A**



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**294.** The equation  $(x - 7)^2 + (y - 8)^2 = 10$  is that of a circle that lies in the standard  $(x,y)$  coordinate plane. One endpoint of a diameter of the circle has  $y$ -coordinate 11. What is the  $y$ -coordinate of the other endpoint of that diameter?

A. 1

B. 3

C. 4

D. 5

**Answer: D**



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**295.** The plans for a diving pool call for a rectangular prism that has a length of 30 meters, a width of 25 meters, and a depth of 5 meters. If the plans are changed to increase both the length and the width of the pool by 10%, what will be the increase, to the nearest 1%, in the volume of the pool?

A. 0.1

B. 0.17

C. 0.2

D. 0.21

**Answer: D**



**Watch Video Solution**

**296.** One solutions of the euqation  $4x^3 - 2x^2 + x + 7 = 0$  is  $x = -1$ . Which of the following describes the other 2 solutions?

- A. Both are negative real numbers
- B. One is a negative real number, and the other is a positive real number.
- C. Both are positive real number.

D. Both are complex numbers that are not real.

**Answer: D**



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