



# MATHS

## BOOKS - INDEPENDENTLY PUBLISHED MATHS (ENGLISH)

### MATH PRACTICE TEST

#### Section 1

1. If

$$a + 2b + 2c = 11, 2a + b + 2c = 10 \text{ and } 2a + 2b + c = 9$$

, What is the value of a ?

A. 1

B. 2

C. 3

D. 4

**Answer: A**



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2. The cost, in dollars, of producing tires by a manufacturing firm is determined by the following equation :  $C = 120 + 90 \times W + 78 \times N$  , where 'C' represents the cost incurred , 'W' represents the number of workers, 'N' represents the number of units

produced. If 10 units have to be produced, what is the maximum number of workers that can be employed so that the total cost doesn't exceed \$2700?

A. 18

B. 19

C. 20

D. 21

**Answer: C**



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3. If the quadratic  $x^2 - (2a - 3)x + (a^2 + 5) = 0$  has roots whose sum is five, what is the product of the roots of the above quadratic equation ?

A. 6

B. 7

C. 8

D. 9

**Answer: A**



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4. Which of the following are the coordinates of the left - most point on the circle represented by the equations  $x^2 + y^2 - 8x + 6y = 0$  ?

A.  $(9 - 3)$

B.  $(1, 3)$

C.  $(-1, -3)$

D.  $(-9, -3)$

**Answer: C**



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5.  $x$  and  $y$  are positive integers with  $x > y$ . The numbers  $(x + 2y)$  and  $(2x + y)$  leave remainders 6 and 1 respectively when divided by 7. What is the remainder when  $(x - y)$  is divided by 7?

A. 1

B. 2

C. 3

D. 4

**Answer: B**



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6. Adam bought 23 pencils 15 erasers and 20 shapeners from a stationery shop and spent at total of \$111. Bob bought 19 erasers, 12 pencils and 40 sharpeners from the same stationery shop and spent \$10 more than Adam. Which of the two equations satisfy the above two conditions, if the price of pencil is \$a , price of an eraser is \$b and price of a sharpener is \$ c?

A.  $23a + 15b + 20c = 111, 19a + 12b + 40c = 101$

B.  $23a + 15b + 20c = 111, 19b + 12b + 40c = 121$

C.  $23a + 15b + 20c = 111, 12a + 19b + 40c = 101$

D.  $23a + 15b + 20c = 111, 12a + 19b + 40c = 121$

**Answer: D**



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7.  $f(x) = x^2 - 6x + 8$  and  $g(x) = x - 2$  . At how many points do the graphs of the two functions intersect ?

A. 0

B. 1

C. 2

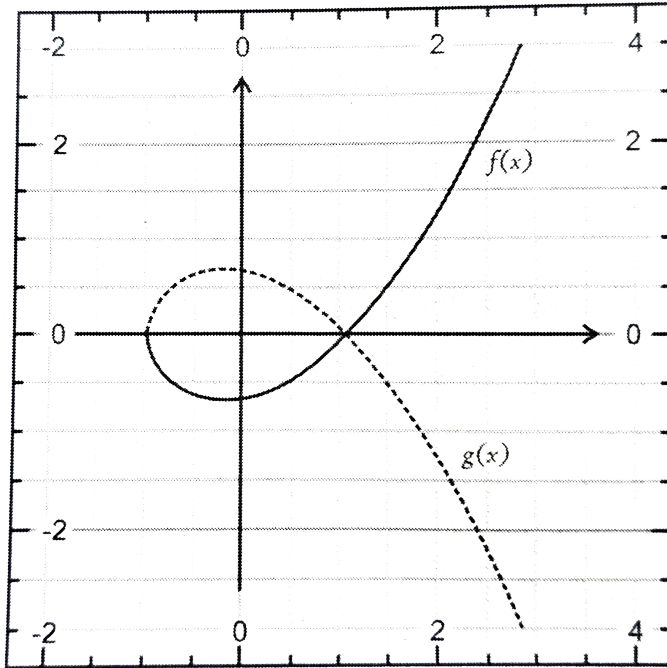
D. 3

**Answer: C**



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8.

The graph of  $f(x)$  and  $g(x)$  are shown above . Which options is true ?

A.  $f(x) = g(-x)$

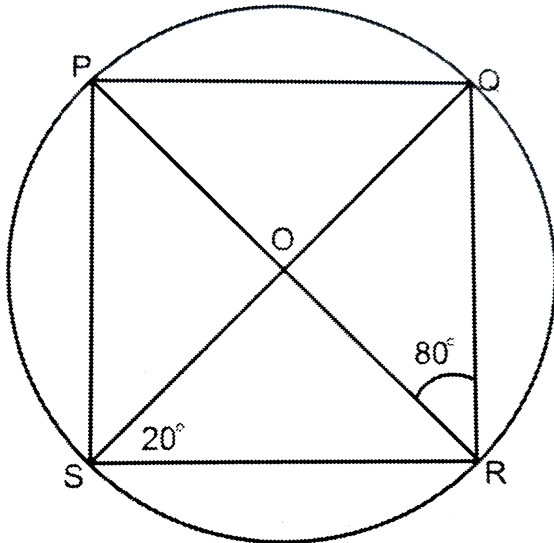
B.  $f(x) = g(x) - x$

C.  $f(x) = -g(x)$

D.  $f(x) = -g(-x)$

Answer: C

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9.

PQRS is a cyclic quadrilateral, its diagonals intersect at O

. If  $\angle PRQ = 80^\circ$  and  $\angle QSR = 20^\circ$ , what is the measure in degrees of  $\angle PSR$ ?

A.  $45^\circ$

B.  $50^\circ$

C.  $80^\circ$

D.  $100^\circ$

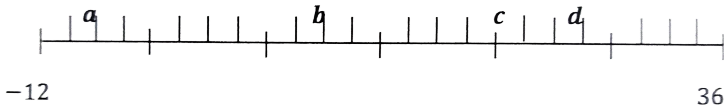
**Answer: D**



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**10.** Refer to the number line below where the numbers a,b,d have been marked . All tick - marks are equally

spaced. Choose the correct options based on the values of  $a, b, c$  and  $d$ .



A.  $a+b = d$

B.  $|a| + |d| = |c| + |b|$

C.  $c|a| = bd$

D.  $(d-6) |a| = bc$

**Answer: D**



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11. For all numbers  $x$ , let  $f(x) = x^2 - 6x + 8$  and  $g(x) = x - 2$ . For how many integer values of  $x$  is  $g(x) \geq f(x)$ ?

A. 1

B. 2

C. 3

D. 4

**Answer: D**



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12.  $N = 4^{61} + 4^{61} + 4^{62} + 4^{62}$ . Choose the correct statement(s):

I.  $N$  is divisible by 3.

II.  $N$  is divisible by 5.

III.  $N$  is a perfect square.

A. only I

B. only II

C. only III

D. only I and II

**Answer: B**



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13. Abe reads a book every day some page in the morning and some in the evening. He reads 23 pages every morning and 31 page every evening . The number of page completed by Abe after some number of days can be written as a function of the number of pages read in the evening . If the number of days is represented by ' N', the number of page read in the morning be 'M' and the number of pages read in the evenings be 'E' , which of the following the number of days for which Abe read the book ? It is know that if Abe read in the morning , he did not read in the evening and vice versa.

$$A. N = 23M + 31E$$

$$B. N = 31M + 23E$$

$$C. N = \frac{M}{23} + \frac{E}{31}$$

$$D. N = \frac{M}{31} + \frac{E}{23}$$

**Answer: C**



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**14.** If  $a^3b^4c^7d^2$  is negative, where  $a, b, c, d$  are integers, all the following statements are incorrect EXCEPT ?

A.  $ab^2cd^2$  is positive

B.  $b^2d$  is positive

C.  $bc^2d$  is positive



D.  $a^2b^2c^2$  is positive

**Answer: D**



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**15.** If the roots of the equations  $x^2 - (a - b)x + c = 0$  are integers which are equal in magnitude and opposite in sign, which of the following statements are true ?

I.  $a = -b$

II.  $a = b$

III.  $c + a^2 = 0$

A. Only I

B. Only II

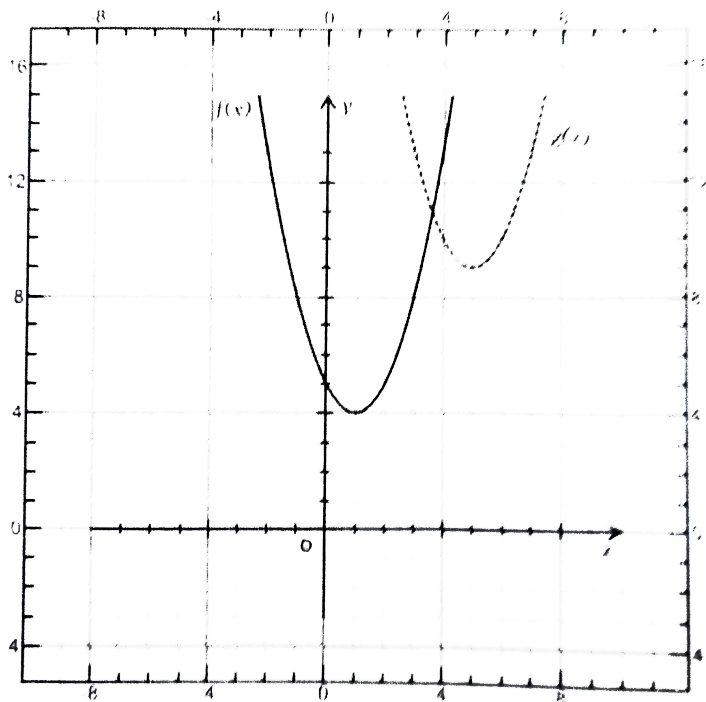
C. Only III

D. Both I and II

**Answer: B**



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16.

The graph of  $f(x)$  and  $g(x)$  are shown below. If  $g(x) = f(x + k) - m$ , what is the value of  $|k + m|$  ?



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**17.** Some friends decided to buy a Nikon camera priced at \$300 by contributing equal amount of money. At the time of purchase, one more friend decided to contribute along with the others, thus reducing the contribution of each friend by \$10. How many friends were there originally ?



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**18.** The relation between the numbers of pieces  $p$  Amy has learnt to sing at the end of  $n$  weeks of singing lesson is given as :  $p = 2n + 3$  .

After how many weeks would Amy be able to sing 17 pieces ?



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19. If  $p, q, r$  are positive integers, find the maximum possible value of  $(p + q + r)$  if

$$px - (x + r) = 23x - 15.$$



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20. If the correct form of  $2i^4 + 4i^3 - i^2 + 3i$  is  $a + ib$ , where the imaginary number  $i$  is such that  $i^2 = -1$ .

What is the value of  $(a + b)$ ?



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## Section 2

1. When 1189 and 643 are divided by a positive integer  $N$ , the remainder obtained in each case is the same. What is the sum of digits of the largest two - digit value of  $N$  ?

A. 10

B. 15

C. 37

D. 78

**Answer: A**



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2. Among 40 employees in an office , 60% are mem. Out of them 33.33% play rugby. If 30% of the total empolyess play rugby, how many of the total employees are women who do not play rubgy ?

A. 4

B. 12

C. 16

D. 20

**Answer: B**



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3. A model of a planned city is made where an actual distance 10 miles is represented as 5 meters. If the area of the city is 60 square, and 1 mile = 1600 meters, what is the area of the model in square miles ?

- A.  $5.9 \times 10^4$  square miles
- B.  $5.9 \times 10^{-5}$  square miles
- C.  $5.9 \times 10^{-6}$  square miles
- D.  $5.9 \times 10^{-7}$  square miles

**Answer: C**



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4. A man earns \$40 for a period of 5 hours that he works per day. Thereafter , for every additional hour , he earns \$5 per hour. If the man earns \$P in a day working for t hours, where  $t > 5$  and is an integer , and  $P \leq 60$ , which of the following sets of value of P and t satisfy the above conditions ?

A.  $P = 60, t = 10$

B.  $P = 55, t = 10$

C.  $P = 50, t = 9$

D.  $P = 50, t = 7$

**Answer: D**



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5.  $z = \frac{7 - 5i}{11 + 4i}$ , Which of the following options is equivalent to  $z$  where the imaginary number  $i$  is such that  $i^2 = -1$ ?

A.  $0.42 - 0.61i$

B.  $0.38 - 0.69i$

C.  $0.32 - 0.21i$

D.  $0.61 - 0.42i$

**Answer: A**



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6. If  $3x + 2y + 4z = 20$ ,  $5x + 7y - 9z = -10$  which of the following can be a set of values of  $x$ ,  $y$  and  $z$  ?

A.  $x = 2, y = -1, z = 4$

B.  $x = 4, y = 2, z = 1$

C.  $x = 1, y = 3, z = 2$

D.  $x = 2, y = 1, z = 3$

**Answer: D**



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7. Three friends, Joe, Matt and Bruce decided to have a beer party. Joe and Matt brought along three and five

bottles of beers respectively. Bruce did not bring along any beer for the party. The friends shared the beer equally and at the end of the party , Bruce paid Joe and Matt a total of \$16 for his share. How much out of the \$16 did Matt get (assume that each beer bottle was priced the same ) ?

- A. \$2
- B. \$6
- C. \$10
- D. \$14

**Answer: D**



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8. If  $n$  is an even number which leaves a remainder of two when divided by five, what is the remainder if  $(3n + 7)(2n + 5)$  is divided by 10 /

A. 1

B. 3

C. 5

D. 7

**Answer: D**



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9. Which of the following is the correct value of

$$\left( \frac{7\pi^c}{4} + \frac{4\pi^c}{3} - \frac{5\pi^c}{12} \right)?$$

A.  $\frac{5\pi^c}{4}$

B.  $\frac{5\pi^c}{3}$

C.  $300^\circ$

D.  $480^\circ$

**Answer: D**



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10. Two marbles are picked simultaneously from a box containing three red and five blue marbles. What is the probability that the marbles are of the same color ?

A. 0.11

B. 0.36

C. 0.46

D. 0.53

**Answer: C**



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11. The average of five distinct integers is 60. If the largest integer is 70, what is the minimum possible value of the smallest integer ?

A. 0

B. 1

C. 20

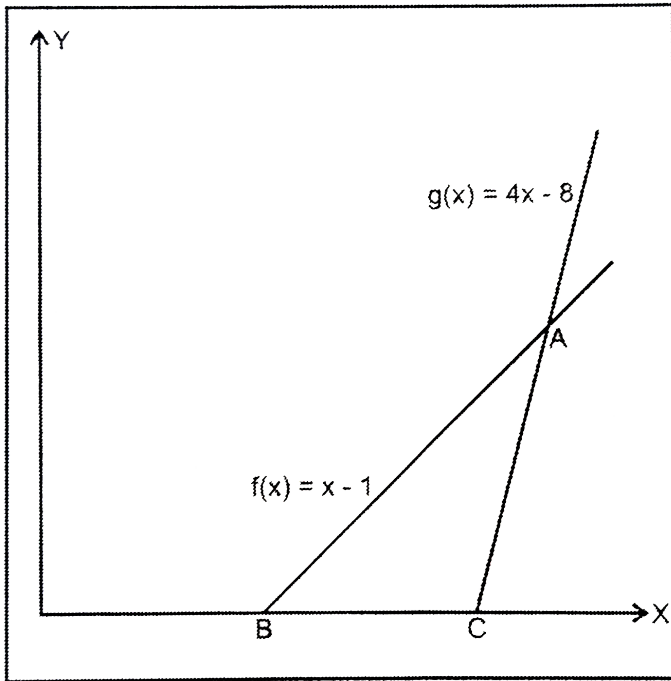
D. 26

**Answer: D**



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12.

What is the area of the triangle ABC bounded by the graphs of  $f(x) = x - 1$  and  $g(x) = 4x - 8$  and the X-axis as shown in the graph below ?

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

B. 1

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

D. 2

**Answer: A**



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13. If the equation  $3 - x = \sqrt{(x^2) - 15}$  has an extraneous solution, what is the extraneous solution ?

A. 7 —

B. 0

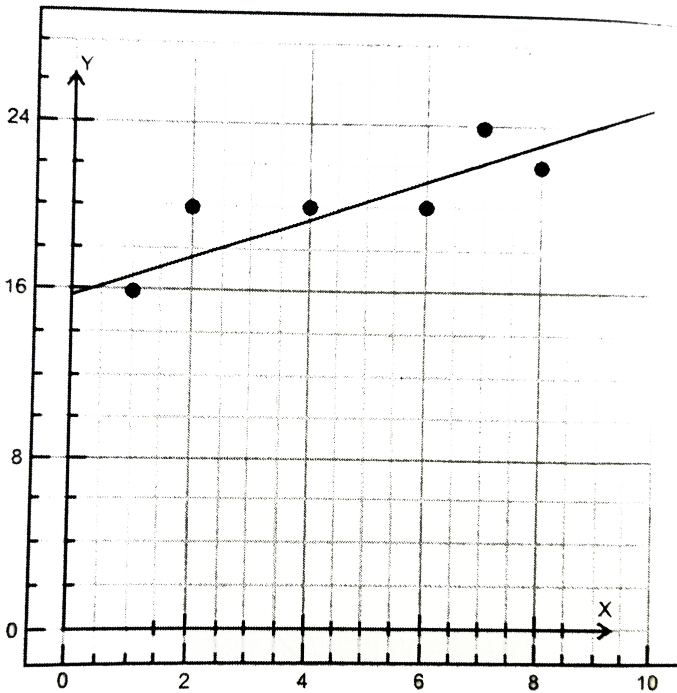
C. 2

D. 4

Answer: D



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14.

In a experiment a set of points denoted by the  $(x,y)$  coordinates are shown in the graph above along with

the line of best fit. Which of the following is the best equation for the above line ?

A.  $y = 0.7x - 3.7$

B.  $y = 0.9x + 15.8$

C.  $y = 1.2x - 6.8$

D.  $y = 1.2x + 12.3$

**Answer: B**



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15. In the formula  $\frac{3y}{2x - y} - 2 = 5x$ , what is the correct expression of  $y$  in terms of  $x$  ?

- A.  $\frac{2x(5x + 2)}{5(x + 1)}$
- B.  $\frac{x(5x + 2)}{(x + 5)}$
- C.  $\frac{5x(5x + 1)}{2(x + 1)}$
- D.  $\frac{5x(x + 5)}{2(5x + 2)}$

**Answer: A**



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**16.** Acer.com recently purchased 30 printers, each at \$120. The store then sold the printers, to a dealer , all at the sam price. Had the store sold each printer for \$10 more than what it actually did , the total profit made

would have been \$1800. What was the selling price of each printer ?

A. \$50

B. \$120

C. \$150

D. \$170

**Answer: D**



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17. Amy, Joe and Ron contributed a total of \$255 for a trip to an amusement park. Had each friend managed

\$5 more , the ratio of their contribution would have been 2:3:4 respectively.What was the actual ratio in which they had contributed \$255?

A. 11 : 17 : 23

B. 13 : 19 : 25

C. 5 : 6 : 9

D. 3 : 5 : 7

**Answer: A**



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**18.** The population of a town increases by 20% in each year starting 2010. If the total population of the two in 2013 is 77940, what was the population of the town in 2010?

A. 60000

B. 45000

C. 40000

D. 35000

**Answer: B**



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19.  $f(x) = (5 - x^p)^{\frac{1}{2}}$  . If the value of  $f(f(2)) = 2$  , what is the value of p ?

A. 1

B. 2

C. 3

D. 4

**Answer: B**



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20. Joe, a fruit vendor , sold 3 apples, 4 oranges and 6 bananas to a customer for \$25. He sold 5 apples , 3

oranges and 11 bananas to another customer for \$36. If a third customer wants to buy one apple, 5 oranges and one banana, how much would he have to pay ?

- A. \$9
- B. \$14
- C. \$18
- D. \$22

**Answer: B**



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21. The profit, in dollars of a company is determined by the following equation :  $P = 50.5 \times N - 210.5$  , where 'p' represents the profit of the company and 'N' represents number of units manufactured by company.  
when will the company got the profit?

- A. When the number of units manufactured is 2
- B. When the number of units manufactured is 3
- C. When the number of units manufactured is 4
- D. When the number of units manufactured is 6

**Answer: D**



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22. In a field trip organized by a school for the 6th grade students , it was decided that there should be at least one teacher for every 8 students combined participated in the trip. How many students were there in the trip ?

A. 40

B. 41

C. 42

D. 43

**Answer: C**



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23.  $f(x) = 2^x + 1$  and  $g(x) = x^3 - \frac{x}{2} + 2$ . At which of the points given by the options below do the graphs of the two functions intersect?

I.  $(x,y) = (-1,2)$

II.  $(x,y) = (0,2)$

III  $(x,y) = (1,3)$  .

A. Only I

B. Only II

C. Only III

D. Both I and II

**Answer: B**



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**24.** Amazon.com offers successive discounts of 30% and 20% on laptops. Its rival, Wal - Mart, offers successive discounts of 10% and 40% on the same laptops. If a laptop is listed at \$600 in both the stores , how much does a customer stand to save by choosing one store over the other ?

A. 6

B. 12

C. 18

D. 20

**Answer: b**



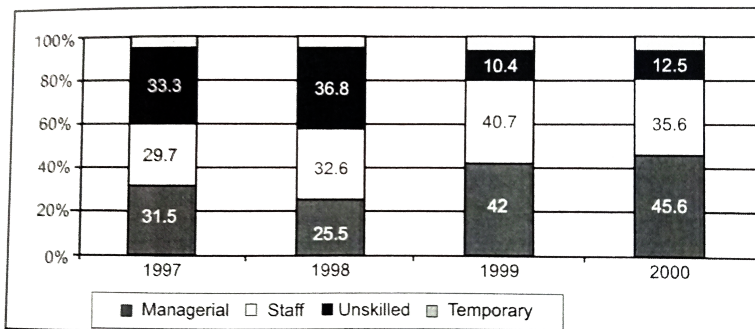
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25. If  $\frac{1}{x} + \frac{1}{y} = 2$  and  $\frac{3}{x} + \frac{4}{y} = 7$ , what is the value of  $(x + y)$  ?



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26. The following graph shows the breakup of the type of employees of company Z form 1997 - 2000, Managerial , Staff, Unskilled and Temporay .

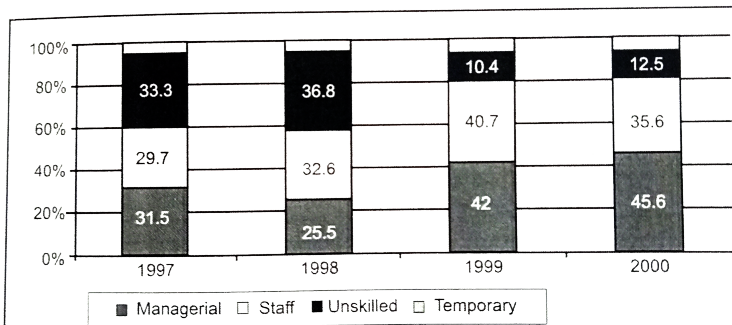


If the total number of employees remained the same throughout, what is the approximate percent increase in the number of staff employees between 1997 and 1998 ?



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27. The following graph shows the breakup of the type of employees of company Z from 1997 - 2000, Managerial , Staff, Unskilled and Temporaray .



If the total strength of all employees in 1997 was 5000,



and there was a 20% increase in total strength for every year from 1997, what is the number of managerial employees in 1999 ?

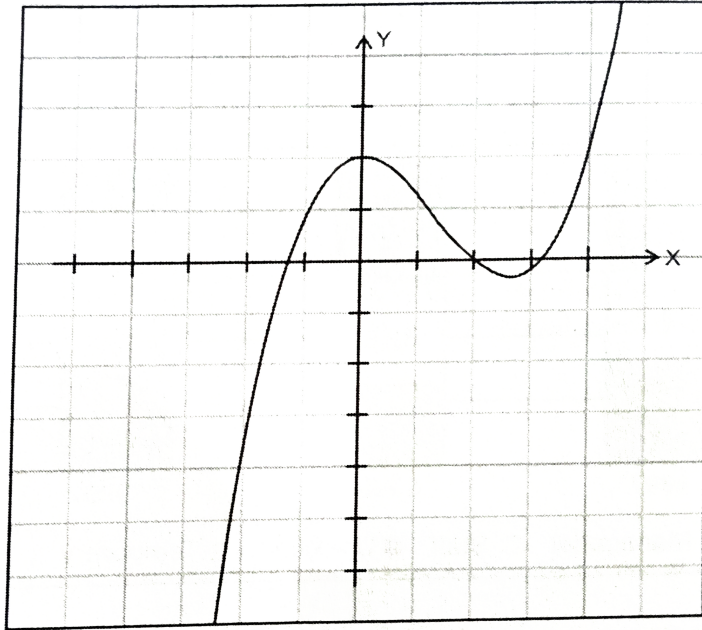


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**28.** A man buys  $a$  apples and  $g$  oranges, each costing 80 cents and 60 cents respectively. If the man buys less than 18 fruits and spends less than \$12, which of the following is the correct inequality representing the above information ?



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29.

Which of the following could be the equation of the graph shown above ?



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30. What is the value of  $\left\{ \frac{(a + b)^2 - (a^2 + b^2)}{(a + b)^2 - (a - b)^2} \right\}$  ?



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31. The first term of a sequence is  $\frac{1}{2}$  and the second term is  $\frac{1}{4}$ . Each term thereafter is the sum of all the terms before it, If the  $n^{\text{th}}$  term is the first term of the sequence that is an integer, what is the value of n ?



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32. Given that the equation  $(3x + 2)k + 5 = 12x + 7$  has infinite solutions, what is the value of  $(k + m)$  ?



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**33.** A line makes a positive X - intercept and a negative Y - intercept and has a slope equal of  $\frac{4}{3}$ . If the coordinates of the points where the line intersects the X and Y axes are integers, what is the angle formed by the line with the X and Y axes ?



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**34.** The average of x and 3y is 12, the average of 2x and 3z is 21. What is the average of x,y and z ?



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**35.** The equations  $(a-3)x + 3y = 12$  and  $4x+(a -2y) = k$  have infinitely many solutions. What is the sum of all the possible vlaue of  $k$  ?



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**36.** Two tangents are draw from a point P, 40 units from the centre of the circle and inclined to each other at  $60^\circ$ . What is the area , to the nearet integer, of the region AXBP ?



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37. A vendor has two containers containing milk and water solutions of volume 10 liters and 20 liters. What would be the minimum concentration (%) of milk in any of the containers so that he could mix them to get an 80% milk solution ?



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38. The heights of the  $10^{th}$  grade students of Manhattam Public School are measured . It is found that in Section A, the minimum height is  $(x^2 + 1)$  feet while the maximum is  $(4x - 1)$  feet. In section B, the minimum height is  $(x^2 + 1.5)$  feet while the maximum is  $(4x - 0.5)$  feet. If all the students are considered , their

range (i.e., difference between the maximum and minimum height) comes to 2.5 feet. What is the height of the tallest students (in feet) in the 10<sup>th</sup> grade , if both sections taken together ?



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