



MATHS

BOOKS - EDUCART PUBLICATION

SAMPLE PAPER 02

Section A

1. A card is drawn from a box, which have cards marked with numbers 2 to 101, mixed thoroughly. One card is drawn from the box. What is the probability that the card taken out bears a number which is a perfect cube?

A. $\frac{1}{20}$

B. $\frac{7}{100}$

C. $\frac{9}{100}$

D. $\frac{3}{100}$

Answer: D



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2. A chord of circle of a radius 28 cm subtends a right angle at the centre.

What is the area of the minor sector?

A. 621cm^2

B. 616cm^2

C. 718cm^2

D. 721cm^2

Answer: B



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3. Find $\cos \theta$, if $6 \cot \theta + 2 \operatorname{cosec} \theta = \cot \theta + 5 \operatorname{cosec} \theta$.

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

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

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

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

Answer: B



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4. Find the number of solutions for the pair of equations $x = 0$ and $x = 3$.

A. one solution

B. two solutions

C. three solution

D. No solution

Answer: D



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5. Two dice are thrown at the same time. Find the probability of getting different numbers on both dice.

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

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

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

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

Answer: C



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6. The sum of two numbers is 33 and their difference is 17. Find the numbers.

A. 11 and 22

B. 25 and 8

C. 17 and 26

D. 24 and 9

Answer: B



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7. If $\sin A + \sin^2 A = 1$, then the value of $\cos^2 A + \cos^4 A$ is 2 (b) 1 (c) -2

(d) 0

A. 1

B. 0

C. -1

D. ∞

Answer: A

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8. What will be the decimal expansion of the rational number $\frac{27}{1250}$?

A. 0.0125

B. 0.0021

C. 0.0315

D. 0.0216

Answer: D

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9. Calculate the LCM of two positive integers whose product is 108 and HCF is 3

A. 72

B. 36

C. 18

D. 9

Answer: B



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10. Calculate the HCF of p^3q^2 and p^2q , provided that p and q are prime numbers ?

A. pq

B. pq^2

C. p^2q

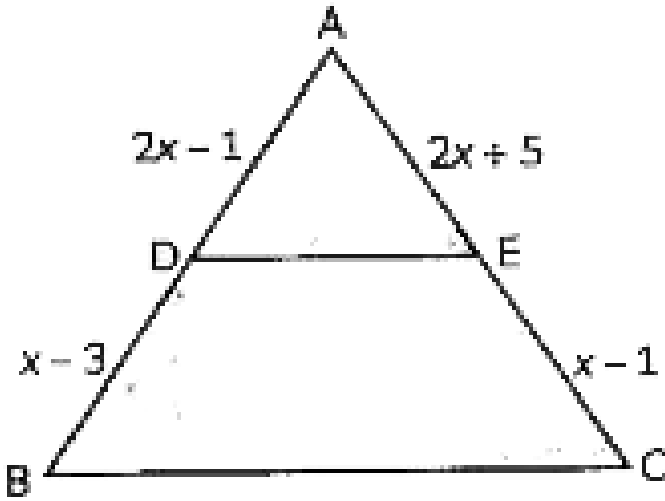
D. p^2q^2

Answer: C



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11. Find the value of x , in the adjoining figure, if $DE \parallel BC$.



- A. 8
- B. 9
- C. 10
- D. 11

Answer: A

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12. What is the ratio in which point P(1, 2) divides the join of A(-2, 1) and B(7,4)?

A. 1 : 2

B. 2 : 1

C. 3 : 4

D. 2 : 3

Answer: A



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13. Write the prime factorisation of 3825.

A. $3^2 \times 5^2 \times 17$

B. $3^3 \times 5 \times 17$

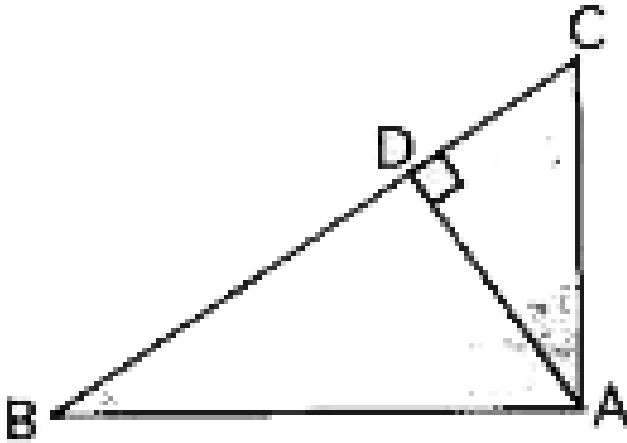
C. $3^2 \times 5 \times 17$

D. $3 \times 5^3 \times 17$

Answer: A

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14. Evaluate the value of $AB^2 + CD^2$ in the given figure, if $AD \perp BC$ and $BD = 2, AC = 4$



A. 16

B. 20

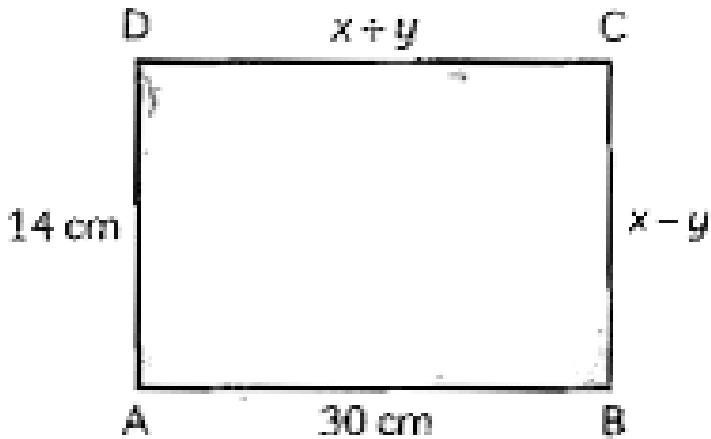
C. 4

D. 6

Answer: B

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15. ABCD is a rectangle with dimensions mentioned in the figure. Find the value of y .



A. 21

B. 7

C. 22

D. 8

Answer: D



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16. In an isosceles right angled triangle, what is the length of the equal sides of the triangle, if its hypotenuse is $6\sqrt{2}cm$?

A. $3\sqrt{2}cm$

B. $6cm$

C. 12 cm

D. 8 cm

Answer: B



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17. What is the value of k in the quadratic polynomial $3x^2 + 2kx - 3$. if $x - \frac{1}{2}$, one of its zero?

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

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

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

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

Answer: D



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18. Two dice are thrown together. Then the probability that sum of the two numbers on the dice will be multiple of 4 is:

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

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

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

D. 0

Answer: B

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19. What is the value of 'a' if the mid-point of the line segment joining the points P(6,a-2) and Q(-2, 4) is (2,-4)?

A. - 10

B. 10

C. 0

D. 7

Answer: A

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20. After how many places of decimal, will the decimal expansion of a terminate?

A. one place

B. two place

C. three place

D. four place

Answer: C



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Section B

1. If the perimeter of a semi-circular protractor is 36cm, then its diameter is?

A. 7 cm

B. 14 cm

C. 21 cm

D. 42 cm

Answer: A



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2. If we toss two unbiased coins simultaneously then the probability of getting no head is $\frac{A}{B}$. Then $(A + B)^2$ will be equal to:

A. 21

B. 25

C. 10

D. 5

Answer: B



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3. What is the measure of the hypotenuse of a right triangle, when its medians, drawn from the vertices of the acute angles, are 5 cm and

$$2\sqrt{10}cm$$

A. $5\sqrt{8}cm$

B. $2\sqrt{13}cm$

C. $6\sqrt{10}cm$

D. $2\sqrt{7}cm$

Answer: B



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4. Evaluate for what value of c for which the system of linear equations

$cx + 3y = 3$, $12x + cy = 6$ has no solution.

A. -6

B. 0

C. 6

D. 12

Answer: A



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5. If it is proposed to build a single circular park equal in area to the sum of areas of two circular parks of diameters 16 m and 12 m in a locality. The radius of the new park would be

A. 10 m

B. 5 m

C. 20 m

D. 24 m

Answer: A



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6. Evaluate $\frac{x}{\sqrt{a^2 + x^2}}$ where $a = x \tan \theta$.

A. $\sec^2 \theta$

B. $\cos \theta$

C. 0

D. $\tan \theta$

Answer: B

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7. Evaluate $\frac{y^2}{b^2} - \frac{x^2}{a^2}$, where $x = a \tan \theta$ and $y = b \sec \theta$.

A. 0

B. 1

C. -1

D. 3

Answer: B

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8. A circle's circumference is equal to the sum of the circumferences of two circles having diameters 34 cm and 28 cm. What is the radius of the new circle?

A. 31 cm

B. 62 cm

C. 38 cm

D. 28 cm

Answer: A



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9. What is the LCM of smallest prime and smallest composite natural number?

A. 2

B. 4

C. 8

D. 6

Answer: B



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10. A, B and C start at the same time in the same direction to run around a circular stadium. A completes a round in 252 seconds, B in 308 seconds and C in 198 seconds, all starting at same point After what time will they again at the starting point ?

A. 46 min 12 sec

B. 42 min 6 sec

C. 52 min 12 sec

D. 56 min 10 sec

Answer: A



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11. Two angles are supplementary to each other. The larger of two supplementary angles exceeds the smaller by 20° . Then, the smaller angle is.

A. 60°

B. 80°

C. 65°

D. 75°

Answer: B



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12. Evaluate the simplified value of $(1 + \cot^2 \theta)(1 - \cos \theta)(1 + \cos \theta)$.

A. 1

B. -1

C. $\cot \theta$

D. $\sec^2 \theta$

Answer: A



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13. If $\Delta ABC \sim \Delta PQR$ then evaluate the length of AC. If perimeter of $\Delta ABC = 20\text{cm}$, perimeter of $\Delta PQR = 40\text{ cm}$ and $PR = 8\text{ cm}$.

A. 4 cm

B. 6 cm

C. 10 cm

D. 3 cm

Answer: A

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14. On choosing a letter randomly from the letters of the word "ASSASSINATION" the probability that the letter chosen is a vowel is in the form of $\frac{6}{2x + 1}$ then x is equal to:

- A. 8
- B. 7
- C. 6
- D. 5

Answer: C

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

A. 19 m

B. 20 m

C. 18 m

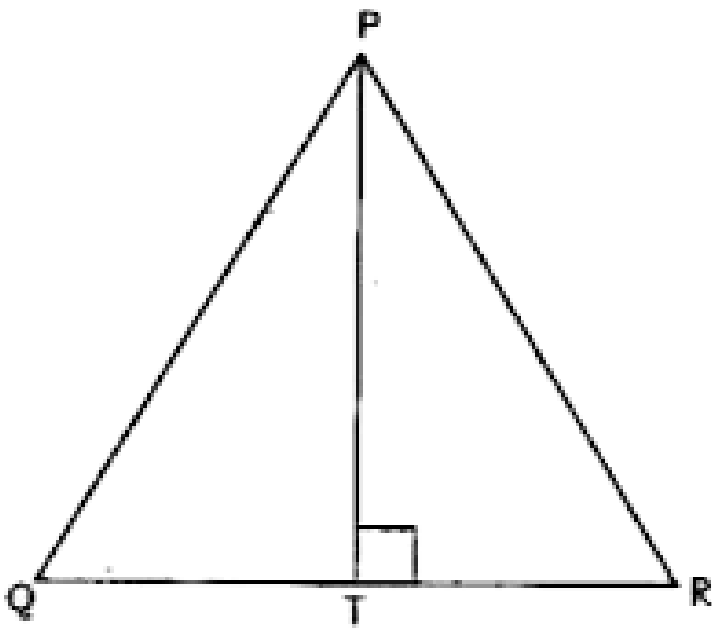
D. 17 m

Answer: D



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16. In an equilateral triangle ΔPQR , PT is an altitude. Then the value of $4PT^2$ is:



- A. $3PQ^2$
- B. $(PQ + QR)^2$
- C. PQ^2
- D. $2PQ^2$

Answer: A

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17. Salesman was having a lot of 100 shirts of which 88 are good, & 8 have minor defects and 4 have major defects. Suresh, a shopkeeper will buy only those shirts which are good What is the probability that he will buy a shirt?

A. $\frac{22}{25}$

B. $\frac{23}{25}$

C. $\frac{11}{100}$

D. $\frac{24}{25}$

Answer: A



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18. An arc of length of length 19 cm of a circle of radius 30 cm, subtends an angle θ at the centre O. Then value of θ is:

A. 30°

B. 36.27°

C. 45°

D. 52°

Answer: B



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19. A girl of height 90 cm is walking away from the base of a lamp-post at a speed of 1.2 m/s. If the lamp is 3.6 m above the ground, find the length of her shadow after 4 seconds.

A. $1.6m$

B. $1.5m$

C. 3 m

D. 2 m

Answer: A



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20. Evaluate $x + y$, if $217x + 131y = 913$ and $131x + 217y = 827$.

A. 5

B. 4

C. 7

D. -8

Answer: A



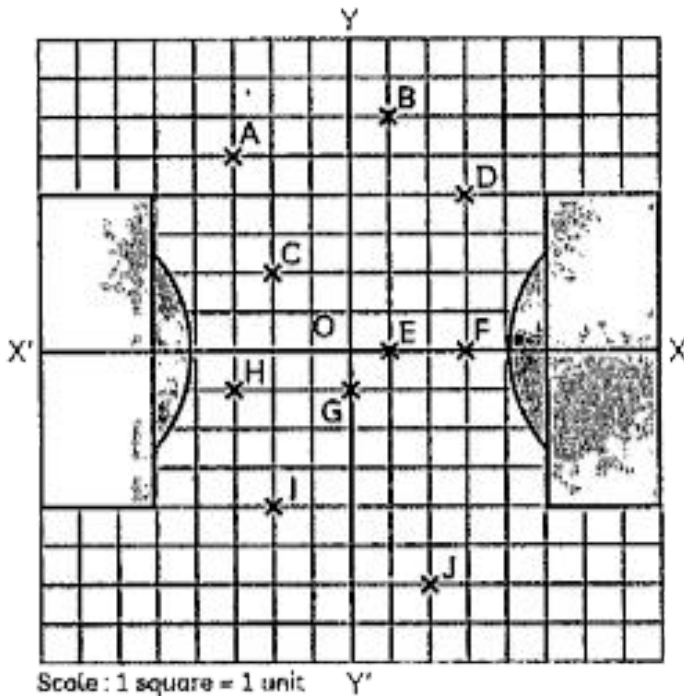
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Section C

1. Interschool tournament matches of basketball are going to happen very soon. The coach is making his team practicing very hard. He guided his team, the various tactics of how to perform and their respective

positions on the ground.

A coach is discussing the strategy of the game with his players. The position of players is marked with cross X'in the grid.



If we consider O as the origin, then the point shown on the grid whose abscissa is zero, is:

A. E

B. G

C. F

D. H

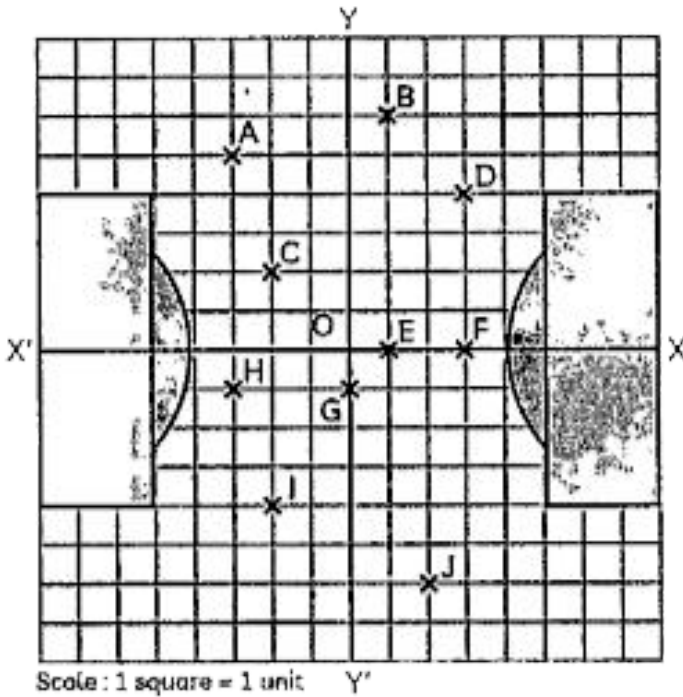
Answer: B



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2. Interschool tournament matches of basketball are going to happen very soon. The coach is making his team practicing very hard. He guided his team, the various tactics of how to perform and their respective positions on the ground.

A coach is discussing the strategy of the game with his players. The position of players is marked with cross 'X' in the grid.



Evaluate the distance between the player C and B.

- A. $4\sqrt{2}$ units
- B. $2\sqrt{5}$ units
- C. $5\sqrt{2}$ units

D. 5 units

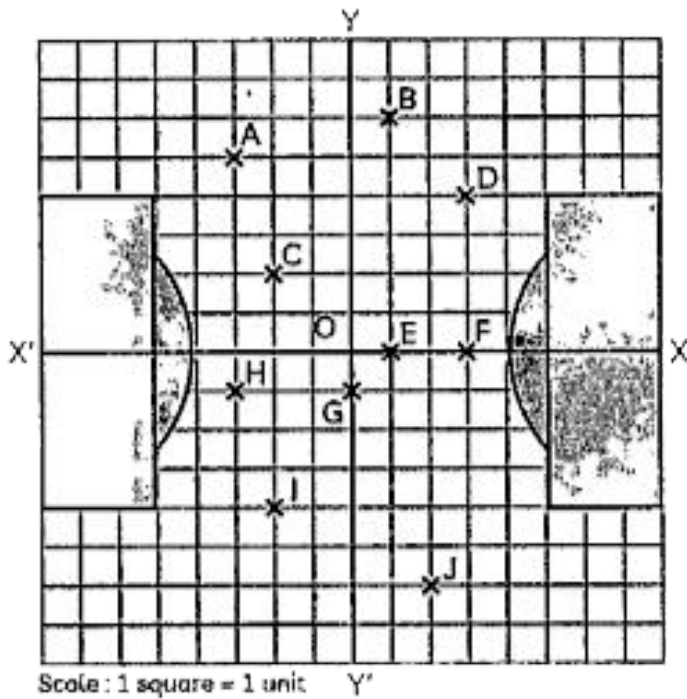
Answer: A



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3. Interschool tournament matches of basketball are going to happen very soon. The coach is making his team practicing very hard. He guided his team, the various tactics of how to perform and their respective positions on the ground.

A coach is discussing the strategy of the game with his players. The position of players is marked with cross X'in the grid.



Which among the following is a player whose position is 6 units from x-axis and 2 units to the right of y-axis?

- A. A
- B. J
- C. B

D. I

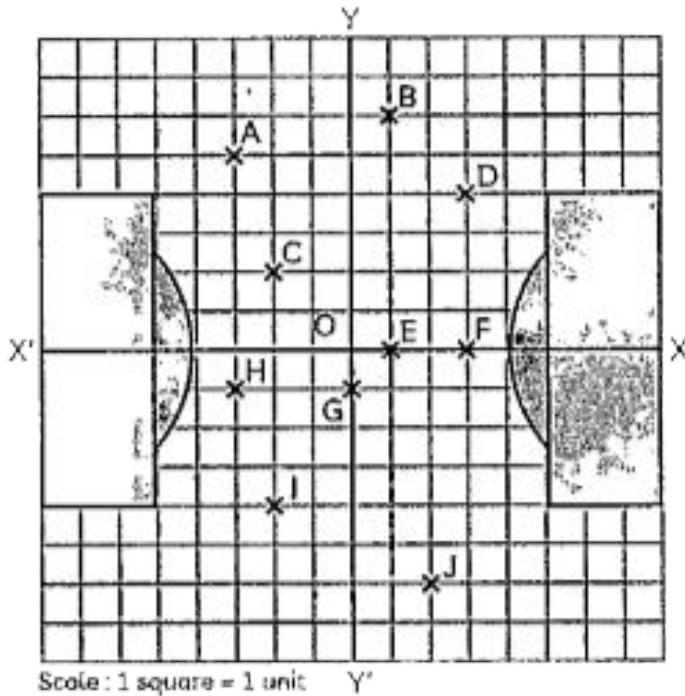
Answer: B



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4. Interschool tournament matches of basketball are going to happen very soon. The coach is making his team practicing very hard. He guided his team, the various tactics of how to perform and their respective positions on the ground.

A coach is discussing the strategy of the game with his players. The position of players is marked with cross X'in the grid.



If we consider (x, y) as the coordinates of the mid-point of the line segment joining A and H, then

A. $x = -2, y = 3$

B. $x = -3, y = -2$

C. $x = -3, y = 2$

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

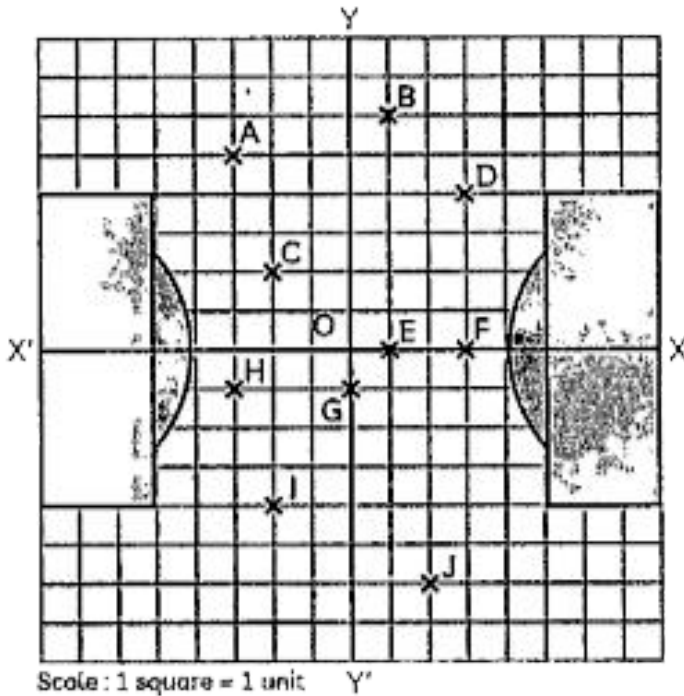
Answer: C



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5. Interschool tournament matches of basketball are going to happen very soon. The coach is making his team practicing very hard. He guided his team, the various tactics of how to perform and their respective positions on the ground.

A coach is discussing the strategy of the game with his players. The position of players is marked with cross X'in the grid.



According to sudden requirement coach of the team decided to increase one player in the 4th quadrant without increasing the total number of players, so he decided to change the position of player F in such a way that F becomes symmetric to D w.r.t. X-axis then new position of F is

A. (4,3)

B. $(-4,3)$

C. $(3,-4)$

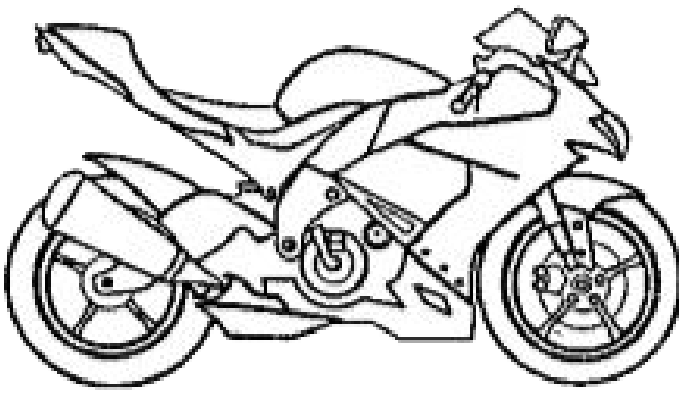
D. $(3,4)$

Answer: C



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6. Somesh is driving motorcycle, in a zigzag way on the road. His motorbike moves on a road and traces a curved path. The path traced by it is shown by the curve ABCDE.



The pattern of the path traced is in the shape of parabola. In mathematical form, the given path followed the polynomial expression in the form

$$p(x) = a_n x^n + a_{n-1} x^{n-1} + a_{n-2} x^{n-2} + \dots$$

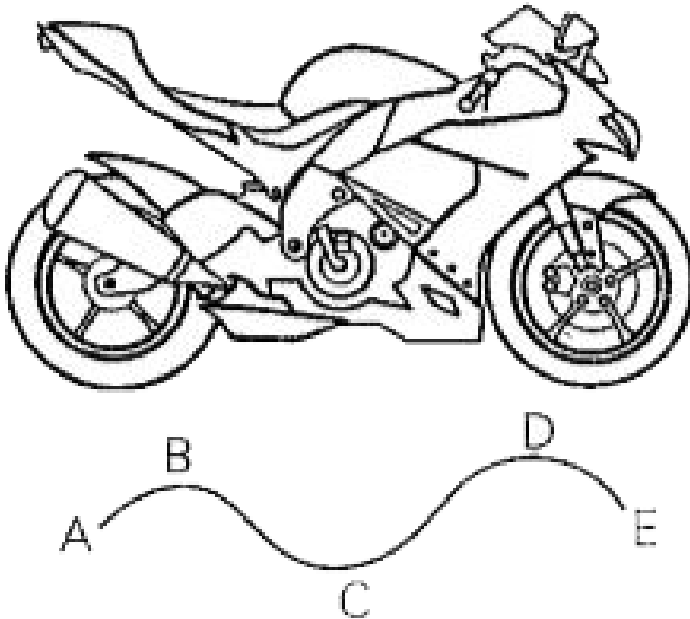
Which of the following describes the shape of the curve CDE?

- A. Circle
- B. Straight line
- C. Parabolic
- D. Ellipse

Answer: C

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7. Somesh is driving motorcycle, in a zigzag way on the road. His motorbike moves on a road and traces a curved path. The path traced by it is shown by the curve ABCDE.



The pattern of the path traced is in the shape of parabola. In mathematical form, the given path followed the polynomial expression in the form

$$p(x) = a_n x^n + a_{n-1} x^{n-1} + a_{n-2} x^{n-2} + \dots$$

If the shape of the curve ABC is represented by quadratic equation $x^2 - 7x + 12$ then its zeroes are:

A. 3,4

B. 4,-5

C. 3,-5

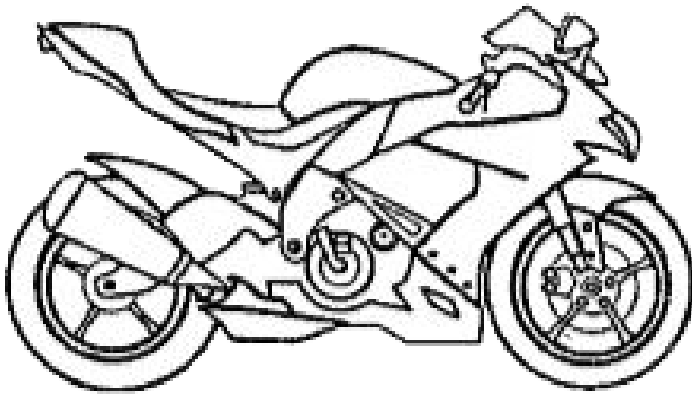
D. 2,-3

Answer: A



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8. Somesh is driving motorcycle, in a zigzag way on the road. His motorbike moves on a road and traces a curved path. The path traced by it is shown by the curve ABCDE.



The pattern of the path traced is in the shape of parabola. In mathematical form, the given path followed the polynomial expression in the form

$$p(x) = a_n x^n + a_{n-1} x^{n-1} + a_{n-2} x^{n-2} + \dots$$

What is the polynomial representation of the path traced by the bike, when zeroes are 2 and -4,

A. $x^2 + 2x - 8$

B. $x^2 - 2x - 8$

C. $x^2 - 4x - 8$

$$D. x^2 + 2x + 8$$

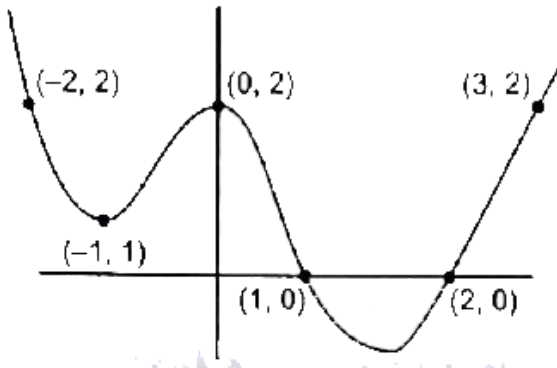
Answer: A



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9. In the given figure graph of :

$$y = p(x) = x^n + a_1x^{n-1} + a_2x^{n-2} + \dots + a_n \text{ is given.}$$



The product of all imaginary roots of $p(x) = 0$ is:

A. 1

B. 2

C. 3

D. 4

Answer: D



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10. Find the distance between the zeroes of the equation:

$$x^2 + 8x + 15 = 0$$

A. 1

B. 2

C. 3

D. 4

Answer: B



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1. The HCF of 135 and 225 is:

A. 15

B. 75

C. 45

D. 5

Answer: C



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2. Write the exponent of 2 in the prime factorization of 144.

A. 2

B. 4

C. 1

D. 6

Answer: B



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3. Write the common difference of an A.P. whose n th term is $a_n = 3n + 7$

.

A. 3

B. 7

C. 10

D. 6

Answer: A



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4. Write the value of λ for which $x^2 + 4x + \lambda$ is a perfect square.

A. 16

B. 9

C. 1

D. 4

Answer: D



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5. The value of k , for which the pair of linear equations $kx + y = k^2$ and $x + ky = 1$ has infinitely many solutions, is:

A. ± 1

B. 1

C. -1

D. 2

Answer: B

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6. The value of p for which $(2p + 1)$, 10 and $(5p + 5)$ are three consecutive terms of an AP, is:

A. -1

B. -2

C. 1

D. 2

Answer: D

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7. The number of terms of an AP $5, 9, 13, \dots, 185$ is

A. 31

B. 51

C. 41

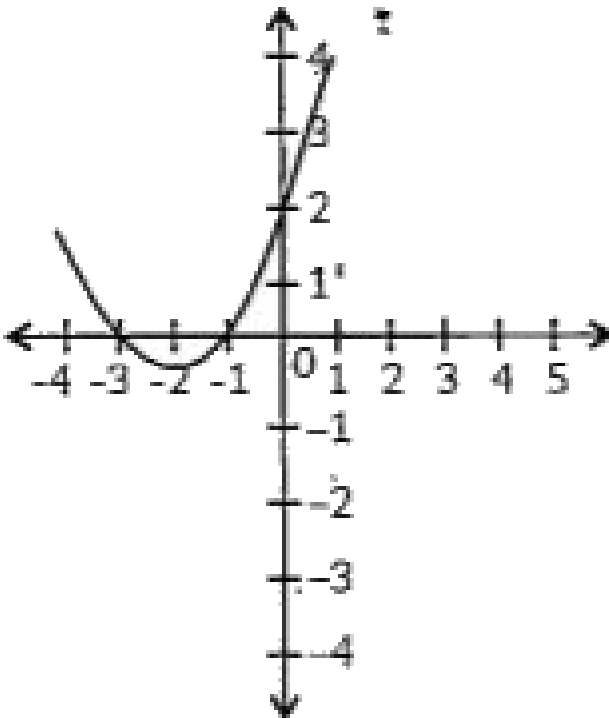
D. 40

Answer: D



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8. In the figure, the graph of the polynomial $p(x)$ is given. The number of zeroes of the polynomial is:



A. 1

B. 2

C. 3

D. 0

Answer: B



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9. If (a, b) is the mid-point of the line segment joining the points $A(10, -6)$ and $B(k, 4)$ and $a - 2b = 18$, the value of k is:

A. 30

B. 22

C. 4

D. 40

Answer: B

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10. The value of k for which the points $A(0, 1)$, $B(2, k)$ and $C(4, -5)$ are colinear is:

A. 2

B. -2

C. 0

D. 4

Answer:

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11. If $\triangle ABC \sim \triangle DEF$ such that $AB = 1.2$ cm and $DE = 1.4$ cm, the ratio of the areas of $\triangle ABC$ and $\triangle DEF$ is:

A. 49 : 36

B. 6:7

C. 7:6

D. 36:49

Answer: D

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Section A Fill In The Blanks

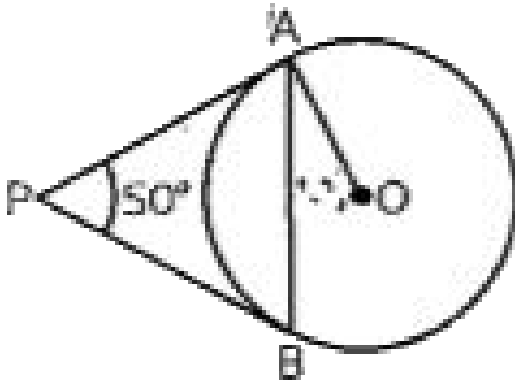
1. $\sqrt{2}$ times the distance between (0, 5) and (-5, 0) is

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2. What is the distance between two parallel tangents of a circle of radius 4 cm?

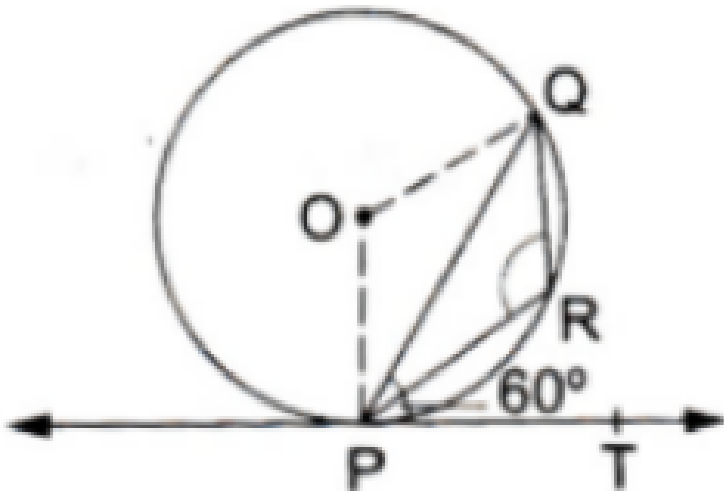
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3. In the figure, PA and PB are tangents to the circle with centre O such that $\angle APB = 50^\circ$, and the measure of $\angle OAB$ is



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4. In the adjoining figure, PQ is a chord of a circle and PT is the tangent at P such that $\angle QPT = 60^\circ$. Find $\angle PRQ$.



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5. $\frac{3\cot 40^\circ}{\tan 50^\circ} - \frac{1}{2} \left(\frac{\cos 35^\circ}{\sin 55^\circ} \right) = \dots\dots\dots$

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6. If $\cot \theta = \frac{7}{8}$ then the value of $\frac{(1 + \sin \theta)(1 - \sin \theta)}{(1 + \cos \theta)(1 - \cos \theta)} = \dots\dots\dots$

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Section A Very Short Answer Type Questions

1. Find the value of $\frac{1}{(1 + \tan^2 \theta)} + \frac{1}{(1 + \cot^2 \theta)}$

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2. Two cones have their heights in the ratio 1:3 and the radii of their bases in the ratio 3:1. Find the ratio of their volumes.

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3. Using the empirical formula, find the mode of a distribution whose mean is 8.32 and the median is 8.05.

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4. The probability that it will rain tomorrow is 0.85. What is the probability that it will not rain tomorrow?

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5. What is the Arithmetic mean of the first 'n' natural numbers ?

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Section B

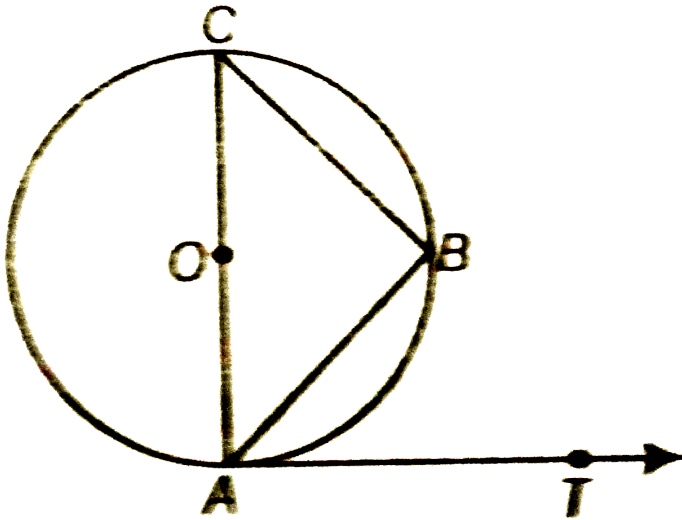
1. Find the 11th term from the last term (towards the first term) of the AP
12, 8, 4,... - 84.

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2. Solve the equation: $1+ 5+9+13+\dots+x= 1326$.

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3. If AB is chord of a circle with centre O , AOC is a diameter and AT is the tangent at A as shown in figure. Prove that $\angle BAT = \angle ACB$.



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4. If $\tan \theta = \frac{3}{4}$ find the value of $\left(\frac{1 - \cos^2 \theta}{1 + \cos^2 \theta} \right)$

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5. If $\tan \theta = \sqrt{3}$ find the value of $\left(\frac{2 \sec \theta}{1 + \tan^2 \theta} \right)$

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6. Read the given passage and answer the questions that follow.

Chanhudaro was a tiny settlement (less than 7 hectares) as compared to Mohenjodaro (125 hectares), almost exclusively devoted to craft production, including bead-making, shellcutting, metal-working, seal-making and weight-making. The variety of materials used to make beads is remarkable: stones like carnelian (of a beautiful red colour), jasper, crystal, quartz and steatite, metals like copper, bronze and gold, and shell, faience and terracotta or burnt clay. Some beads were made of two or more stones, cemented together, some of stone with gold caps. The shapes were numerous – disc shaped, cylindrical, spherical, barrel-shaped, segmented. Some were decorated by incising or painting, and some had designs etched onto them.

Techniques for making beads differed according to the material. Steatite, a very soft stone, was easily worked. Some beads were moulded out of a

paste made with steatite powder. This permitted making a variety of shapes, unlike the geometrical forms made out of harder stones. How the steatite micro bead was made remains a puzzle for archaeologists studying ancient technology. Archaeologists' experiments have revealed that the red colour of carnelian was obtained by firing the yellowish raw material and beads at various stages of production. Nodules were chipped into rough shapes, and then finely flaked into the final form. Grinding, polishing and finally drilling completed the process. Specialised drills have been found at Chanhudaro, Lothal and more recently at Dholavira. Nageshwar and Balakot, both settlements are near the coast. These were specialised centres for making shell objects – including bangles, ladles and inlay – which were taken to other settlements. Similarly, it is likely that finished products (such as beads) from Chanhudaro and Lothal were taken to the large urban centres such as Mohenjodaro and Harappa.

Which of these stones is very soft and easy to mould?

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7. A solid is in the form of a right circular cylinder, with a hemisphere at one end and a cone at the other end. The radius of the common base is 3.5 cm and the heights of the cylindrical and conical portions are 10 cm and 6 cm, respectively. Find the total surface area of the solid. (Use $\pi = 22/7$)

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8. Find the probability that a leap year selected at random will contain 53 Sundays.

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9. Find the value of p, if the mean of the following distribution is 7.5.

Classes	2-4	4-6	6-8	8-10	10-12	12-14
Frequency (f)	6	8	15	p	8	4

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1. Find a , b and c such that the following numbers are in AP, a , 7, b , 23 and c .

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2. If m times the m^{th} term of an A.P. is equal to n times its n^{th} term, show that the $(m + n)^{\text{th}}$ term of the A.P. is zero.

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3. Find the value of k for which the quadratic equation $(k + 4)x^2 + (k + 1)x + 1 = 0$

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4. On dividing $(x^3 - 3x^2 + x + 2)$ by a polynomial $g(x)$, the quotient and remainder are $(x-2)$ and $(-2x+4)$ respectively. Find $g(x)$.

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5. If the sum of squares of zeros of the polynomial $x^2 - 8x + k$ is 40, find the value of k .

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6. In what ratio does the point $P(-4, y)$ divide the line segment joining the points $A(-6, 10)$ and $B(3, -8)$ if it lies on AB . Also, find the value of y .

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7. Theorem: A tangent to a circle is perpendicular to the radius through the point of contact.



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8. Prove that the angle between the two tangents drawn from an external point to a circle is supplementary to the angle subtended by the line segments joining the points of contact at the centre.



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9. Theorem 6.8 : In a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.



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10. If $\sin \theta + \cos \theta = p$ and $\sec \theta + \operatorname{cosec} \theta = q$; show that $q(p^2 - 1) = 2p$



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11. 500 persons have to dip in a rectangular tank which is 80 m long and 50 m broad. What is the rise in the level of water in the tank, if the average displacement of water by a person is 0.04 m^3 ?

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Section D

1. Show that 12^n cannot end with the digits 0 or 5 for any natural number n

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2. Prove that $\sqrt{2} + \sqrt{5}$ is irrational.

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3. A train covered a certain distance at a uniform speed. If the train had been 5 kmph faster, it would have taken 3 hours less than the scheduled time. And, if the train were slower by 4 kmph, it would have taken 3 hours more than the scheduled time. Find the length of the journey.

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4. In an equilateral triangle ABC, D is a point on side BC such that $BD = \frac{1}{3}BC$. Prove that $9AD^2 = 7AB^2$.

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5. Prove that the sum of the squares of the sides of a rhombus is equal to the sum of the squares of its diagonals.

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6. The angle of elevation of cloud from a point 60 m above a lake is 30° and the angle of depression of the reflection of cloud in the lake is 60° . Find the height of the cloud .



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7. A vertical tower stands on a horizontal land and is surmounted by a vertical flag staff of height 12 metres. At a point on the plane, the angle of elevation of the bottom and the top of the flag staff are respectively 45° and 60° . Find the height of tower.



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8. The dimensions of a solid iron cuboid are $4.4m \times 2.6m \times 1.0m$.It is melted and recast into a hollow cylindrical pipe of 30 cm inner radius and thickness 5cm .Find the length of the pipe.



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9. For the following frequency distribution draw a cumulative frequency curve of 'more than type' and hence obtain the median value

<i>Class</i>	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
<i>Frequency</i>	5	15	20	23	17	11	5



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