



# MATHS

## BOOKS - EDUCART PUBLICATION

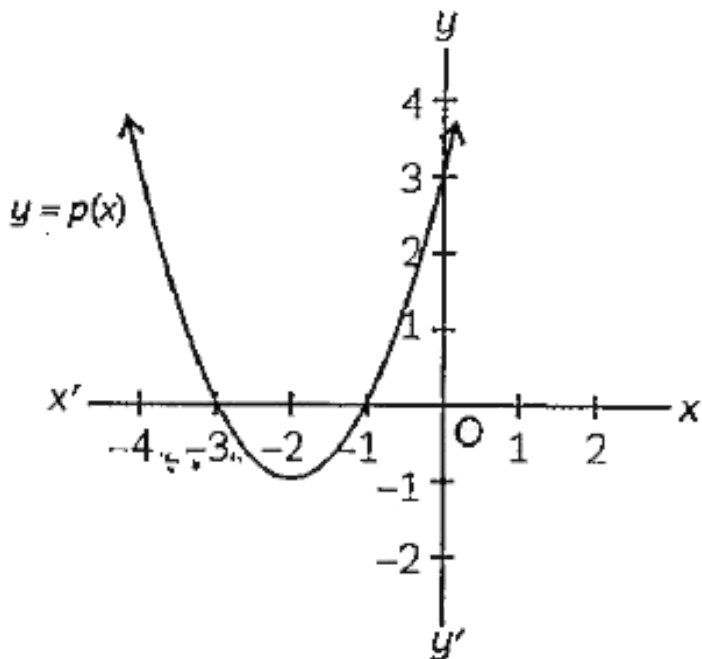
### SAMPLE PAPER 4

#### Section A

1. The graph of a polynomial  $p(x)$  is given in the figure.

What are the zeroes of polynomial from the

graph



- A. 3 and 0
- B.  $-3$  and  $-1$
- C.  $-3$  and 0
- D.  $-1$  and 0

**Answer: B**



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2. What is the type of solution for pair of linear equation  $ax + by = c$ ,  $mx + ny = n$ .

A. unique

B. infinite

C. No solution

D. Data is insufficient

**Answer: A**



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3. A game consists of tossing a one rupee coin 3 times and noting its outcome each time. Hanif wins if all the tosses give the same result i.e. three heads or three tails, and loses otherwise. Calculate the probability that Hanif will lose the game.

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

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

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

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

**Answer: C**



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**4.** Form a linear equation to represent the given situation :

Meena went to a bank to withdraw Rs. 2000. She asked the cashier to give her Rs. 50 and Rs. 100 note only. Meena got 25 notes in all. Consider Rs. 50 notes as  $x$  and Rs. 100 notes as  $y$ .

A.  $50x + 100y = 2000, x + y = 25$

B.  $x + 50y = 100, 100x + y = 2000$

C.  $x + y = 25, 100x + 50y = 2000$

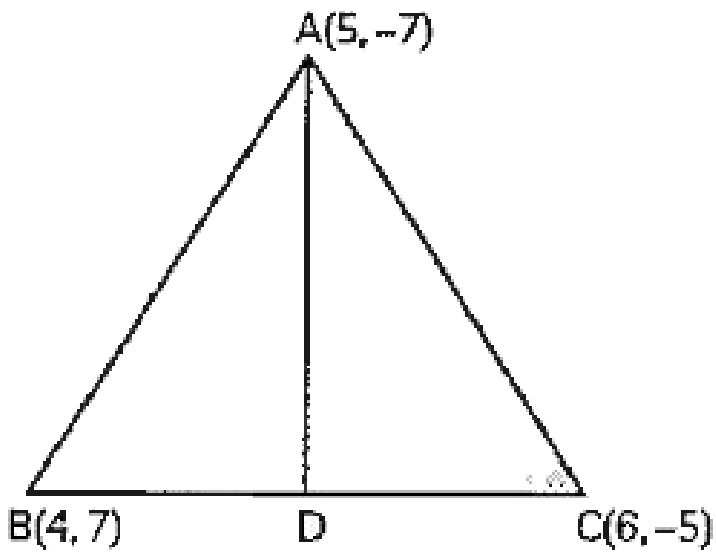
D.  $2x + 100y = 2000, x + y = 20$

**Answer: A**



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5. Here AD is a median of  $\triangle ABC$ . What are then coordinates of D?



A. (5,1)

B. (-1,1)

C. (-5,1)

D. (1,1)

**Answer: A**



6. Find the value of  $(\sin A + \cos A) \times \operatorname{cosec} A$ ,

if  $\cot A = \frac{12}{5}$ .

A.  $\frac{13}{5}$

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

C.  $\frac{17}{5}$

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

**Answer: C**





7. If the probability of raining tomorrow is 0.75, then the probability that it will not rain tomorrow is :

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

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

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

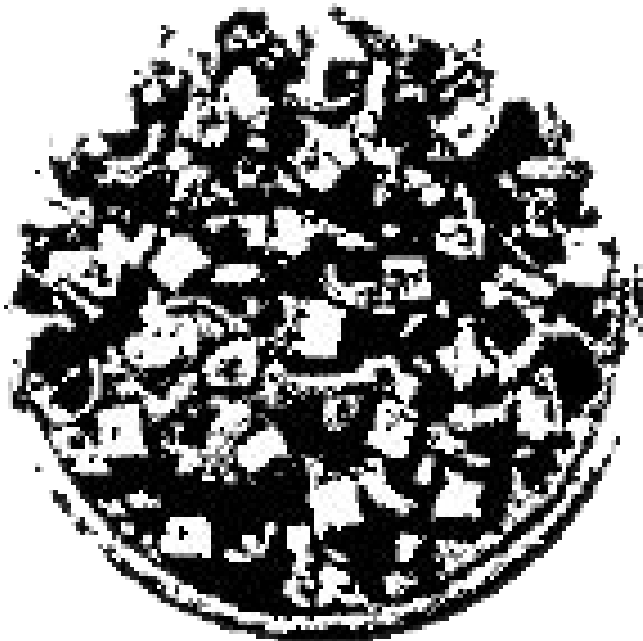
D.  $\frac{1}{3}$

**Answer: A**



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8. Sonal and two of her friends went out to celebrate friendship day. They went to Pizza hut and ordered double cheese pizza and other stuff. They cut the pizza into 6 slices, so each one can have 2 slices of it.



Consider a circle of radius 21 cm, in which an arc of any length subtends an angle of  $60^\circ$  at the centre of the circle.

Then what is the length of the arc?

A. 21 cm

B. 22 cm

C. 14 cm

D. 28 cm

**Answer: B**



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9. Form a quadratic polynomial whose zeroes are

$$\frac{3}{5} \text{ and } -\frac{1}{2}$$

A.  $x^2 - 9x + 6$

B.  $10x^2 - x - 3$

C.  $9x^2 + x + 6$

D.  $7x^2 - 3x + 4$

**Answer: B**



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10. The areas of two similar triangles are  $121 \text{ cm}^2$  and  $64 \text{ cm}^2$  respectively. If the median of the first triangle is 12.1 cm, then the corresponding median of the other is :

A. 6.4 cm

B. 8.8 cm

C. 9.6 cm

D. 7.6 cm

**Answer: B**



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11. Which of the following condition is correct for the graph of quadratic polynomial  $p(x) = ax^2 + bx + c$  to be an upward parabola?

A.  $a < 0$

B.  $a = 0$

C.  $a > 0$

D.  $b = 0$

**Answer: C**



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12. Find the value of  $x$  , if the distance between the points  $(x, - 1)$  and  $(3, 2)$  is 5.

A. 7,-1

B. 1,7

C. - 7,1

D.  $- 1, - 7$

**Answer: A**



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13. If point  $P(4,2)$  lies on the line segment joining the points  $A(2,1)$  and  $B(8,4)$  then

A.  $AP = PB$

B.  $AP = \frac{1}{2}PB$

C.  $AP = \frac{1}{3}PB$

D.  $AP = \frac{1}{4}PB$

**Answer: C**



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14. A box had 24 marbles of which  $x$  are red,  $2x$  are white and  $3x$  are blue. A marble is selected at random from it. What is the probability that it is white?

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

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

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

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

**Answer: A**



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**15.** Find a relation between  $a$  and  $b$ , for which the system of equation  $ax + 2y = 7$  and  $3x + by = 16$  represents parallel lines.

A.  $a - b = 5$

B.  $a + 2b = 7$

C.  $ab = 6$

D.  $\frac{a}{2b}$

**Answer: C**



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16. Find the coordinates of third vertex of a triangle, if centroid of the triangle is  $(3,-5)$  and two of its vertices are  $(4,-8)$  and  $(3,6)$ .

A.  $(1,5)$

B.  $(2,-13)$

C.  $(5,6)$

D.  $(-1,3)$

**Answer: B**



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17. Evaluate :  $\sin^{29} x + \operatorname{cosec}^{29} x$ ,

if  $\sin x + \operatorname{cosec} x = 2$ .

A. 2

B. 0

C. 1

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

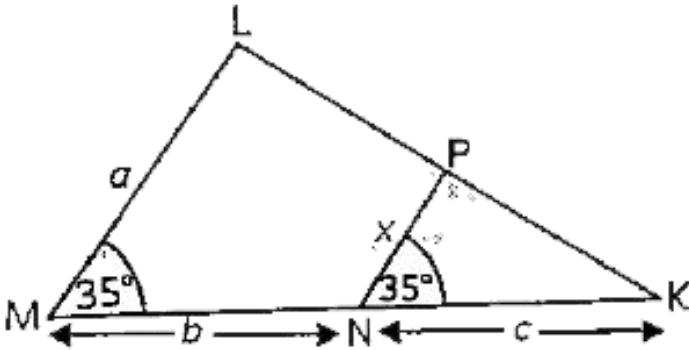
**Answer: A**



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18. Evaluate the value of  $x$  in terms of  $a, b$  and  $c$ .

(See the given figure)



A.  $\frac{ac}{b+c}$

B.  $\frac{ab+ac}{b^2}$

C.  $\left(\frac{1}{a} + \frac{1}{b}\right)^2$

D.  $\frac{ab}{a+c}$

**Answer: A**



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19. There are four rods A, B, C and D of same length  $L$  but different linear mass density  $d$ ,  $2d$ ,  $3d$  &  $4d$  respectively. These are joined to form a square frame with sides C & D along  $x$  &  $y$  axis of coordinate axes respectively. Find coordinate of centre of mass of structure. ?

A.  $\left(-2, \frac{-5}{3}\right)$

B.  $\left(-2, \frac{5}{3}\right)$

C.  $\left(2, \frac{-5}{3}\right)$

D.  $\left(2\frac{5}{3}\right)$

**Answer: C**



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20. What is the value of  $\sec \theta$ , if  $\sin \theta - \cos \theta = 0$ ?

A. 1

B.  $\sqrt{2}$

C. -1

D. 0

**Answer: B**



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## Section B

1. Find the radius of a circle, if the end points of diameter of the circle are (2,4) and (-3,-1).

A.  $3\sqrt{2}$  units

B.  $5\sqrt{2}$  units

C.  $\frac{5\sqrt{2}}{2}$  units



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

**Answer: D**



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2. Find the value(s) of  $k$ , if one of the zeroes of the polynomial

$f(x) = (k^2 + 8)x^2 + 13x + 6k$  is reciprocal of the other.

A. 2,4

B. 3,5

C. 1,3

D.  $-1, 1$

**Answer: A**



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**3.** If two irrational numbers are multiplied, then their product is :

A. Zero

B. always rational

C. always irrational

D. rational or irrational

**Answer: D**



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4. From where does the graph of the equations  $x - y = 0$  pass?

A. x - axis

B. y - axis

C. origin

D. data insufficient

**Answer: C**



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5. Calculate the ratio between the LCM and HCF of the numbers 5,15 and 20.

A. 5 : 3

B. 7 : 2

C. 9 : 4

D. 12 : 1

**Answer: D**



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6. What is the value of  $x$  in the following equation:

$$\sqrt{2} \sec x - 2 \tan x = 0, 0^\circ < x < 90^\circ$$

A.  $30^\circ$

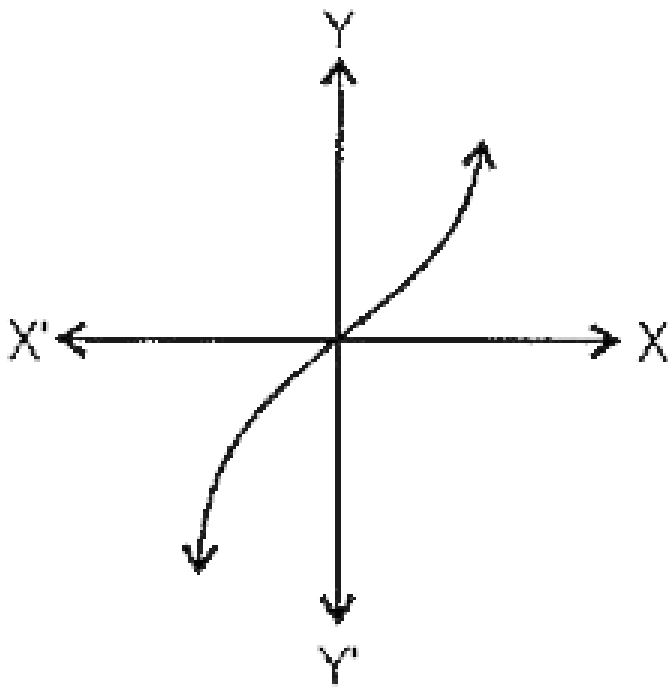
B.  $45^\circ$

C.  $60^\circ$

D.  $75^\circ$

**Answer: B**

7. How many zeroes and there of  $y = f(x)$  for the given graph?



A. 0

B. 1

C. 2

D. 3

**Answer: B**



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**8.** If  $x = a$ ,  $y = b$  is the solution of the pair of equation  $x - y = 2$  and  $x + y = 4$  then the value of 'a' and 'b' are respectively.

A. 1,3

B. 2,3

C. 3,1

D. 2,5

**Answer: C**

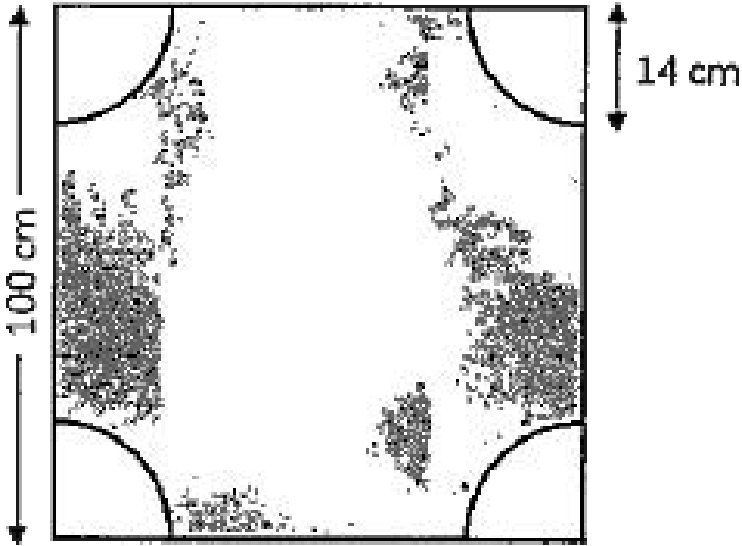


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9. Find the area of shaded region in the given figure in which the squares is of side 100 cm and quadrant of radius 14 cm is formed and four



corners.



A.  $9384 \text{ cm}^2$

B.  $8998 \text{ cm}^2$

C.  $9212 \text{ cm}^2$

D.  $9656 \text{ cm}^2$

**Answer: A**



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10. If  $\tan \theta = \frac{12}{13}$ , evaluate  $\frac{2 \sin \theta \cos \theta}{\cos^2 \theta - \sin^2 \theta}$ .

A.  $\frac{144}{169}$

B.  $\frac{25}{313}$

C.  $\frac{313}{25}$

D.  $\frac{169}{144}$

**Answer: C**



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11. What is the midpoint of the line formed by joining P(-2,0) and Q(3,2)?

A. 1,2

B.  $\left(\frac{1}{2}, 1\right)$

C. (2,1)

D.  $\left(-\frac{1}{2}, -1\right)$

**Answer: B**



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12. Which of the following is not a zero of polynomial,  $p(x) = x^2 - 7x + 6$

A. 1

B. 2

C. 6

D. 1 and 6

**Answer: B**



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**13.** If any two given lines represents a pair of inconsistent linear equation, then both lines must be :

- A. intersecting
- B. coincident
- C. parallel
- D. both (b) and (c )

**Answer: C**



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14. For the given polynomial  $p(x) = 2x^2 - 8x + 6$ , what is the sum of its zeroes is.

A. -1

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

C. 4

D. 3

**Answer: C**



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15.

Evaluate

:

$$\cot 10^\circ \cdot \cot 20^\circ \cdot \cot 30^\circ \cdot \cot 40^\circ \dots \dots \dots \cot 90^\circ$$

.

A. 1

B. -1

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

D. 0

**Answer: D**



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16. What is the perimeter of a semicircular protractor of diameter 14 cm ?

A. 36 cm

B. 7 cm

C. 28 cm

D. 32 cm

**Answer: A**



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17. Somya's saving purse contains hundred 50 p coins, seventy Rs. 1 coins, fifty Rs. 2 coins and thirty Rs. 5 coins.

If it is equally likely that one of the coins will fall out when the purse is turned upside down, then what is the probability that the coin that fell down will be a Rs.1 coins ?

A.  $\frac{8}{25}$

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

C.  $\frac{3}{25}$

D.  $\frac{1}{25}$

**Answer: B**



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**18.** One of the common solution of  $ax + by = c$  and  $y$  axis is

A.  $(0,b)$

B.  $\left(0, \frac{c}{b}\right)$

C.  $\left(0, \frac{a}{c}\right)$

D.  $(0,0)$

**Answer: B**



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19. What is the probability of getting 101 marks out of 100 marks in monthly exams?

A. 1

B. 0

C. 0.5

D. 0.01

**Answer: B**



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20. What is the radius of a circle, whose sum of circumference and the radius is 51 cm?

- A. 7 cm
- B. 14 cm
- C. 21 cm
- D. 42 cm

**Answer: A**



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## Section C

1. H.C.F. of 52, 30 and 18 is



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2. If the H.C.F. of 52, 30 and 18 can be represented as  $7m - 12$ , then  $m = ?$

A. 1

B. 5

C. 2

D. 3

**Answer: C**



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**3. The HCF of 252 and 308 is :**

A. 4

B. 12

C. 14

D. 28

**Answer: D**



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4. The prime factorization of 308 can be expressed as :

A.  $2 \times 3 \times 7 \times 11$

B.  $2^2 \times 7 \times 11$

C.  $2^2 \times 11 \times 17$

D.  $2^2 \times 3 \times 17$

**Answer: B**



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5. The LCM of 60, 90 and 180 is:

A. 720

B. 360

C. 180

D. 90

**Answer: C**



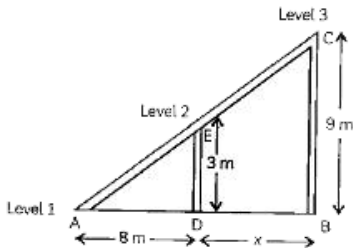
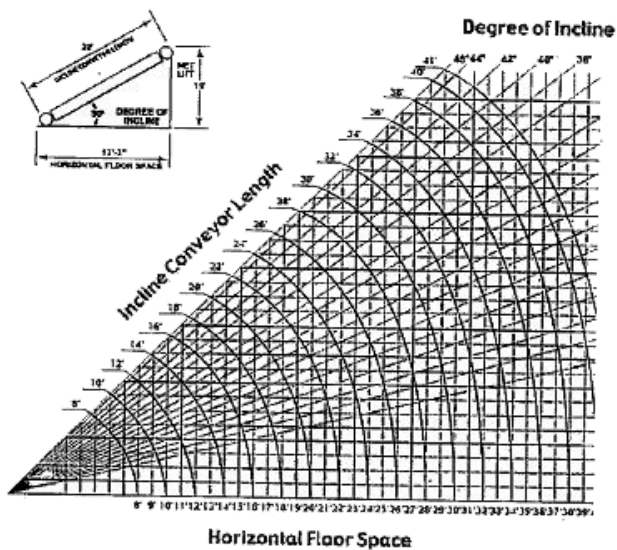
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**6.** A factory is using an inclined conveyor belt to transport its product from level 1 to 2 which is 3 m above level - 1 as shown in the figure below. The inclined conveyor is supported from one end to level 1 and from the other end to a post located 8 m away from level 1 supporting point.



## **Degree of Incline**



The factory wants to extend the conveyor belt to reach at a new level 3 which is 9 m above level 1 while maintaining the inclination angle.

Which concept of geometry helps in determining the distance at which level 3 should be placed?

A. Area of sector

B. Congruency of triangles

C. Similarity of triangles

D. Pythagoras Theorem

**Answer: C**



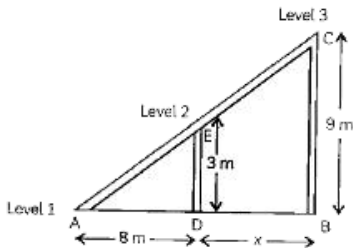
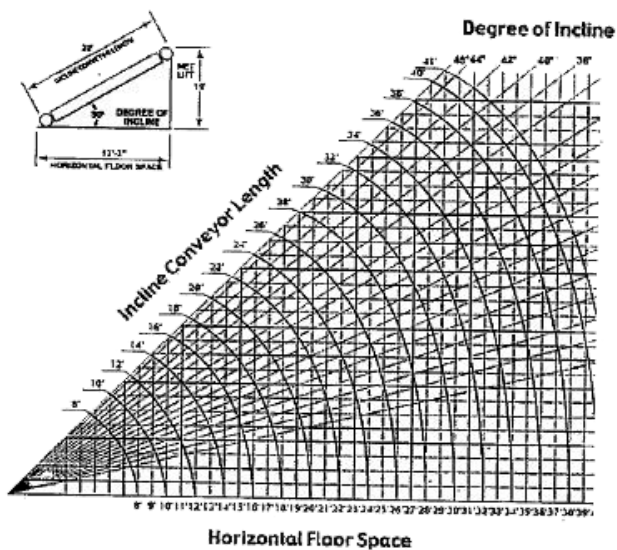
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7. A factory is using an inclined conveyor belt to transport its product from level 1 to 2 which is 3 m above level - 1 as shown in the figure below. The

inclined conveyor is supported from one end to level 1 and from the other end to a post located 8 m away from level 1 supporting point.



**Degree of Incline**



The factory wants to extend the conveyor belt to reach at a new level 3 which is 9 m above level 1 while maintaining the inclination angle.

The distance at which a new post is to be installed to support the conveyor belt at level 3,

is

A. 11 m

B. 14 m

C. 20 m

D. 24 m

**Answer: D**



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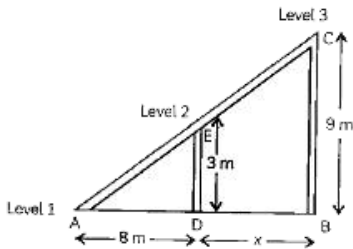
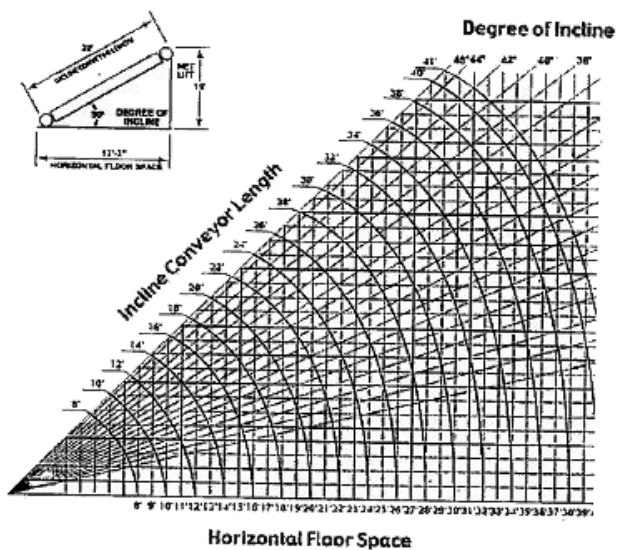
**8.** A factory is using an inclined conveyor belt to transport its product from level 1 to 2 which is 3 m above level - 1 as shown in the figure below. The

inclined conveyor is supported from one end to level 1 and from the other end to a post located 8 m away from level 1 supporting point.



**Degree of Incline**





The factory wants to extend the conveyor belt to reach at a new level 3 which is 9 m above level 1 while maintaining the inclination angle.

How much distance is extended from D to B?

- A. 12 m

B. 16 m

C. 6 m

D. 3 m

**Answer: B**



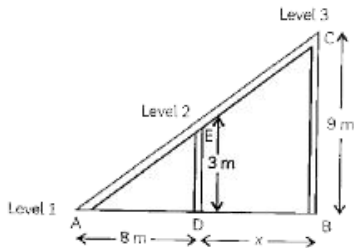
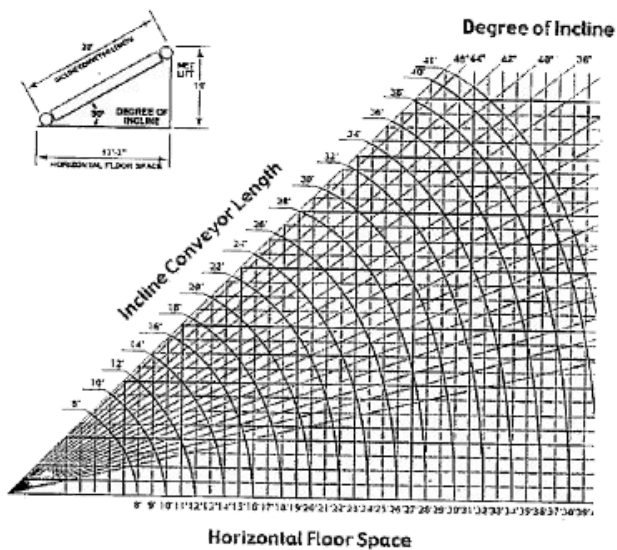
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9. A factory is using an inclined conveyor belt to transport its product from level 1 to 2 which is 3 m above level - 1 as shown in the figure below The inclined conveyor is supported from one end to level 1 and from the other end to a post located 8

m away from level 1 supporting point.



**Degree of Incline**



The factory wants to extend the conveyor belt to reach at a new level 3 which is 9 m above level 1 while maintaining the inclination angle.

The length of the conveyor belt up to level 3 is

A. 22.8 m

B. 26 m

C. 25.6 m

D. 33m

**Answer: B**



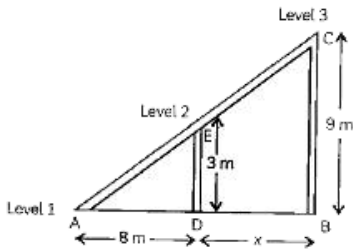
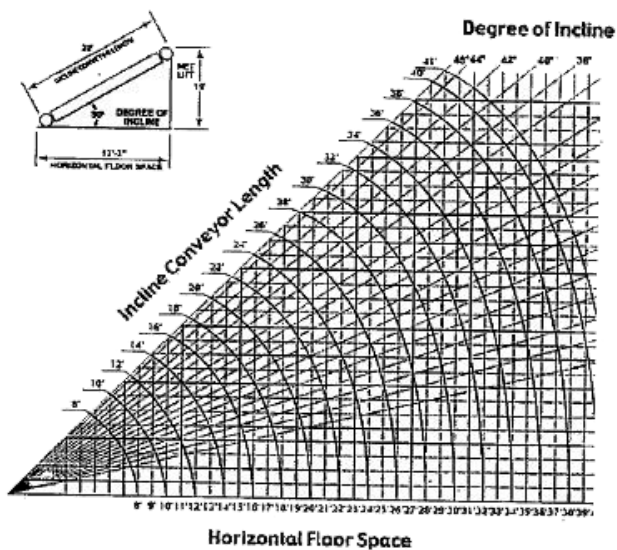
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**10.** A factory is using an inclined conveyor belt to transport its product from level 1 to 2 which is 3 m above level - 1 as shown in the figure below The inclined conveyor is supported from one end to level 1 and from the other end to a post located 8

m away from level 1 supporting point.



**Degree of Incline**



The factory wants to extend the conveyor belt to reach at a new level 3 which is 9 m above level 1 while maintaining the inclination angle.

The length of the conveyor belt up to level 2 is

- A. 12.1 m

B. 7.2 m

C. 6.9 m

D. 8.5 m

**Answer: D**



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## Part A Section I

1. Using factorisation, find the HCF of 36 and 54.



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2. Write a rational number and an irrational number between 1 and 2.



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3. Find the zeros of the polynomial  $p(x) = x^2 - 7x + 6$



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4. Determine the discriminant of the quadratic equation  $2x^2 - 7x - 6 = 0$



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5. Which term of the A.P. 4,9,14 is 254?



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6. Find the sum of the first 20 natural numbers.



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7. Find the centroid of  $\triangle ABC$ , where  $A(-4, 6)$ ,  $B(2, -2)$  and  $C(2, 5)$



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8. A man goes 15 m due west and then 8 m due north. How far is he from the starting point?



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9. Prove that  $4 \tan^2 A - 4 \sec^2 A = -4$



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10. If  $\tan A = \frac{3}{4}$ , find the value of  $\sin A$ .



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11. If the perimeter of a semicircular protractor is 36cm, find its diameter.



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12. The chord of a circle of radius  $10\text{cm}$  subtends a right angle at its centre. The length of the

chord (in cm) is



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**13.** A box contains 20 balls bearing numbers - 1, 2, 3, 4, ..., 20.

A ball is drawn at random from the box. What is the probability that the number on the ball is divisible by 7?



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**14.** The mean of twenty observations is 15. If two observations 3 and 14 are replaced by 8 and 9 respectively, then what will be the new mean.



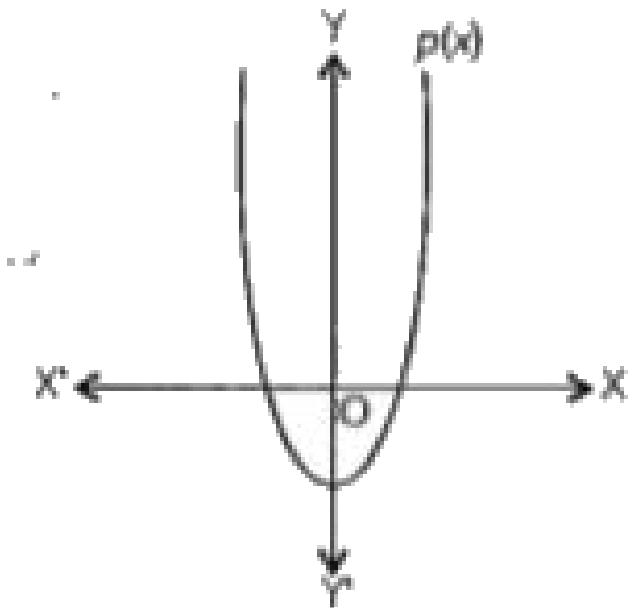
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**15.** If the mean and mode of a discrete data is 6 and 9, find the median of the data.



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16. Write the number of zeros for a polynomial  $p(x)$  whose graph is given in the figure.



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17. Write a pair of lines which has the unique solution  $x = -1, y = 3$



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18. The quadratic equation  $2x^2 + px + 3 = 0$  has two equal roots. Find the value of  $p$ .



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19. Construct a tangent to a circle of radius 4cm from a point which is at a distance of 6 cm from



its centre.



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**20.** The perimeters of two similar triangles are 30 cm and 20 cm respectively. If one side of the first triangle is 9 cm long, find the length of the corresponding side of the second triangle.



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**21.** In a circle of radius 7 cm, tangent PT is drawn from a point P such that  $PT = 24$  cm. If O is the

centre of circle, then find the length of OP.



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## Part A Section Ii

1. The area of the sector with central angle  $90^\circ$  and radius  $200m$  is

A. 11400

B. 20000

C. 31400

D. 40000

**Answer: C**



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2. If the diagonals of a rhombus are  $200m$  long each, then the area of the rhombus is

A. 11400

B. 20000

C. 31400

D. 40000

**Answer: B**



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3. If the radius of a cone is  $8m$  and its slant height is  $21m$ , then the curved surface area of the conical structure is



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4. If fencing needs to be done for a rectangular field of length  $80m$  and width  $60m$ , then the total

length (in m) of the fence required is



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5. If the cost of fencing is ₹ 12 per metre, then the total cost of fencing a park in the shape of a sector of circle having central angle  $90^\circ$  and radius  $200m$  is



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6. Puma stores are networks of retail shops owned and operated by Puma Company. These

shops operater in different parts of country. One can easily didentify these shops in any part of the country as they have same appearance, even their interior is also identical. All the shops are supplied the goods from head office only and all the policies for all branches are made by head office only. Even store sell some goods at uniform prices.

(a) State the type of retail store mentioned in above case.

(b) State any two features of chain store.

A. 46 masks of type A, and 54 masks of type B

B. 54 masks of type A, and 46 masks of type B

C. 41 masks of type A, and 59 masks of type B

D. 59 masks of type A, and 41 masks of type B

**Answer: D**



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7. A company manufactures two types of lamps say A and B. Both lamps go through a cutter and then a finisher. Lamp A requires 2 hours of the cutter's time and 1 hours of the finisher's time. Lamp B requires 1 hour of cutter's and 2 hours of finisher time. The cutter has 100 hours and

finisher has 80 hours of time available each month. Profit on one lamp A is Rs. 7.00 and on one lamp B is Rs. 13.00. Assuming that he can sell all that he produces, how many of each type of lamps should be manufactured to obtain maximum profit?

A. ₹ 550

B. ₹ 560

C. ₹ 1050

D. ₹ 1100

**Answer: D**







8. One kind of cake requires 200 g of flour and 25 g of fat, and another kind of cake requires 100 g of flour and 50 g of fat. Find the maximum number of cakes which can be made from 5 kg of flour and 1 kg of fat assuming that there is no shortage of the other ingredients used in making the cakes. Formulate the above as a linear programming problem and solve graphically.

A. 120 masks of type A, and 130 masks of type

B

B. 130 masks of type A, and 120 masks of type

B

C. 155 masks of type A, and 95 masks of type B

D. 165 masks of type A, and 85 masks of type B

**Answer: D**



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9. On Feb. 02, 2017, Verma purchased from Sharma goods for Rs 17,500. Verma paid Rs 2,500 immediately and for the balance gave a

promissory note to Sharma payable after 60 days. Sharma immediately endorsed the promissory note in favour of his creditor. Gupta for the full settlement of a debt of Rs 15,400. On the due date of the bill Gupta presented the bill to Verma which the latter dishonoured and Gupta paid Rs 5,000 noting charges. On the same date Gupta informed Sharma about the dishonour of the bill. Sharma settled his debt to Gupta by cheque for Rs 15,500 which includes noting charges and interest. Verma settled Sharma's claim by cheque for the same amount. Record the necessary journal entries in the books of Sharma, Gupta and

Verma for the above transaction and prepare Verma's and Gupta's accounts in the books of Sharma. Sharma's account in the books of Verma. And also Sharma's account in the books of Gupta.

A. ₹ 3000

B. ₹ 3052

C. ₹ 2941

D. ₹ 2938

**Answer: A**



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**10.** On Feb. 02, 2017, Verma purchased from Sharma goods for Rs 17,500. Verma paid Rs 2,500 immediately and for the balance gave a promissory note to Sharma payable after 60 days. Sharma immediately endorsed the promissory note in favour of his creditor. Gupta for the full settlement of a debt of Rs 15,400. On the due date of the bill Gupta presented the bill to Verma which the latter dishonoured and Gupta paid Rs 5,000 noting charges. On the same date Gupta informed Sharma about the dishonour of the bill. Sharma settled his debt to Gupta by cheque for Rs 15,500 which includes noting charges and

interest. Verma settled Sharma's claim by cheque for the same amount. Record the necessary journal entries in the books of Sharma, Gupta and Verma for the above transaction and prepare Verma's and Gupta's accounts in the books of Sharma. Sharma's account in the books of Verma. And also Sharma's account in the books of Gupta.

A. 200% in type A, and 100% in type B

B. 180% in type A and 110% in type B

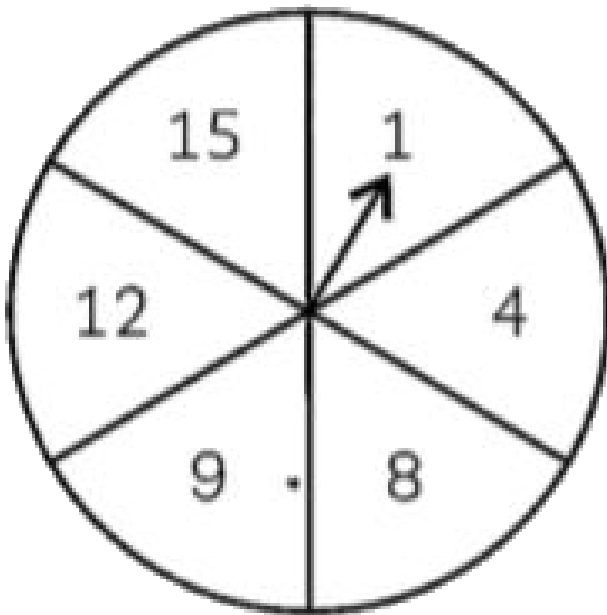
C. 150% in type A and 120% in type B

D. 110% in type A and 180% in type B

**Answer: B**



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**11.**

What is the probability of getting an odd number on the spinner?

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

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

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

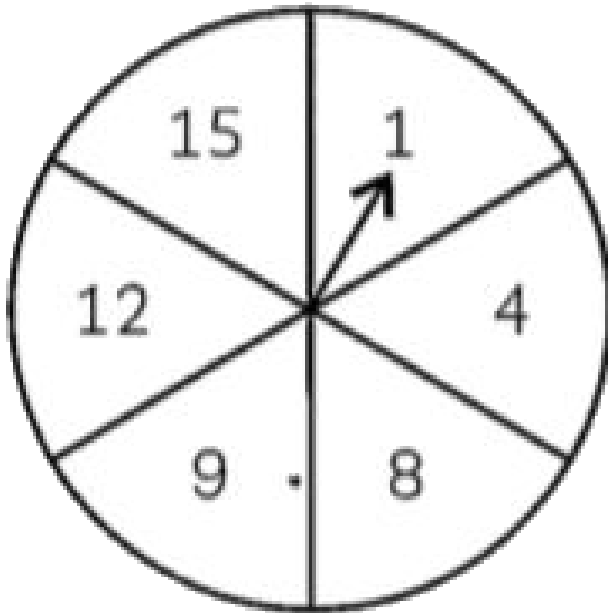
D.  $\frac{1}{16}$

**Answer: B**



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12.

What is the probability of getting an even number on the spinner?

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

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

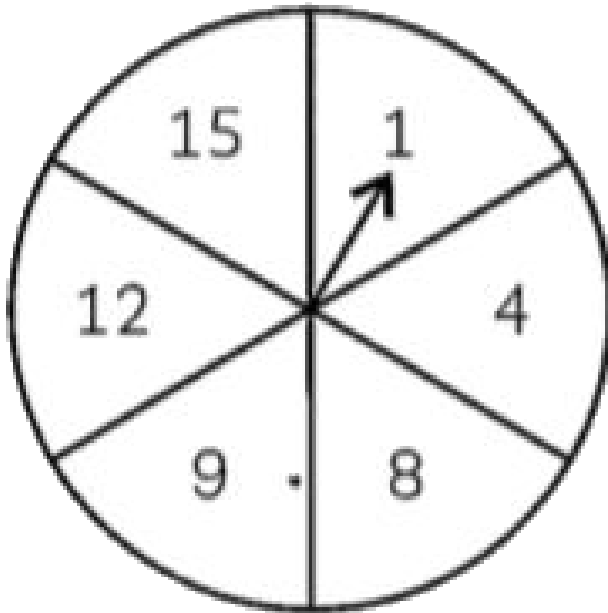
C.  $\frac{1}{8}$

D.  $\frac{1}{16}$

**Answer: B**



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13.

What is the probability of getting a prime number on the spinner?

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

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

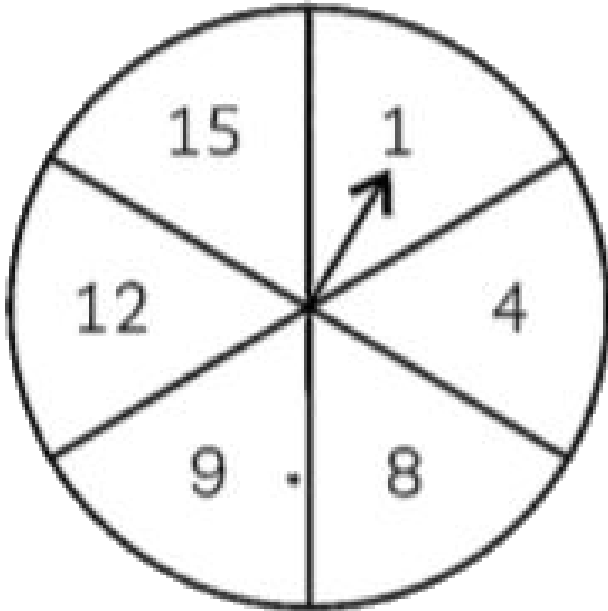
C.  $\frac{1}{3}$

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

**Answer: B**



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14.

What is the probability of getting a square number on the spinner?

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

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

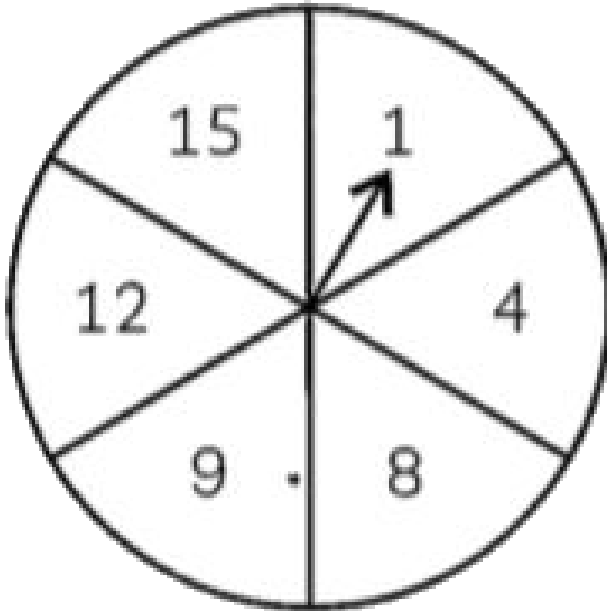
C.  $\frac{1}{3}$

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

**Answer: B**



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15.

What is the probability of getting a number greater than 5 on the spinner?

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

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

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

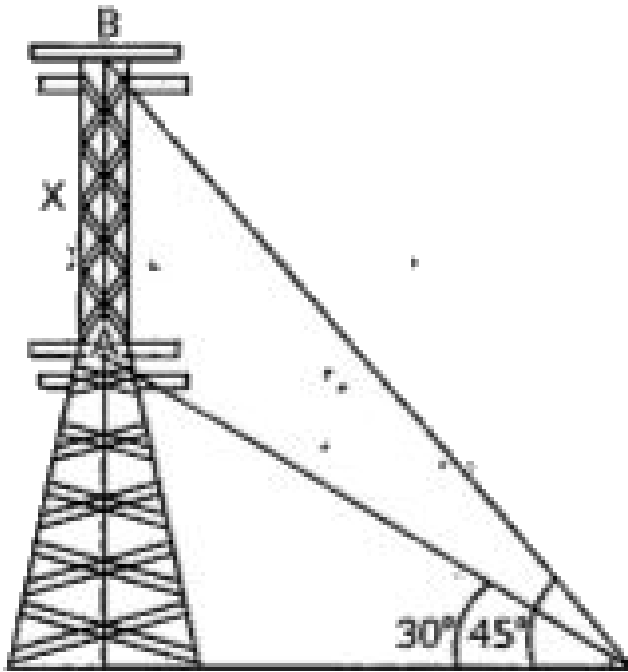
D.  $\frac{2}{3}$

**Answer: B**



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16.  $C \leftarrow 24 \text{ m} \rightarrow O$

The height AC is:

A. 13.84 m

B. 14.6 m

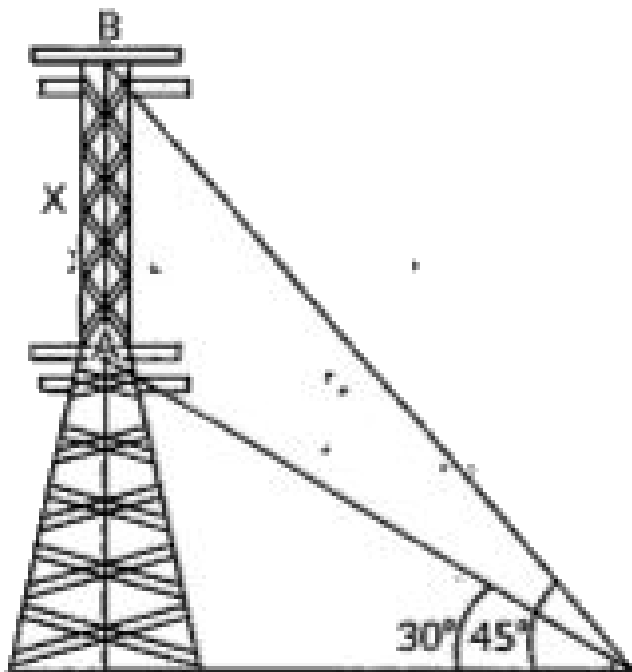
C. 16.7 m

D. 34.6 m

**Answer: A**



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17.  $\leftarrow C \quad \xrightarrow{24\text{ m}} \quad O$

The height AB is:

A. 5.4 m

B. 3.3 m

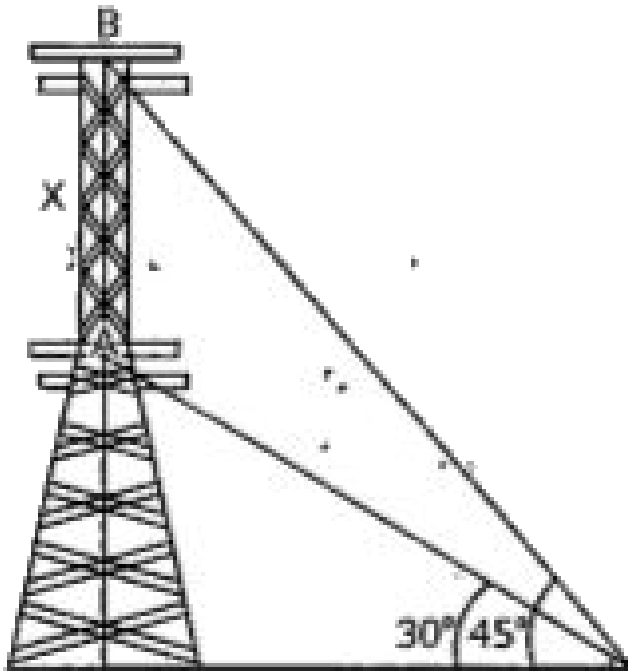
C. 6.16 m

D. 10.16 m

**Answer: D**



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18.  $C \leftarrow 24 \text{ m} \rightarrow O$

The height BC is:

A. 17.9 m

B. 24 m

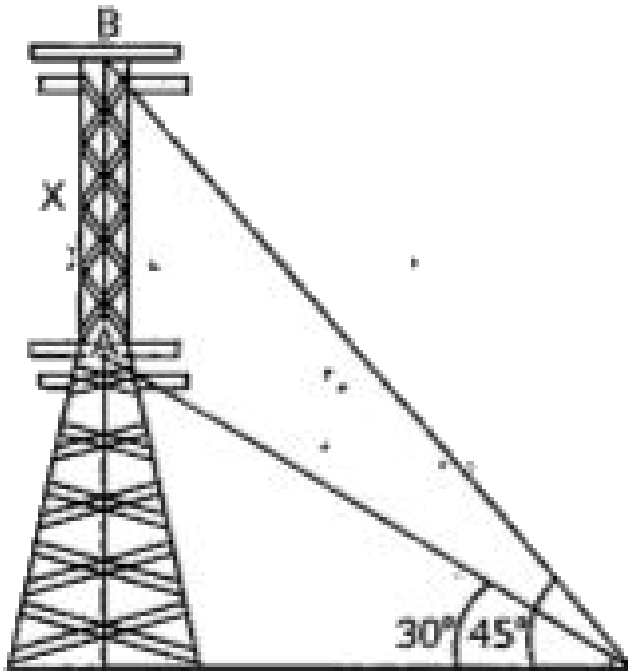
C. 31.6 m

D. 20 m

**Answer: D**



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19.  $\leftarrow C \quad \xrightarrow{24\text{ m}} \quad O$

The length OA is:

A. 11.8 m

B. 14.6 m

C. 27.7 m

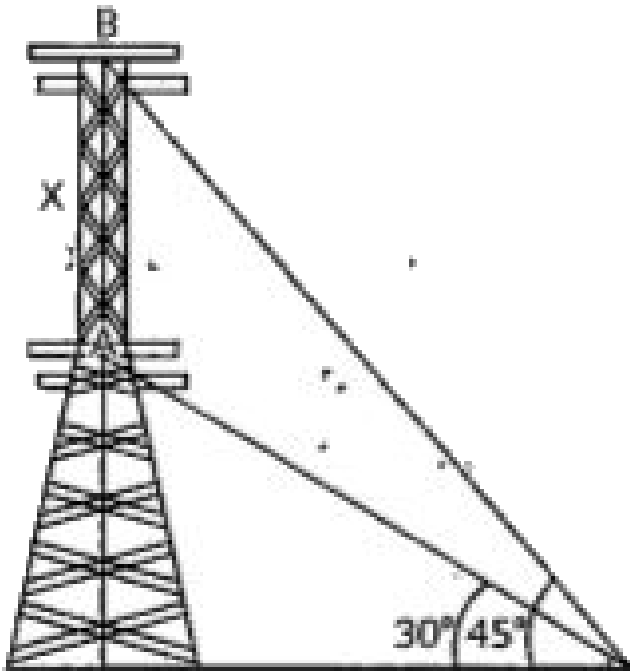
D. 33.84 m

**Answer: C**



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20.  $C \longleftarrow 24\text{ m} \longrightarrow O$

The length OB is:

A. 11.8 m

B. 14.6 m

C. 27.7 m

D. 33.84 m

**Answer: D**



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## Part B Section Iii

1. Two unbiased coins are tossed. Find the probability of getting two heads



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2. Two coins are tossed simultaneously. Find the probability of getting at least one head.



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3. If  $\alpha$  and  $\beta$  be the zeroes of the quadratic polynomial  $p(x) = 2x^2 - kx + 7$  since that  $\alpha^2 + \beta^2 - \frac{1}{2}\alpha\beta = \frac{23}{2}$ , find the value of k.



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4. Find the value of  $\sin 60^\circ \cos 30^\circ + \cos 60^\circ \sin 30^\circ$ .



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5. Find a relation between  $x$  and  $y$  such that the point  $(x, y)$  is equidistant from the points  $(3, 6)$  and  $(-3, 4)$



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6. Show that the points  $(4, 2)$ ,  $(7, 5)$  and  $(9, 7)$  are collinear.



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7. If the circumference of a circle increases from  $4\pi$  to  $8\pi$ , then find the percentage increase in the area of the circle.



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8. If 0.3528 is expressed in the form  $\frac{p}{2^m 5^n}$ , find the smallest values of m, n and p.



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9. Using prime factorisation, find the LCM of 150 and 210.



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## Part B Section Iv

1. Prove that  $\sqrt{7}$  Is an irrational number..



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2. Solve for  $x$  and  $y$ :

$$3x+2y=11$$

$$2x+3y=4$$



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3. Two poles of height  $a$  metres and  $b$  metres are  $p$  metres apart. Prove that the height of the point of intersection of the lines joining the top of each pole to the foot of the opposite pole is given by

$$\frac{ab}{a+b} \text{ metres.}$$



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4. Draw a line segment of length 8 cm and divides it in the ratio 2:3



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5. If two adjacent vertices of a parallelogram are  $(3, 2)$  and  $(-1, 0)$  and the diagonals intersect at  $(2, -5)$ , then find the coordinates of the other two vertices.

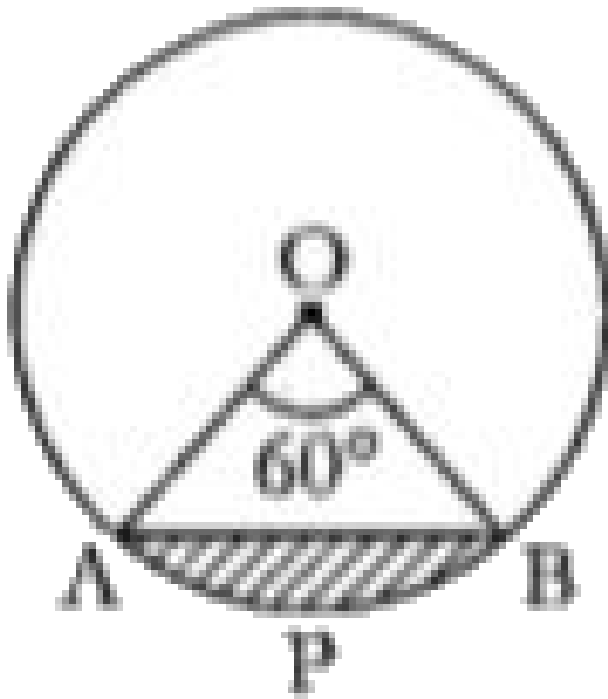


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6. In a circle of radius 7 cm, a chord makes an angle of  $60^\circ$  at the centre of the circle. Find area of the circle

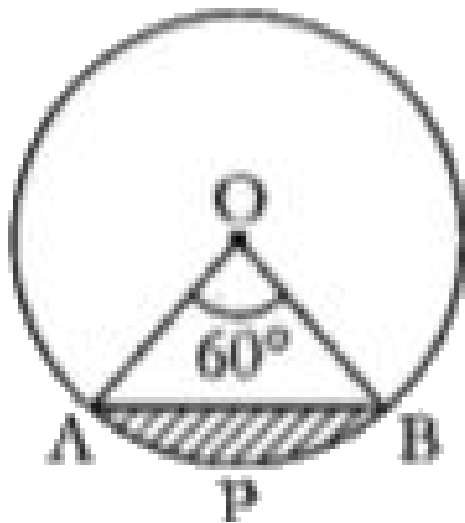
(Take  $\sqrt{3} = 1.73$ )



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7. In a circle of radius 7 cm, a chord makes an angle of  $60^\circ$  at the centre of the circle. Find area of sector AOB

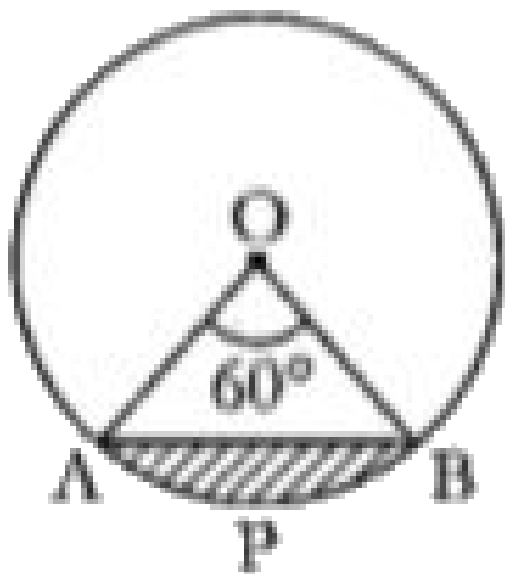
(Take  $\sqrt{3} = 1.73$ )



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8. In a circle of radius 7 cm, a chord makes an angle of  $60^\circ$  at the centre of the circle. Find area of minor segment APB

(Take  $\sqrt{3} = 1.73$ )



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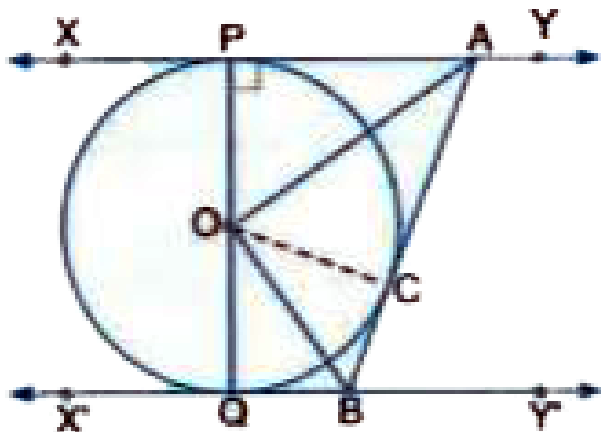
**9.** A solid wooden toy is in the shape of a right circular cone mounted on a hemisphere. If the radius of the hemisphere is 4.2 cm and the total height of the toy is 10.2 cm, find the volume of the wooden toy.



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**10.** In Fig XY and X'Y' are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersecting XY and X'Y' at

B , prove that  $\angle AOB = 90^\circ$



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## Part B Section V

1. Find the zeroes of the polynomial

$p(x) = 4x^2 - 7x + 3$  by factorising it and verify

the relationship between the zeroes and coefficients of  $p(x)$ .



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2. State and prove the Pythagoras theorem.



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3. If  $\angle B$  of  $\Delta ABC$  is an acute angle and  $AD \perp BC$ ; prove  $AC^2 = AB^2 + BC^2 - 2BC \cdot CD$



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4. In a  $\triangle ABC$ ,  $\angle B$  is an acute-angle and  $AD \perp BC$ . Prove that:

$$AB^2 + CD^2 = AC^2 + BD^2$$



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5. Two pillars of equal height stand on either side of a roadway which is 120 m wide. At a point in the road between the pillars, the angles of elevation of the pillars are  $60^\circ$  and  $30^\circ$ . Find the

height of each pillars to the nearest metre and position of the point from both the pillars.



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## Part A Section I

1. What is the common zero of the polynomial

$$x^3 + 1, x^2 - 1 \text{ and } x^2 + 2x + 1?$$



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2. If  $p$ ,  $2p - 1$ ,  $2p + 1$  are three consecutive terms of an A.P., then what is the value of  $p$  ?



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3. In which quadrant does the point  $(-1, -2)$  lie?



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4. The perimeter of the triangle with vertices  $(0, 4)$ ,  $(0, 0)$  and  $(3, 0)$  is



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5. If radii of two concentric circles are 4 cm and 5 cm, then length of each chord of one circle which is tangent to the other circle, is



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6. Find the value of  $\sqrt{\sec^2 45^\circ - \cot^2 45^\circ}$



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7. If  $\tan x = \sin 45^\circ \cos 45^\circ + \sin 30^\circ$  then  $x$  is equal to



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8. What is the area of a circle inscribed in a square of side 'a' units?



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9. A car travels 0.99 km in which each wheel makes 450 complete revolutions. Find radius of the wheel.



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10. In the distribution given below, Find the modal class is:

Marks	Below 10	Below 20	Below 30	Below 40	Below 50	Below 60
Frequency	3	12	27	57	75	80



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11. A number from 11 to 30 was chosen at random. Find the probability of this chosen number being a multiple of 2.



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12. If  $\alpha$  and  $\beta$  are the zeros of the polynomial

$$p(x) = x^2 - px + q,$$

then find the value of  $\frac{1}{\alpha} + \frac{1}{\beta}$



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13. Find the sum of first 20 even numbers.



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14. Find the discriminant of the quadratic

equation  $(p + 3)x^2 - (5 - p)x + 1 = 0$  and

hence determine the value of  $p$  for which the roots are real and distinct.



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15. In  $ABC$ ,  $DE$  is parallel to base  $BC$ , with  $D$  on  $AB$  and  $E$  on  $AC$ . If  $\frac{AD}{DB} = \frac{2}{3}$ , find  $\frac{BC}{DE}$ .



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16. In a frequency distribution, what does ogive help in calculating?



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**17.** Find the median of the following data:

5, 2, 7, 9, 3, 2, 4, 8.



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**18.** Find the discriminant of the equation

$$x^2 + 3x + 2 = 0.$$



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19. Write the  $8^{th}$  term from the end of A.P -12, -7, -2, ....., 68.



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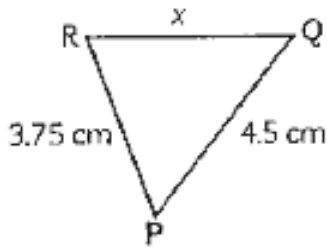
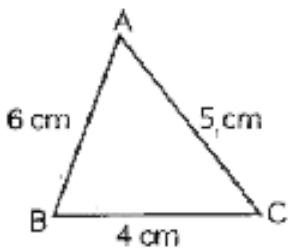
20. State *SAS* similarity criterion.



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21. In the given figure  $\triangle ABC - \triangle PQR$ . Find the value of  $x$ .





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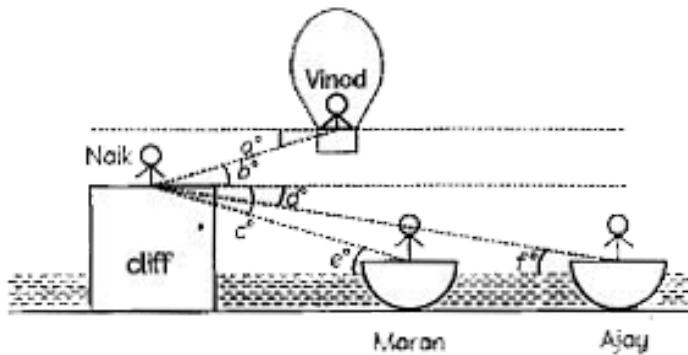
## Part A Section II

1. Mr. Naik is a paramilitary Intelligence Corps officer who is tasked with planning a coup on the enemy at a certain date. Currently he is inspecting the area standing on top of the cliff. Agent Vinod is on a hot air balloon in the sky.

When Mr. Naik looks down below the cliff towards the sea, he has Ajay and Maran in boats positioned to get a good vantage point.

The main goal is to scope out the range and angles at which they should train their soldiers.

Which one is a pair of 'angles of elevation'?



A. ( $\angle a^\circ$ ,  $\angle e^\circ$ )

B. ( $\angle b^\circ$ ,  $\angle e^\circ$ )

C. ( $\angle c^\circ$ ,  $\angle d^\circ$ )

D. ( $\angle a^\circ, \angle f^\circ$ )

**Answer: B**



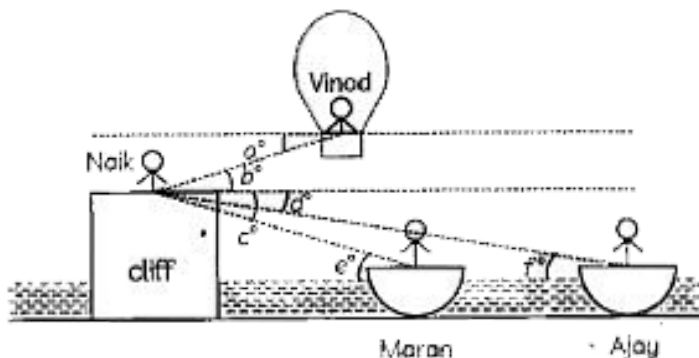
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2. Mr. Naik is a paramilitary Intelligence Corps officer who is tasked with planning a coup on the enemy at a certain date. Currently he is inspecting the area standing on top of the cliff. Agent Vinod is on a hot air balloon in the sky. When Mr. Naik looks down below the cliff towards the sea, he has Ajay and Maran in boats

positioned to get a good vantage point.

The main goal is to scope out the range and angles at which they should train their soldiers.

which one is a pair of 'angles of depression'?



A. ( $\angle a^\circ$ ,  $\angle e^\circ$ )

B. ( $\angle b^\circ$ ,  $\angle e^\circ$ )

C. ( $\angle c^\circ$ ,  $\angle d^\circ$ )

D. ( $\angle a^\circ$ ,  $\angle f^\circ$ )

**Answer: C**



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3. Mr. Naik is a paramilitary Intelligence Corps officer who is tasked with planning a coup on the enemy at a certain date. Currently he is inspecting the area standing on top of the cliff. Agent Vinod is on a hot air balloon in the sky. When Mr. Naik looks down below the cliff towards the sea, he has Ajay and Maran in boats positioned to get a good vantage point.

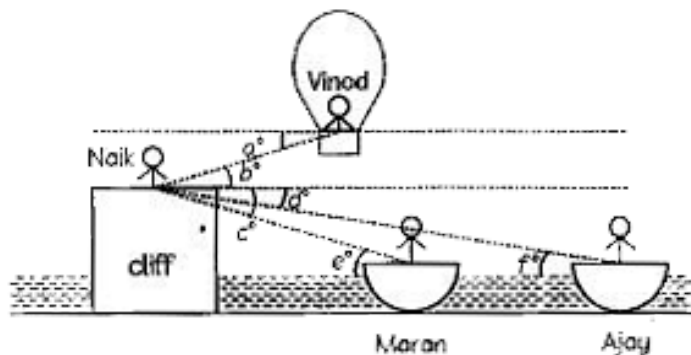
The main goal is to scope out the range and

angles at which they should train their soldiers.

Ajay's boat is 25 m away from the base of the cliff.

If  $\angle d = 30^\circ$ . What is the height of the cliff?

(use  $\sqrt{3} = 1.73$ )



A. 17.5m

B. 12.26m

C. 14.45m

D. 15.4m

**Answer: C**



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4. Mr. Naik is a paramilitary Intelligence Corps officer who is tasked with planning a coup on the enemy at a certain date. Currently he is inspecting the area standing on top of the cliff. Agent Vinod is on a hot air balloon in the sky. When Mr. Naik looks down below the cliff towards the sea, he has Ajay and Maran in boats positioned to get a good vantage point.

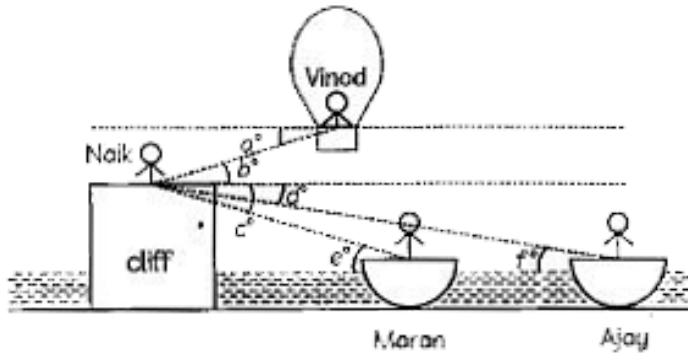
The main goal is to scope out the range and

angles at which they should train their soldiers.

If the height of the cliff is  $30m$ ,  $\angle c = 45^\circ$  and

$\angle d = 30^\circ$ , distance between the two boats is

(use  $(\sqrt{3} = 1.73)$ )



- A.  $6.8m$
- B.  $8.5m$
- C.  $11.2m$
- D.  $21.9m$



**Answer: D**



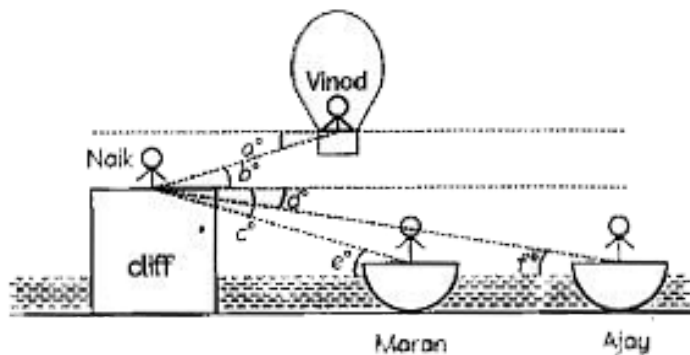
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5. Mr. Naik is a paramilitary Intelligence Corps officer who is tasked with planning a coup on the enemy at a certain date. Currently he is inspecting the area standing on top of the cliff. Agent Vinod is on a hot air balloon in the sky. When Mr. Naik looks down below the cliff towards the sea, he has Ajay and Maran in boats positioned to get a good vantage point.

The main goal is to scope out the range and

angles at which they should train their soldiers.

If the vertical height of the balloon from the top of the cliff is 12m and  $\angle b = 30^\circ$ , then the distance between the Naik and Vinod is



- A. 6m
- B. 12m
- C. 18m
- D. 24m

**Answer: D**



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**6.** If

$$x^3 - 5x^2 - 2x - 6 = m(x^2 + 2x + 1) + (11x + 1)$$

.Then  $m = ?$

A.  $x + 7$

B.  $x - 3$

C.  $x - 7$

D.  $x + 3$

**Answer: C**



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7. If  $11x + 1 = 540$ , then  $x = ?$

A. 12

B. 23

C. 47

D. 49

**Answer: D**



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8. If  $x = 49$ , then  $x^2 + 2x + 1 = ?$ .

A. 1250

B. 2225

C. 2500

D. 2750

**Answer: C**



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9. If  $x = 49$ , then  $x^3 - 5x^2 - 2x - 6 = ?$

A. 53040

B. 93990

C. 1,05,540

D. 1,16,040

**Answer: C**



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10. If  $11x + 1 = 540$ , then  $x - 7 = ?$

A. 49

B. 47

C. 44

D. 42

**Answer: D**



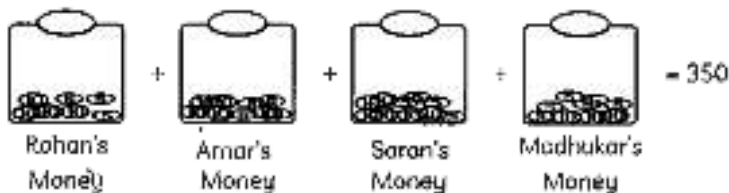
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**11.** To celebrate Diwali festival among senior citizens of an old home, four friends of a society, Rohan, Amar, Saran and Madhukar decided to

pool some money to gift packs to every old man/woman staying in the neighbouring old-age home. They pooled money in the ratio 2 : 3 : 4 : 5. With the pooled money of Rs.3500, they start preparing gift packs. In the preparation of one gift pack, Rohan, Amar, Saran and Madhukar spend 7, 6, 8 and 9 minutes respectively.

On the basis of the above information, answer any four of the following questions:

How much amount was pooled by Saran?



A. Rs.500



B. Rs.750

C. Rs.1000

D. Rs.1250

**Answer: C**



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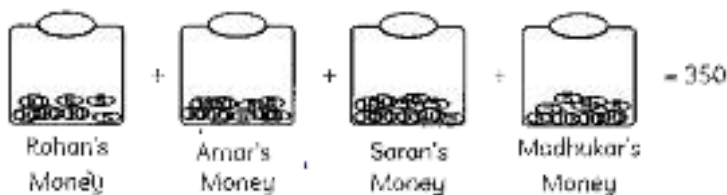
**12.** To celebrate Diwali festival among senior citizens of an old home, four friends of a society, Rohan, Amar, Saran and Madhukar decided to pool some money to gift packs to every old man/woman staying in the neighbouring old-age

home. They pooled money in the ratio 2 : 3 : 4 : 5.

With the pooled money of Rs.3500, they start preparing gift packs. In the preparation of one gift pack, Rohan, Amar, Saran and Madhukar spend 7, 6, 8 and 9 minutes respectively.

On the basis of the above information, answer any four of the following questions:

How much time (in minutes) was spent on one gift?



A. 20

B. 25

C. 30

D. 40

**Answer: C**



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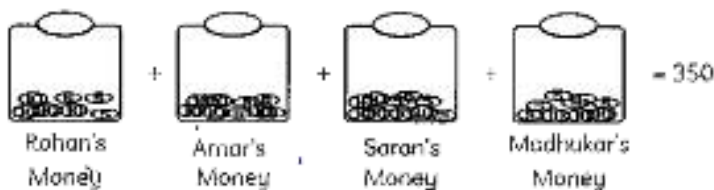
**13.** To celebrate Diwali festival among senior citizens of an old home, four friends of a society, Rohan, Amar, Saran and Madhukar decided to pool some money to gift packs to every old man/woman staying in the neighbouring old-age

home. They pooled money in the ratio 2 : 3 : 4 : 5.

With the pooled money of Rs.3500, they start preparing gift packs. In the preparation of one gift pack, Rohan, Amar, Saran and Madhukar spend 7, 6, 8 and 9 minutes respectively.

On the basis of the above information, answer any four of the following questions:

If each gift costs to them Rs.70, how many senior citizens were given the cards ?



A. 35

B. 50

C. 54

D. 60

**Answer: B**



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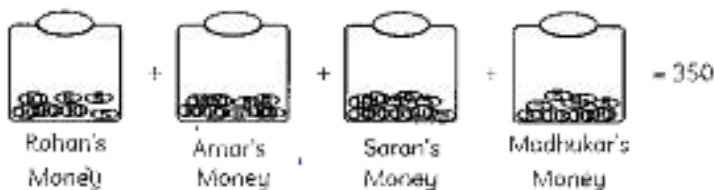
**14.** To celebrate Diwali festival among senior citizens of an old home, four friends of a society, Rohan, Amar, Saran and Madhukar decided to pool some money to gift packs to every old man/woman staying in the neighbouring old-age

home. They pooled money in the ratio 2 : 3 : 4 : 5.

With the pooled money of Rs.3500, they start preparing gift packs. In the preparation of one gift pack, Rohan, Amar, Saran and Madhukar spend 7, 6, 8 and 9 minutes respectively.

On the basis of the above information, answer any four of the following questions:

How much amount was pooled by Rohan and Madhukar together for giving the gifts?



A. Rs. 1856

B. Rs.1750

C. Rs.1623

D. Rs.2150

**Answer: B**



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**15.** Three friends, Rohan, Amar and Saran pooled money to gift packs. They pooled money in the ratio 5:5:4. With the pooled money of Rs.3500. How much was Saran's contribution in preparing the gift packs

A. 3000

B. 1000

C. 2000

D. 1800

**Answer: B**



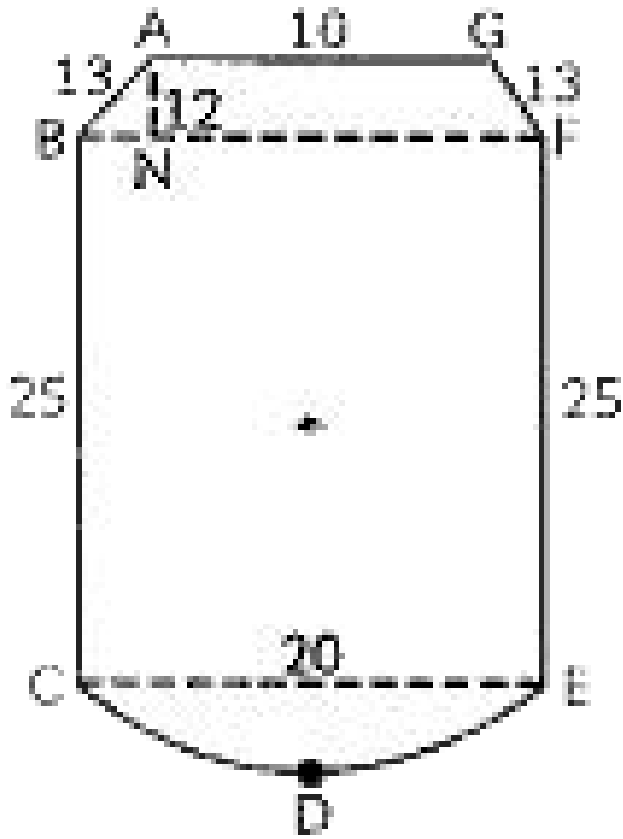
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**16.** In the given cross-section:  $CE = 20$  cm,  $BC = 25$  cm,  $AB = GF = 13$  cm,  $AG = 10$  cm and  $AN = 12$  cm

The perimeter of the trapezium part of the cross



section, is



A. 36cm

B. 56cm

C. 30cm

D. 46cm

**Answer: B**

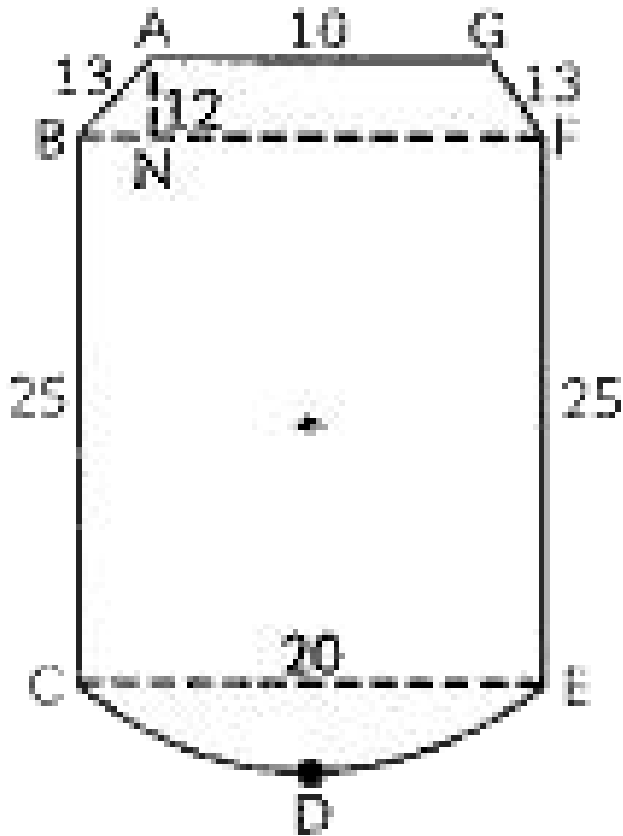


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**17.** In the given cross-section:  $CE = 20$  cm,  $BC = 25$  cm,  $AB = GF = 13$  cm,  $AG = 10$  cm and  $AN = 12$  cm

The area of the semi- circular part of the cross

section, is



A.  $\pi sqcm$

B.  $10\pi sqcm$

C.  $50\pi sqcm$

D.  $100\pi sqcm$

**Answer: D**

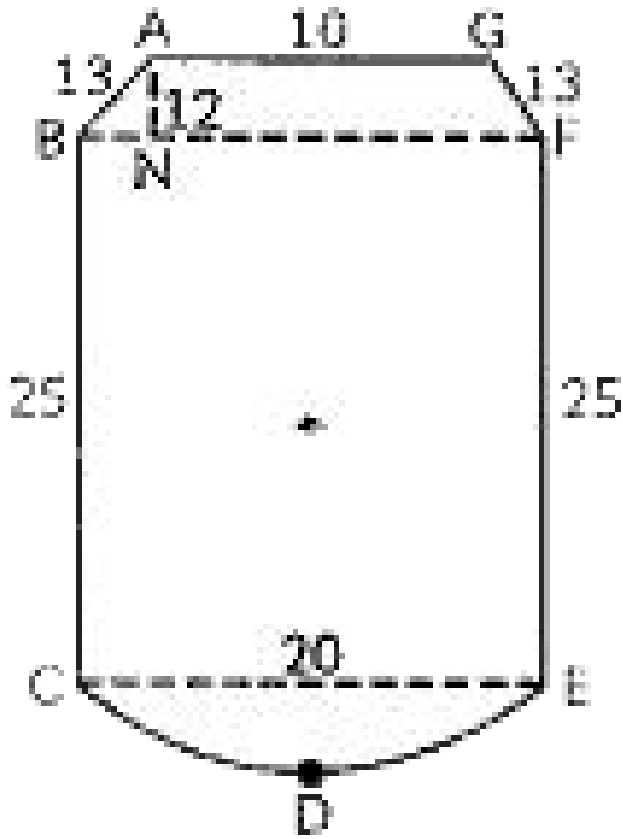


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**18.** In the given cross-section:  $CE = 20$  cm,  $BC = 25$  cm,  $AB = GF = 13$  cm,  $AG = 10$  cm and  $AN = 12$  cm

The perimeter of the rectangular part of the

cross section, is



A. 90cm

B. 70cm

C. 50cm

D. 40cm

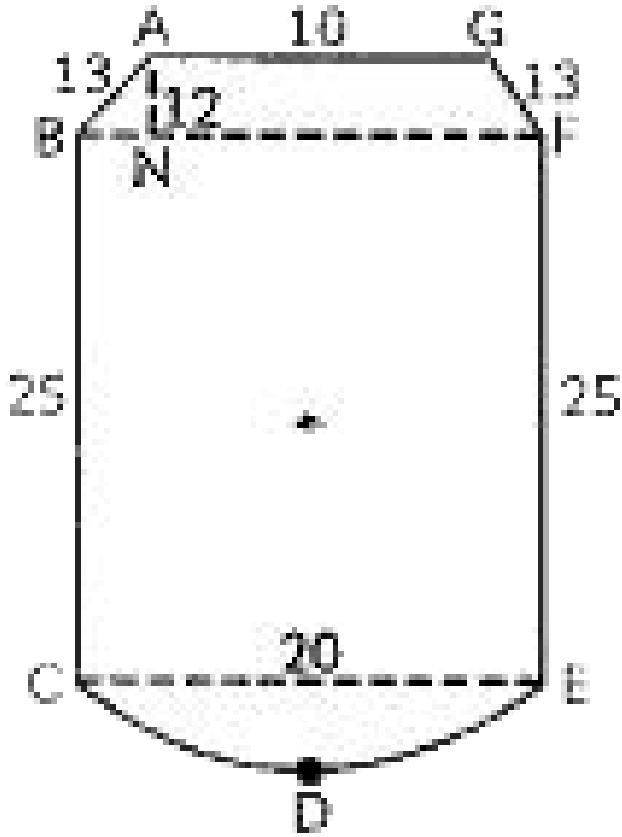
**Answer: A**



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**19.** In the given cross-section:  $CE = 20$  cm,  $BC = 25$  cm,  $AB = GF = 13$  cm,  $AG = 10$  cm and  $AN = 12$  cm

The perimeter of the cross section, is



A. 83 cm

B. 86 cm

C.  $117.4\text{cm}$

D.  $130.4\text{cm}$

**Answer: C**

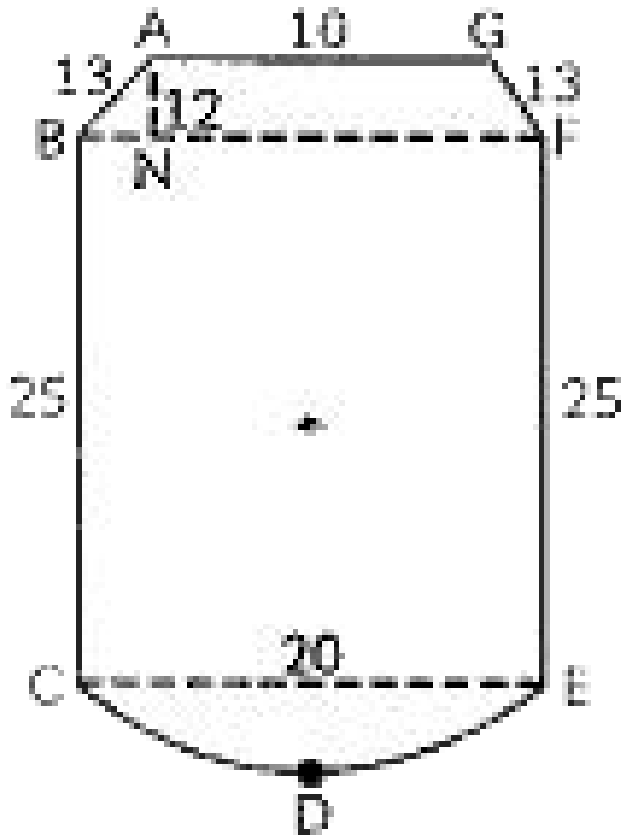


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**20.** In the given cross-section:  $CE = 20\text{ cm}$ ,  $BC = 25\text{ cm}$ ,  $AB = GF = 13\text{ cm}$ ,  $AG = 10\text{ cm}$  and  $AN = 12\text{ cm}$



The area of the cross section, is



A. 873 sq cm

B. 738 sq cm

C. 783 sq cm

D. 837 sq cm

**Answer: D**



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## Part B Section Iii

1. Without actually performing the long division, write the decimal expansion of  $\frac{1175}{2^3 \times 5^4}$



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2. Prove that  $\sqrt{5}$  is an irrational number and hence show that  $3 + \sqrt{5}$  is also an irrational number.



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3. Solve algebraically:  $4x + 3y = 14$  and  $3x - 4y = 23$ .



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4. Evaluate:

$$(\sin^4 60^\circ + \sec^4 30^\circ) - 2(\cos^2 45^\circ - \sin^2 90^\circ)$$



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5. Prove that  $\frac{\sin \theta - 2 \sin^3 \theta}{2 \cos^3 \theta - \cos \theta} = \tan \theta$



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6. A die is thrown twice. Find the probability that:  
5 will not come up either time



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7. Find a point on x - axis which is equidistant from A (-3, 4) and B(7, 6).



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8. If the circumference of a circle increases from  $4\pi$  to  $8\pi$ , then find the percentage increase in the area of the circle.



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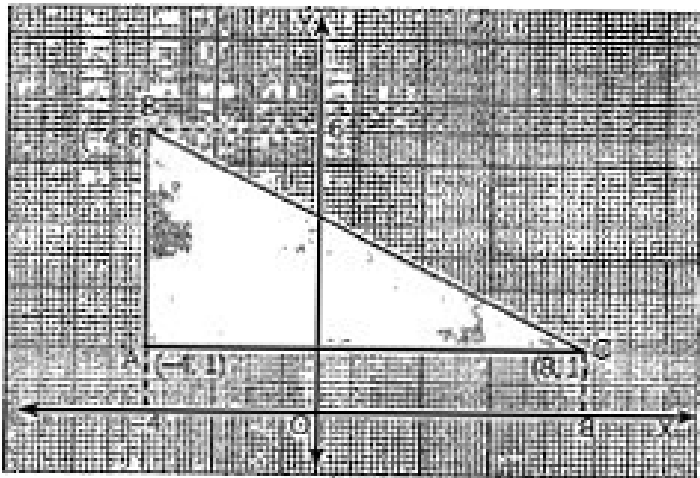
1. The sum of the squares of two consecutive multiples of 7 is 637. Find the multiples.



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2. The figure drawn on the graph paper shows a  $\triangle ABC$  with vertices A (-4, 1) B(-4, 6) and C (8, 1).

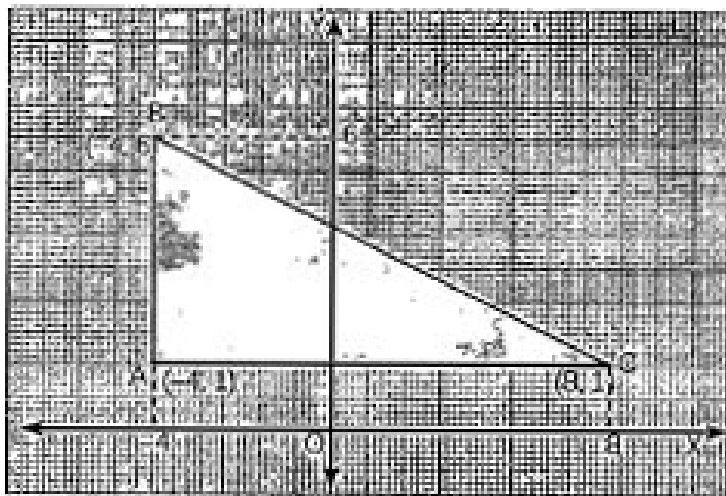
Find the length of BC,



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3. The figure drawn on the graph paper shows a  $\triangle ABC$  with vertices A (-4, 1) B(-4, 6) and C (8, 1).

Find  $\sin B$

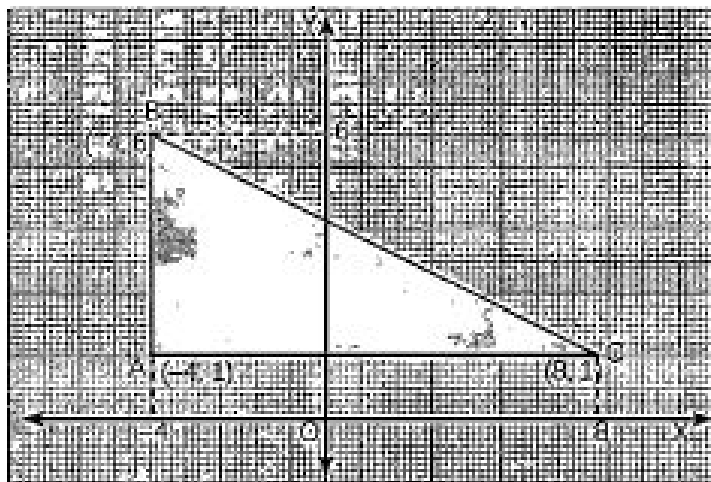


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4. The figure drawn on the graph paper shows a  $\triangle ABC$  with vertices  $A(-4, 1)$ ,  $B(-4, 6)$  and  $C(8, 1)$ .



Find  $\cos C$



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5. Theorem: The length of two tangents drawn from an external point to a circle are equal.



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6. Draw a line segment of length 7.6 cm and divide it in the ratio 5 : 8. Measure the two parts.



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7. The playground of our school is in the shape of a quadrilateral ABCD. A flagpost standing vertically in the ground subtends angles of  $45^\circ$  and  $30^\circ$  at two points P and Q, which lie on the sides AB and AD respectively such that AP = 50 m and AQ = 30 m. If P and Q are the nearest

points on the sides  $AB$  and  $AD$  to the flagpost, then the height of the flagpost is :



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8. Two spotlights,  $P$  and  $Q$  are mounted on a vertical pole  $AB$  as shown.

Light beams from  $P$  and  $Q$  shine to two points on the ground,  $H$  and  $K$ , respectively. Given that  $PQ = 16\text{m}$ ,  $KB = 16\text{m}$ ,  $PH = 35\text{m}$  and  $QK = 20\text{m}$ , Find:

$HK$ , the distance between the projections of the light beams.



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9. The minute hand of a clock is 2 cm long. Find the area of the face of the clock described by the minute hand between 7 am and 7 : 15 am.



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10. Two spheres of same metal weight 1 kg and 7 kg. The radius of the smaller sphere is 3 cm. The two spheres are melted to form a single big sphere. Find the diameter of the new sphere.



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**11.** All questions are compulsory. In case of internal choice, attempt any one.

Determine the median for the following frequency distribution:

<b>Class</b>	100-120	120-140	140-160	160-180	180-200
<b>Frequency</b>	12	14	8	6	10



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**12.** A bag contains 15 white and some black balls. If the probability of drawing a black ball from the

bag is thrice that of drawing a white ball find the number of black balls in the bag.



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## Part B Section V

1. Two men on either side of a 75 m high building and in line with base of building observe the angle of elevation of the top of the building as  $30^\circ$  and  $60^\circ$ . Find the distance between the two men.

(Use  $\sqrt{3} = 1.73$ )



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2. The shadow of a vertical tower on level ground increases by 10 metres, when the altitude of the sun changes from angle of elevation  $45^\circ \rightarrow 30^\circ$ . Find the height of the tower, correct to one place of decimal. (Take  $\sqrt{3} = 1.73$ )



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3. Solve for x and y:

$$2x + 3y + 1 = 0, 3x + 2y - 11 = 0$$

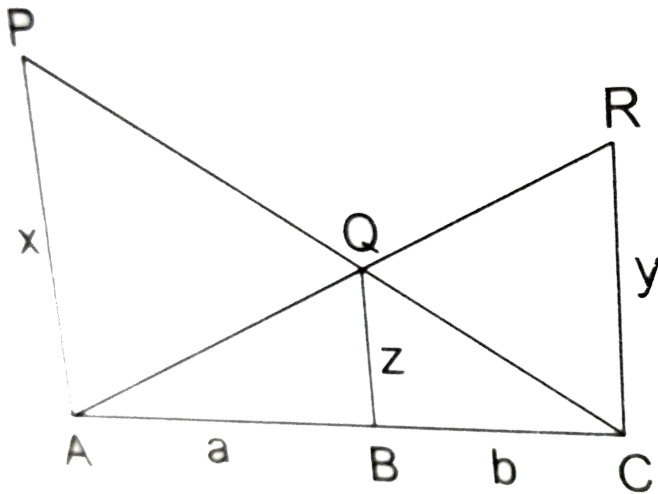


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4. In the given figure, PA, QB and RC each is perpendicular to AC such that

$PA = x$ ,  $RC = y$ ,  $QB = z$ ,  $AB = a$ , and  $BC = b$

Prove that  $\frac{1}{x} + \frac{1}{y} = \frac{1}{z}$



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