MATHS

BOOKS - OSWAL PUBLICATION

SAMPLE QUESTION PAPER

Question Bank

1. The ratio of LCM and HCF of the least composite and the least prime numbers is

A. $1:2$

B. $2:1$

C. $1:1$

D. $1:3$

Answer: B

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2. The value of k for which the lines $5x + 7y = 3$ and $15x + 21y = k$ coincide is

A. 9

B. 5

C. 7

D. 18

Answer: A

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3. A girl walks 200m towards East and then 150m towards North. The distance of the girl from the starting point is

A. 350 m

B. 250 m

C. 300 m

D. 225 m

Answer: B

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4. The lengths of the diagonals of a rhombus are 24cm and 32cm, then the length of the altitude of the rhombus is

A. 12 cm

B. 12.8 cm

C. 19 cm

D. 19.2 cm

Answer: D

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5. Two fair coins are tossed. What is the probability of getting at the most one head?

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

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

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

D. $\dfrac{3}{8}$

Answer: A

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6. $\triangle ABC \sim \triangle PQR$. If AM and PN are altitudes of $\triangle ABC$ and $\triangle PQR$ respectively and AB^2 : $PQ^2 = 4 : 9$ then $AM : PN =$

A. $16:81$

B. $4:9$

C. $3:2$

D. $2:3$

Answer: D

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7. If $2 \sin^2 \beta - \cos^2 \beta = 2$, then β is:

A. $0\,^{\circ}$

B. $90°$

C. $45°$

D. $30°$

Answer: B

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8. Prime factors of the denominator of a rational number with the decimal expansion 44.123 are

A. 2, 3

B. 2, 3, 5

C. 2, 5

D. 3, 5

Answer: C

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9. The lines x = a and y = b, are

A. intersecting

B. parallel

C. overlapping

D. None of these

Answer: A

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10. The distance of point $A(- 5, 6)$ from the origin is :

A. 11 units

B. 61 units

C. $\sqrt{11}$ units

D. $\sqrt{61}$ units

Answer: D

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11. If $a^2 = 23/25$, then a is

A. rational

B. irrational

C. whole number

D. integer

Answer: B

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12. If LCM(x, 18) =36 and HCF(x, 18) =2, then x is

A. 2

B. 3

C. 4

D. 5

Answer: C

13. In $\triangle ABC$ right angled at B, if $\tan A = \sqrt{3}$,

then cos A cos C- sin A sin C =

A. -1

B. 0

C. 1

D. $\sqrt{3}/2$

Answer: B

14. If the angles of $\triangle ABC$ are in ratio 1:1:2, respectively (the largest angle being angle C), then the value of $\dfrac{\sec A}{\operatorname{cosec} B} - \dfrac{\tan A}{\cot B}$ is

A. 0

B. $1/2$

C. 1

D. $\sqrt{3}/2$

Answer: A

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15. The number of revolutions made by a circular wheel of radius 0.7 m in rolling a distance of 176 m is :

A. 22

B. 24

C. 75

D. 40

Answer: D

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16. $\triangle ABC$ is such that AB=3 cm, BC= 2cm, CA= 2.5 cm. If $\triangle ABC \sim \triangle DEF$ and EF = 4cm, then perimeter of $\triangle DEF$ is

A. 7.5 cm

B. 15 cm

C. 22.5 cm

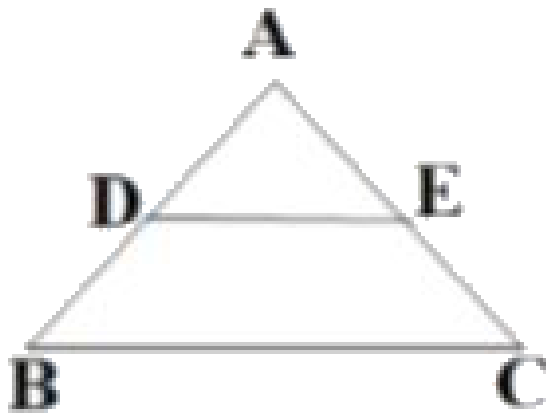D. 30 cm

Answer: B

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17. In the figure, if DE || BC, AD = 3cm, BD = 4cm and BC= 14 cm, then DE equals

A. 7 cm

B. 6 cm

C. 4 cm

D. 3 cm

Answer: B

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18. If $4\tan\beta = 3,$ then $\dfrac{4\sin\beta - 3\cos\beta}{4\sin\beta + 3\cos\beta} =$

A. 0

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

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

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

Answer: A

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19. One equation of a pair of dependent linear equations is $-5x + 7y - 2 = 0$. The second equation can be

A. $10x + 14y + 4 = 0$

B. $-10x - 14y + 4 = 0$

C. $-10x + 14y + 4 = 0$

D. $10x - 14y = -4$

Answer: D

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20. A letter of English alphabet is chosen at random. What is the probability that it is a letter of the word 'MATHEMATICS'?

A. $\dfrac{4}{13}$

B. $\dfrac{9}{26}$

C. $\dfrac{5}{13}$

D. $\dfrac{11}{26}$

Answer: A

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21. If sum of two numbers is 1215 and their HCF is 81, then the possible number of pairs of such numbers are :
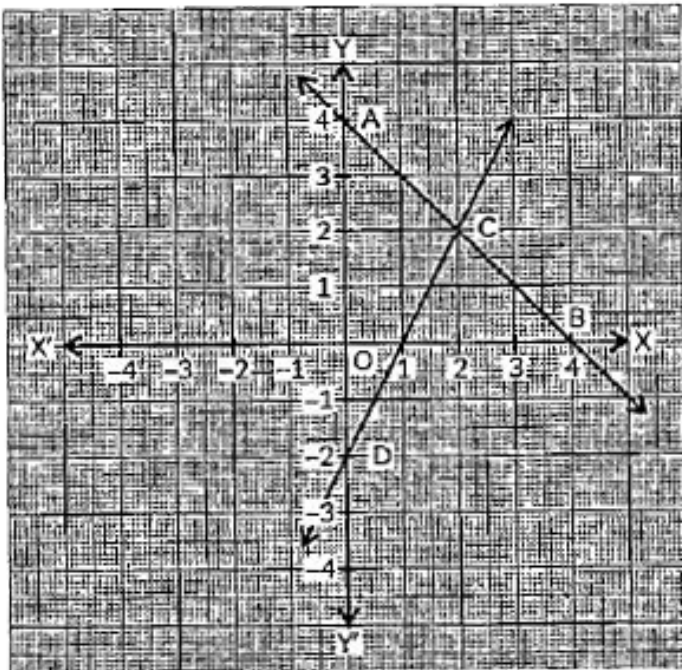
A. 2

B. 3

C. 4

D. 5

Answer: C

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22. Given below is the graph representing two linear equations by lines AB and CD respectively. What is the area of the triangle formed by these two lines and the line is $x = 0$?

A. 3 sq. units

B. 4 sq. units

C. 6 sq. units

D. 8 sq. units

Answer: C

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23. If $\tan \alpha + \cot \alpha = 2,$ then $\tan^{20} \alpha + \cot^{20} \alpha =$

A. 0

B. 2

C. 20

D. 2^{20}

Answer: B

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

A. 5

B. 6

C. 7

D. 8

Answer: A

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25. The LCM of two prime numbers p and q (p

> q) is 221. Find the value of 3p - q.

A. 4

B. 28

C. 38

D. 48

Answer: C

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26. A card is drawn at random from a well -
shuffled pack of 52 cards. Find the probability

that the drawn card is neither a king nor a queen.

A. $\dfrac{11}{13}$

B. $\dfrac{12}{13}$

C. $\dfrac{11}{26}$

D. $\dfrac{11}{52}$

Answer: A

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27. Two dice are rolled simultaneously . Find the probability of getting atleast one'5'.

A. $\dfrac{5}{36}$

B. $\dfrac{11}{36}$

C. $\dfrac{12}{36}$

D. $\dfrac{23}{36}$

Answer: B

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28. If $1 + \sin^2 \alpha = 3 \sin \alpha \cos \alpha$, then the values of $\cot \alpha$ are

A. $-1, 1$

B. $0, 1$

C. $1, 2$

D. `-1, -1

Answer: C

29. The vertices of a parallelogram in order are A(1,2), B(4, y), C(x, 6) and D(3,5). Then (x, y) is
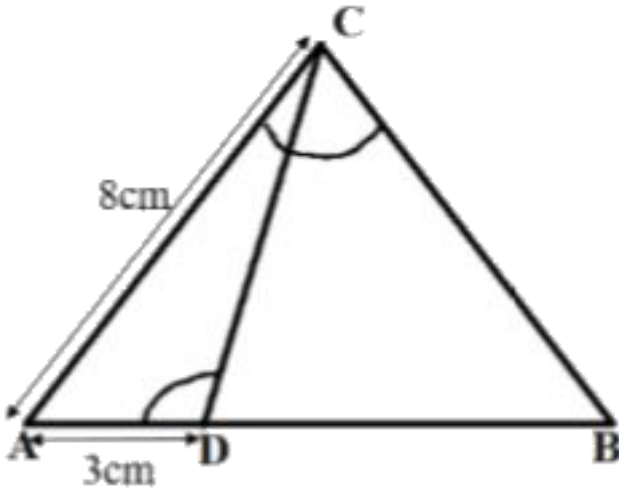
A. (6, 3)

B. (3, 6)

C. (5, 6)

D. (1, 4)

Answer: A

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30. In the given figure, $\angle ACB = \angle CDA$, $AC = 8cm$, $AD = 3cm$, then BD is

A. $\dfrac{22}{3}\,cm$

B. $\dfrac{26}{3}\,cm$

C. $\dfrac{55}{3}\,cm$

D. $\dfrac{64}{3} cm$

Answer: C

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31. The equation of the perpendicular bisector of line segment joining points A(4,5) and B(-2,3) is

A. $2x - y + 7 = 0$

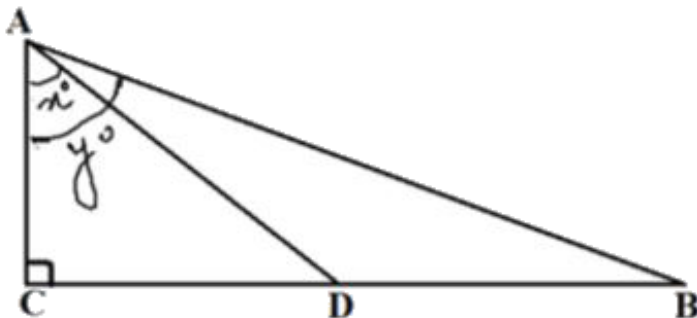B. $3x + 2y - 7 = 0$

C. $3x - y - 7 = 0$

D. $3x + y - 7 = 0$

Answer: D

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32. In the given figure, D is the mid-point of BC, then the value of $\dfrac{\cot y^\circ}{\cot x^\circ}$ is

A. 2

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

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

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

Answer: B

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33. The smallest number by which 1/13 should be multiplied so that its decimal expansion terminates after two decimal places is

A. $\dfrac{13}{100}$

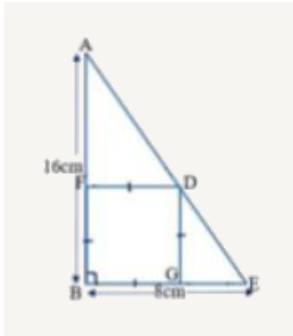B. $\dfrac{13}{10}$

C. $\dfrac{10}{13}$

D. $\dfrac{100}{13}$

Answer: A

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34. Sides AB and BE of a right triangle, right angled at B are of lengths 16 cm and 8 cm respectively. The length of the side of largest

square FDGB that can be inscribed in the

triangle ABE is

A. $\dfrac{32}{3} cm$

B. $\dfrac{16}{3} cm$

C. $\dfrac{8}{3} cm$

D. $\dfrac{4}{3} cm$

Answer: B

35. Point P divides the line segment joining R(-1, 3) and S(9,8) in ratio k:1. If P lies on the line x – y +2=0, then value of k is
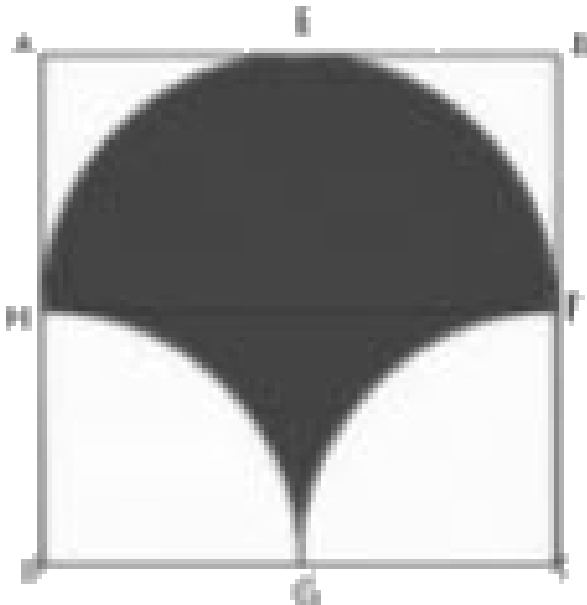
A. $\dfrac{2}{3}$

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

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

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

Answer: A

36. In the figure given below, ABCD is a square of side 14 cm with E, F, G and H as the mid points of sides AB, BC, CD and DA respectively. The area of the shaded portion is

A. $44 cm^2$

B. $49 cm^2$

C. $98 cm^2$

D. $\dfrac{49\pi}{2} cm^2$

Answer: C

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37. Given below is the picture of the Olympic rings made by taking five congruent circles of radius 1cm each, intersecting in such a way

that the chord formed by joining the point of intersection of two circles is also of length 1cm. Total area of all the dotted regions assuming the thickness of the rings to be negligible is

A. $4\left(\dfrac{\pi}{12} - \dfrac{\sqrt{3}}{4}\right) cm^2$

B. $\left(\dfrac{\pi}{6} - \dfrac{\sqrt{3}}{4}\right) cm^2$

C. $4\left(\dfrac{\pi}{6} - \dfrac{\sqrt{3}}{4}\right) cm^2$

D. $8\left(\dfrac{\pi}{6} - \dfrac{\sqrt{3}}{4}\right) cm^2$

Answer: D

38. If 2 and $1/2$ are the zeros of $px^2 + 5x + r$, then

A. p=r=2

B. p=r=-2

C. p=2, r=-2

D. p=-2, r=2

Answer: B

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39. The circumference of a circle is 100 cm. The side of a square inscribed in the circle is

   A. $50\sqrt{2}cm$

   B. $\dfrac{100}{\pi}cm$

   C. $\dfrac{50\sqrt{2}}{\pi}cm$

   D. $\dfrac{100\sqrt{2}}{\pi}cm$

Answer: C

40. The number of solutions of

$3^{x+y} = 243$ and $243^{x-y} = 3$ is

A. 0

B. 1

C. 2

D. infinite

Answer: B

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41.

The figure given alongside shows the path of a diver. When she takes a jump from the diving board . Clearly it is parabola .

Annie was standing on a diving board, 48 feet

above the water level . She took a dive into the
pool. Her height (in feet) above the water
level at any time 't' in seconds is given by the
polynomial h (t) such that

$$h(t) = -16t^2 + 8t + k$$

What is value of k ?

A. 0

B. -48

C. 48

D. $\dfrac{48}{-16}$

Answer: C

42.

The figure given alongside shows the path of a

diver. When she takes a jump from the diving

board . Clearly it is parabola .

Annie was standing on a diving board, 48 feet above the water level . She took a dive into the pool. Her height (in feet) above the water level at any time 't' in seconds is given by the polynomial h (t) such that

$$h(t) = -16t^2 + 8t + k$$

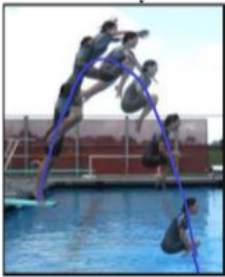At what time will she touch the water in the pool?

A. 30 seconds

B. 2 seconds

C. 1.5 seconds

D. 0.5 seconds

Answer: B

43.

The figure given alongside shows the path of a diver, when she takes a jump from the diving board. Clearly it is a parabola.

Annie was standing on a diving board, 48 feet

above the water level. She took a dive into the

pool. Her height (in feet) above the water level

at any time 't' in seconds is given by the

polynomial h(t) such that

$h(t) = -16t^2 + 8t + k.$

Rita's height (in feet) above the water level is

given by another polynomial p(t) with zeroes -1

and 2. Then p(t) is given by-

A. $t^2 + t - 2$

B. $t^2 + 2t - 1$

C. $24t^2 - 24t + 48$

D. $-24t^2 + 24t + 48$

Answer: D

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44.

The figure given alongside shows the path of a diver. When she takes a jump from the diving board . Clearly it is parabola .

Annie was standing on a diving board, 48 feet

above the water level . She took a dive into the pool. Her height (in feet) above the water level at any time 't' in seconds is given by the polynomial h (t) such that

$$h(t) = -16t^2 + 8t + k$$

A polynomial q(t) with sum of zeroes as 1 and the product as -6 is modelling Anu's height in feet above the water at any time t (in seconds) . Then q (t) is given by:

A. $t^2 + t + 6$

B. $t^2 + t - 6$

C. $-8t^2 + 8t + 48$

D. $8t^2 - 8t + 48$

Answer: C

45.

The figure given alongside shows the path of a diver. When she takes a jump from the diving board . Clearly it is parabola .

Annie was standing on a diving board, 48 feet

above the water level . She took a dive into the

pool. Her height (in feet) above the water

level at any time 't' in seconds is given by the

polynomial h (t) such that

$$h(t) = -16t^2 + 8t + k$$

The   zeroes   of   the   polynomial

$$r(t) = -12t^2 + (k-3)t + 48 \text{ are negative}$$

of each other. Then k is :

A. 3

B. 0

C. -1.5

D. -3

Answer: A

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46. Case Study-2: A hockey field is the playing surface for the game of hockey. Historically, the game was played on natural turf (grass) but nowadays it is predominantly played on an artificial turf.

It is rectangular in shape-100 yards by 60

yards. Goals consist of two upright posts placed equidistant from the centre of the backline, joined at the top by a horizontal crossbar. The inner edges of the posts must by 3.66 metres (4 yards) apart, and the lower edge of teh crossbar must be 2.14 metres (7 feet) above the ground.

Each team plays with 11 players on the field during the game including the goalie.
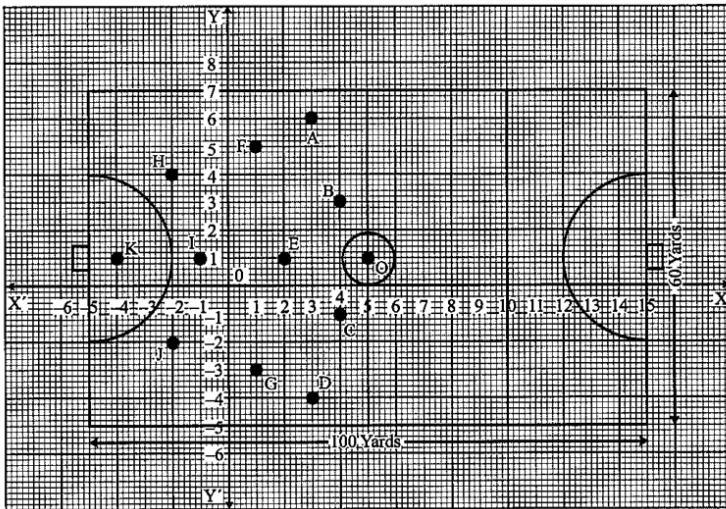
Position you might play include:

Forward: As shown by players A, B, C and D.

Midfielders : As shown by players E, F and.

Fullbacks:As shown by players H, I and J.

Goalie: As shows by player K

Using the picture of a hockey field below, answer the questions that follow:

The coordinates of the centroid of $\triangle EHJ$ are:

A. $\left(\dfrac{-2}{3}, 1\right)$

B. $\left(1, \dfrac{-2}{3}\right)$

C. $\left(\dfrac{2}{3}, 1\right)$

D. $\left(\dfrac{-2}{3}, \ -1\right)$

Answer: A

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47. Case Study-2: A hockey field is the playing surface for the game of hockey. Historically, the game was played on natural turf (grass) but nowadays it is predominantly played on an artificial turf.

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Each team plays with 11 players on the field during the game including the goalie.
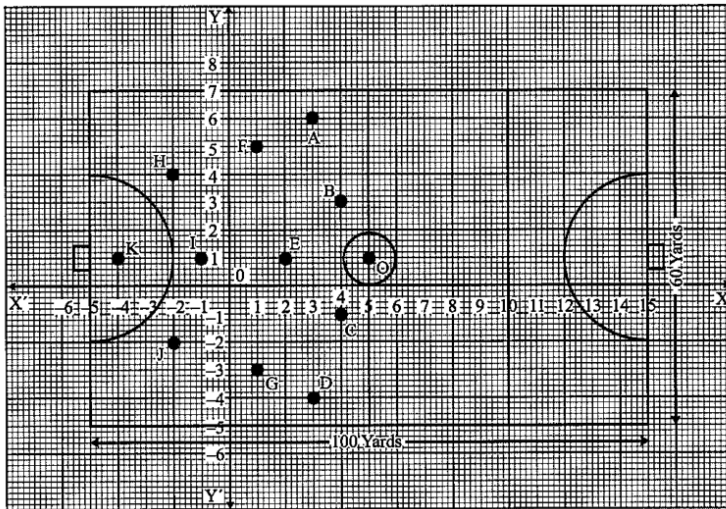
Position you might play include:

Forward: As shown by players A, B, C and D.

Midfielders : As shown by players E, F and.

Fullbacks:As shown by players H, I and J.

Goalie: As shows by player K

Using the picture of a hockey field below, answer the questions that follow:

If a player P needs to be at equal distance from A and G, such that A, P and G are in straight line, then position of P will be given by:

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

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

C. $\left(2, \dfrac{3}{2}\right)$

D. (-2, -3)

Answer: C

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48. Case Study-2: A hockey field is the playing surface for the game of hockey. Historically, the game was played on natural turf (grass)

but nowadays it is predominantly played on an artificial turf.

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Each team plays with 11 players on the field during the game including the goalie.
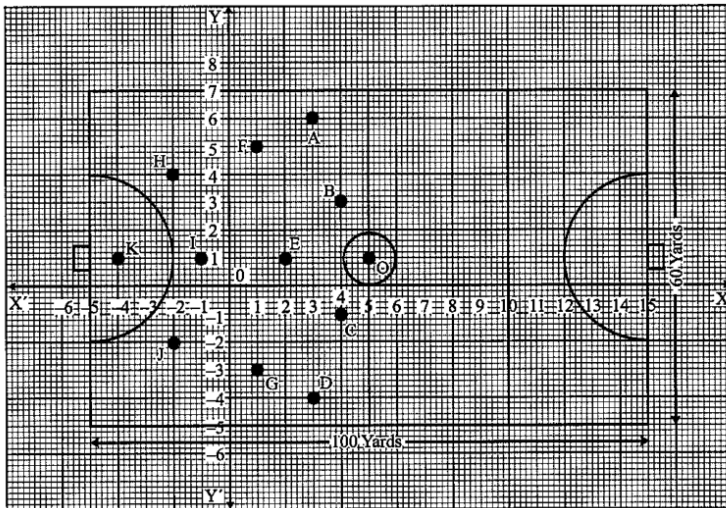
Position you might play include:

Forward: As shown by players A, B, C and D.

Midfielders : As shown by players E, F and.

Fullbacks:As shown by players H, I and J.

Goalie: As shows by player K

Using the picture of a hockey field below, answer the questions that follow:

The point on X-axis equidistant from I and E is:

A. $\left(\dfrac{1}{2}, 0\right)$

B. $\left(0, \dfrac{-1}{2}\right)$

C. $\left(\dfrac{-1}{2}, 0\right)$

D. $\left(0, \dfrac{1}{2}\right)$

Answer: A

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49. Case Study-2: A hockey field is the playing surface for the game of hockey. Historically, the game was played on natural turf (grass)

but nowadays it is predominantly played on an artificial turf.

It is rectangular in shape-100 yards by 60 yards. Goals consist of two upright posts placed equidistant from the centre of the backline, joined at the top by a horizontal crossbar. The inner edges of the posts must by 3.66 metres (4 yards) apart, and the lower edge of teh crossbar must be 2.14 metres (7 feet) above the ground.

Each team plays with 11 players on the field during the game including the goalie.

Position you might play include:

Forward: As shown by players A, B, C and D.

Midfielders : As shown by players E, F and.

Fullbacks:As shown by players H, I and J.

Goalie: As shows by player K

Using the picture of a hockey field below, answer the questions that follow:

What are the coordinates of the position of a player Q such that his distance from K is twice

his distance from E and K, Q and E are collinear?

A. (1, 0)

B. (0, 1)

C. (-2, 1)

D. (-1, 0)

Answer: B

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50. Case Study-2: A hockey field is the playing surface for the game of hockey. Historically, the game was played on natural turf (grass) but nowadays it is predominantly played on an artificial turf.

It is rectangular in shape-100 yards by 60 yards. Goals consist of two upright posts placed equidistant from the centre of the backline, joined at the top by a horizontal crossbar. The inner edges of the posts must by 3.66 metres (4 yards) apart, and the lower edge of teh crossbar must be 2.14 metres (7

feet) above the ground.

Each team plays with 11 players on the field during the game including the goalie.

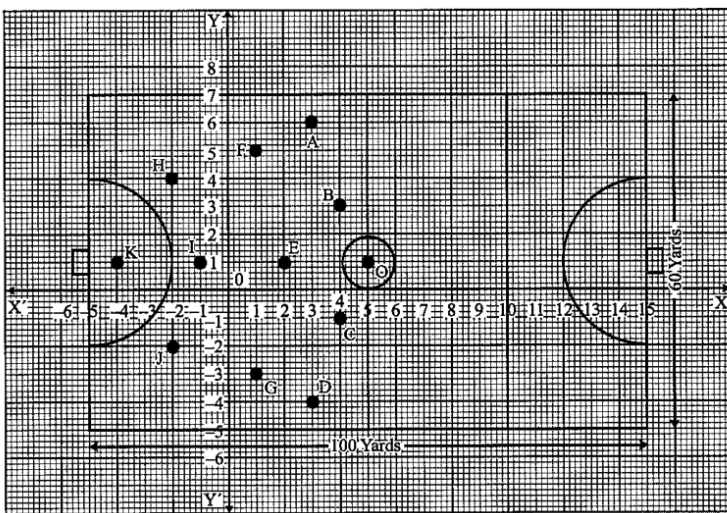Position you might play include:

Forward: As shown by players A, B, C and D.

Midfielders : As shown by players E, F and.

Fullbacks:As shown by players H, I and J.

Goalie: As shows by player K

Using the picture of a hockey field below, answer the questions that follow:

The point on y-axis equidistant from B and C is:

A. (-1, 0)

B. (0, -1)

C. (1, 0)

D. (0, 1)

Answer: D

51. The ratio of LCM and HCF of the least composite and the least prime numbers is

A. $1:2$

B. $2:1$

C. $1:1$

D. $1:3$

Answer: B

52. The value of k for which the lines

$5x + 7y = 3$ and $15x + 21y = k$ coincide is

A. 9

B. 5

C. 7

D. 18

Answer: A

53. A girl walks 200m towards East and then 150m towards North. The distance of the girl from the starting point is

    A. 350 m

    B. 250 m

    C. 300 m

    D. 225 m

Answer: B

54. The lengths of the diagonals of a rhombus are 24cm and 32cm, then the length of the altitude of the rhombus is

    A. 12 cm

    B. 12.8 cm

    C. 19 cm

    D. 19.2 cm

Answer: D

55. Two fair coins are tossed. What is the probability of getting at the most one head?

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

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

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

D. $\dfrac{3}{8}$

Answer: A

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56. $\triangle ABC \sim \triangle PQR$. If AM and PN are altitudes of $\triangle ABC$ and $\triangle PQR$ respectively and AB^2:

$PQ^2 = 4:9$ then $AM:PN =$

A. $16:81$

B. $4:9$

C. $3:2$

D. $2 : 3$

Answer: D

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57. If $2 \sin^2 \beta - \cos^2 \beta = 2$, then β is:

A. $0°$

B. $90°$

C. $45°$

D. $30°$

Answer: B

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58. Prime factors of the denominator of a rational number with the decimal expansion 44.123 are

A. 2, 3

B. 2, 3, 5

C. 2, 5

D. 3, 5

Answer: C

59. The lines x = a and y = b, are

    A. intersecting

    B. parallel

    C. overlapping

    D. None of these

Answer: A

60. The distance of point A(-5, 6) from the origin is

A. 11 units

B. 61 units

C. $\sqrt{11}$ units

D. $\sqrt{61}$ units

Answer: D

61. If $a^2 = 23/25$, then a is

    A. rational

    B. irrational

    C. whole number

    D. integer

Answer: B

62. If LCM(x, 18) =36 and HCF(x, 18) =2, then x is

A. 2

B. 3

C. 4

D. 5

Answer: C

63. In $\triangle ABC$ right angled at B, If $\tan A = \sqrt{3}$,

then $\cos A \cos C - \sin A \sin C$ =

A. -1

B. 0

C. 1

D. $\sqrt{3}/2$

Answer: B

64. If the angles of $\triangle ABC$ are in ratio $1:1:2$, respectively (the largest angle being angle C), then the value of $\dfrac{\sec A}{\cos ecB} - \dfrac{\tan A}{\cot B}$ is:

A. 0

B. $1/2$

C. 1

D. $\sqrt{3}/2$

Answer: A

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65. The number of revolutions made by a circular wheel of radius 0.7m in rolling a distance of 176m is

A. 22

B. 24

C. 75

D. 40

Answer: D

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66. $\triangle ABC$ is such that AB=3 cm, BC= 2cm, CA= 2.5 cm. If $\triangle ABC \sim \triangle DEF$ and EF = 4cm, then perimeter of $\triangle DEF$ is
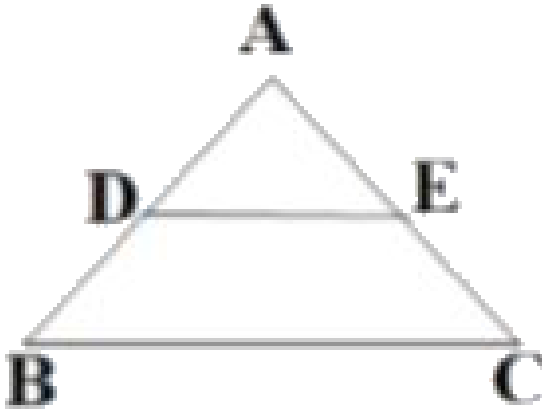
    A. 7.5 cm

    B. 15 cm

    C. 22.5 cm

    D. 30 cm

Answer: B

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67. In the figure, if DE || BC, AD = 3cm, BD = 4cm

and BC= 14 cm, then DE equals

A. 7 cm

B. 6 cm

C. 4 cm

D. 3 cm

Answer: B

68. If $4 \tan \beta = 3,$ then $\dfrac{4 \sin \beta - 3 \cos \beta}{4 \sin \beta + 3 \cos \beta} =$

A. 0

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

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

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

Answer: A

69. One equation of a pair of dependent linear equations is $-5x + 7y - 2 = 0$. The second equation can be

A. $10x + 14y + 4 = 0$

B. $-10x - 14y + 4 = 0$

C. $-10x + 14y + 4 = 0$

D. $10x - 14y = -4$

Answer: D

70. A letter of English alphabet is chosen at random. What is the probability that it is a letter of the word 'MATHEMATICS'?

A. $\dfrac{4}{13}$

B. $\dfrac{9}{26}$

C. $\dfrac{5}{13}$

D. $\dfrac{11}{26}$

Answer: A

71. If sum of two numbers is 1215 and their

HCF is 81, then the possible number of pairs of

such numbers are :

A. 2

B. 3

C. 4

D. 5

Answer: C

72. If $\tan\alpha + \cot\alpha = 2$, then $\tan^{20}\alpha + \cot^{20}\alpha =$

A. 0

B. 2

C. 20

D. 2^{20}

Answer: B

73. If 217x + 131y = 913, 131x + 217y = 827, then x + y is

A. 5

B. 6

C. 7

D. 8

Answer: A

74. The LCM of two prime numbers p and q (p > q) is 221. Find the value of 3p - q.

A. 4

B. 28

C. 38

D. 48

Answer: C

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75. A card is drawn at random from a well shuffled deck of playing cards. Find the probability that the card drawn is neither a king nor a queen

A. $\dfrac{11}{13}$

B. $\dfrac{12}{13}$

C. $\dfrac{11}{26}$

D. $\dfrac{11}{52}$

Answer: A

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76. Two fair dice are rolled simultaneously. The probability that 5 will come up at least once is

A. $\dfrac{5}{36}$

B. $\dfrac{11}{36}$

C. $\dfrac{12}{36}$

D. $\dfrac{23}{36}$

Answer: B

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77. If $1 + \sin^2 \alpha = 3 \sin \alpha \cos \alpha,$ then the values of $\cot \alpha$ are

A. $-1, 1$

B. $0, 1$

C. $1, 2$

D. `-1, -1

Answer: C

78. The vertices of a parallelogram in order are

A(1,2), B(4, y), C(x, 6) and D(3,5). Then (x, y) is

    A. (6, 3)
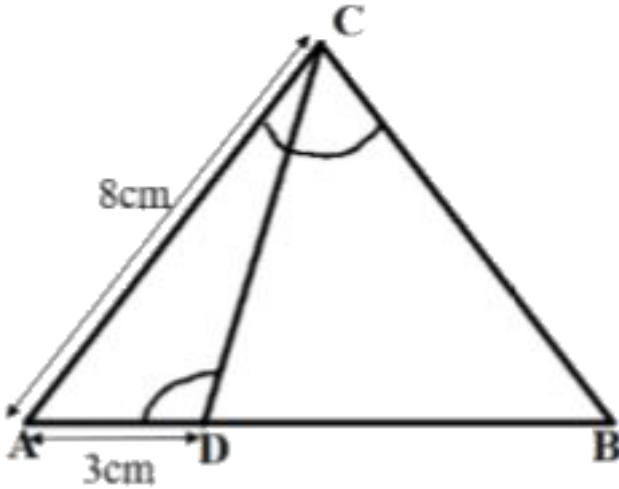
    B. (3, 6)

    C. (5, 6)

    D. (1, 4)

Answer: A

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79. In the given figure,

$\angle ACB = \angle CDA$, $AC = 8cm$, $AD = 3cm$,

then BD is

A. $\dfrac{22}{3}\,cm$

B. $\dfrac{26}{3}\,cm$

C. $\dfrac{55}{3}\,cm$

D. $\dfrac{64}{3} cm$

Answer: C

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80. The equation of the perpendicular bisector

of line segment joining points A(4,5) and

B(-2,3) is

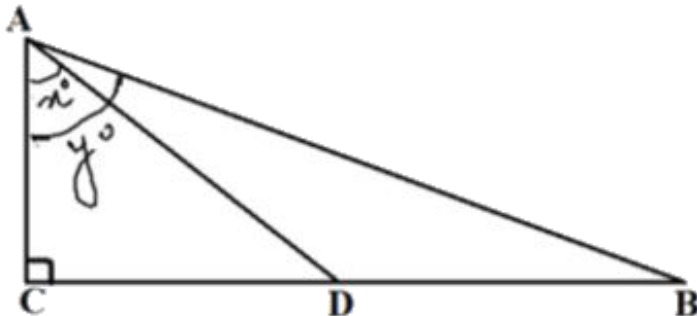A. $2x - y + 7 = 0$

B. $3x + 2y - 7 = 0$

C. $3x - y - 7 = 0$

D. $3x + y - 7 = 0$

Answer: D

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81. In the given figure, D is the mid-point of BC, then the value of $\dfrac{\cot y^{\circ}}{\cot x^{\circ}}$ is

A. 2

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

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

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

Answer: B

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82. The smallest number by which 1/13 should be multiplied so that its decimal expansion terminates after two decimal places is

A. $\dfrac{13}{100}$

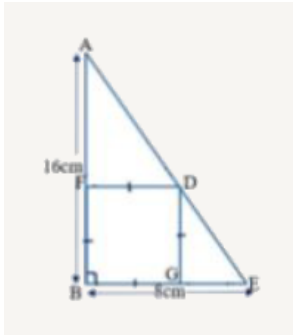B. $\dfrac{13}{10}$

C. $\dfrac{10}{13}$

D. $\dfrac{100}{13}$

Answer: A

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83. Sides AB and BE of a right triangle, right angled at B are of lengths 16 cm and 8 cm respectively. The length of the side of largest

square FDGB that can be inscribed in the triangle ABE is

A. $\dfrac{32}{3}cm$

B. $\dfrac{16}{3}cm$

C. $\dfrac{8}{3}cm$

D. $\dfrac{4}{3}cm$

Answer: B

84. Point P divides the line segment joining R(-1, 3) and S(9,8) in ratio k:1. If P lies on the line x – y +2=0, then value of k is
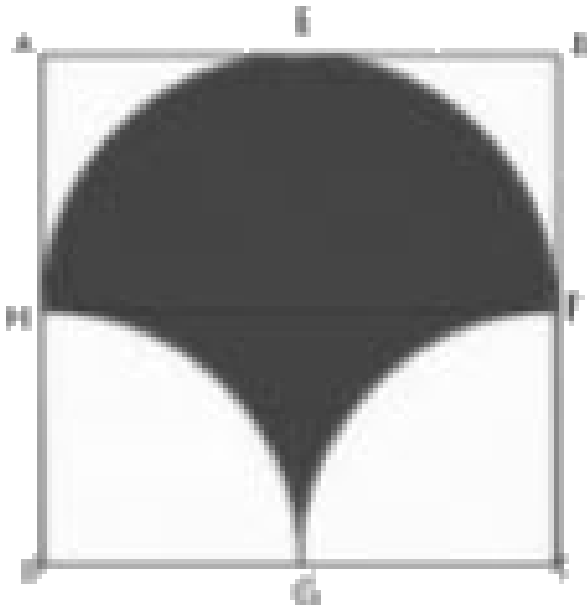
A. $\dfrac{2}{3}$

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

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

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

Answer: A

85. In the figure given below, ABCD is a square of side 14 cm with E, F, G and H as the mid points of sides AB, BC, CD and DA respectively. The area of the shaded portion is

A. $44 cm^2$

B. $49 cm^2$

C. $98 cm^2$

D. $\dfrac{49\pi}{2} cm^2$

Answer: C

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86. Given below is the picture of the Olympic rings made by taking five congruent circles of radius 1cm each, intersecting in such a way

that the chord formed by joining the point of intersection of two circles is also of length 1cm. Total area of all the dotted regions assuming the thickness of the rings to be negligible is

A. $4\left(\dfrac{\pi}{12} - \dfrac{\sqrt{3}}{4}\right) cm^2$

B. $\left(\dfrac{\pi}{6} - \dfrac{\sqrt{3}}{4}\right) cm^2$

C. $4\left(\dfrac{\pi}{6} - \dfrac{\sqrt{3}}{4}\right) cm^2$

D. $8\left(\dfrac{\pi}{6} - \dfrac{\sqrt{3}}{4}\right) cm^2$

Answer: D

87. If 2 and $1/2$ are the zeros of $px^2 + 5x + r$,

then

    A. p=r=2

    B. p=r=-2

    C. p=2, r=-2

    D. p=-2, r=2

Answer: B

88. The circumference of a circle is 100 cm. The side of a square inscribed in the circle is

A. $50\sqrt{2}cm$

B. $\dfrac{100}{\pi}cm$

C. $\dfrac{50\sqrt{2}}{\pi}cm$

D. $\dfrac{100\sqrt{2}}{\pi}cm$

Answer: C

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89. The number of solutions of

$3^{x+y} = 243$ and $243^{x-y} = 3$ is

A. 0

B. 1

C. 2

D. infinite

Answer: A

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90.

The figure given alongside shows the path of a diver, when she takes a jump from the diving board. Clearly it is a parabola.

Annie was standing on a diving board, 48 feet

above the water level. She took a dive into the

pool. Her height (in feet) above the water level

at any time 't' in seconds is given by the

polynomial h(t) such that

$h(t) = -16t^2 + 8t + k.$

What is the value of k?

    A. 0

    B. -48

    C. 48

    D. $\dfrac{48}{-16}$

Answer: C

91.

The figure given alongside shows the path of a

diver. When she takes a jump from the diving

board . Clearly it is parabola .

Annie was standing on a diving board, 48 feet above the water level . She took a dive into the pool. Her height (in feet) above the water level at any time 't' in seconds is given by the polynomial h (t) such that

$$h(t) = -16t^2 + 8t + k$$

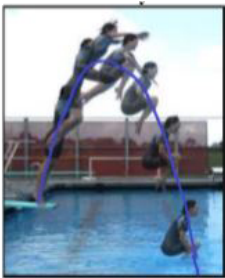At what time will she touch the water in the pool?

A. 30 seconds

B. 2 seconds

C. 1.5 seconds

D. 0.5 seconds

Answer: B

92.

The figure given alongside shows the path of a diver, when she takes a jump from the diving board. Clearly it is a parabola.

Annie was standing on a diving board, 48 feet

above the water level. She took a dive into the

pool. Her height (in feet) above the water level

at any time 't' in seconds is given by the

polynomial h(t) such that

$$h(t) = -16t^2 + 8t + k.$$

Rita's height (in feet) above the water level is

given by another polynomial p(t) with zeroes -1

and 2. Then p(t) is given by-

A. $t^2 + t - 2$

B. $t^2 + 2t - 1$

C. $24t^2 - 24t + 48$

D. $-24t^2 + 24t + 48$

Answer: D

93.

The figure given alongside shows the path of a diver. When she takes a jump from the diving board . Clearly it is parabola .

Annie was standing on a diving board, 48 feet

above the water level . She took a dive into the

pool. Her height (in feet) above the water

level at any time 't' in seconds is given by the

polynomial h (t) such that

$$h(t) = -16t^2 + 8t + k$$

A polynomial q(t) with sum of zeroes as 1 and

the product as -6 is modelling Anu's height

in feet above the water at any time t (in

seconds) . Then q (t) is given by:

A. $t^2 + t + 6$

B. $t^2 + t - 6$

C. $-8t^2 + 8t + 48$

D. $8t^2 - 8t + 48$

Answer: C

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94.

The figure given alongside shows the path of a diver. When she takes a jump from the diving board . Clearly it is parabola .

Annie was standing on a diving board, 48 feet

above the water level . She took a dive into the pool. Her height (in feet) above the water level at any time 't' in seconds is given by the polynomial h (t) such that

$$h(t) = -16t^2 + 8t + k$$

The zeroes of the polynomial $r(t) = -12t^2 + (k-3)t + 48$ are negative of each other. Then k is :

A. 3

B. 0

C. -1.5

D. -3

Answer: A

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95. Case Study-2: A hockey field is the playing surface for the game of hockey. Historically, the game was played on natural turf (grass) but nowadays it is predominantly played on an artificial turf.

It is rectangular in shape-100 yards by 60

yards. Goals consist of two upright posts placed equidistant from the centre of the backline, joined at the top by a horizontal crossbar. The inner edges of the posts must by 3.66 metres (4 yards) apart, and the lower edge of teh crossbar must be 2.14 metres (7 feet) above the ground.

Each team plays with 11 players on the field during the game including the goalie.
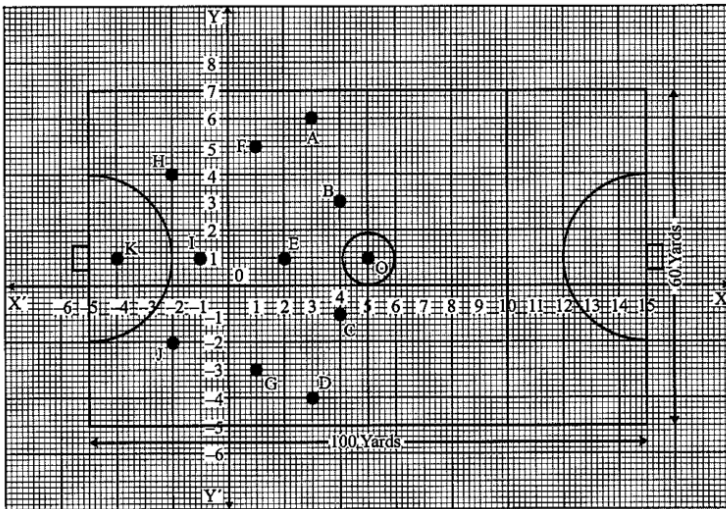
Position you might play include:

Forward: As shown by players A, B, C and D.

Midfielders : As shown by players E, F and.

Fullbacks:As shown by players H, I and J.

Goalie: As shows by player K

Using the picture of a hockey field below, answer the questions that follow:

The coordinates of the centroid of $\triangle EHJ$ are:

A. $\left(\dfrac{-2}{3}, 1\right)$

B. $\left(1, \dfrac{-2}{3}\right)$

C. $\left(\dfrac{2}{3}, 1\right)$

D. $\left(\dfrac{-2}{3}, -1 \right)$

Answer: A

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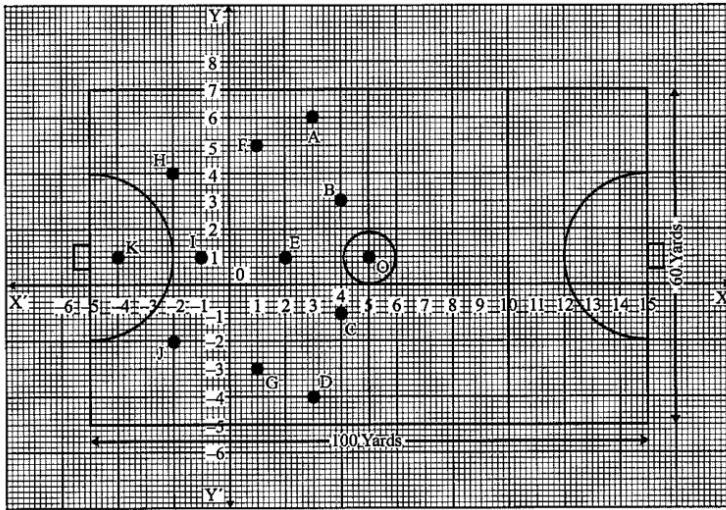
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Fullbacks:As shown by players H, I and J.

Goalie: As shows by player K

Using the picture of a hockey field below, answer the questions that follow:

If a player P needs to be at equal distance from A and G, such that A, P and G are in straight line, then position of P will be given by:

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

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

C. $\left(2, \dfrac{3}{2} \right)$

D. (-2, -3)

Answer: C

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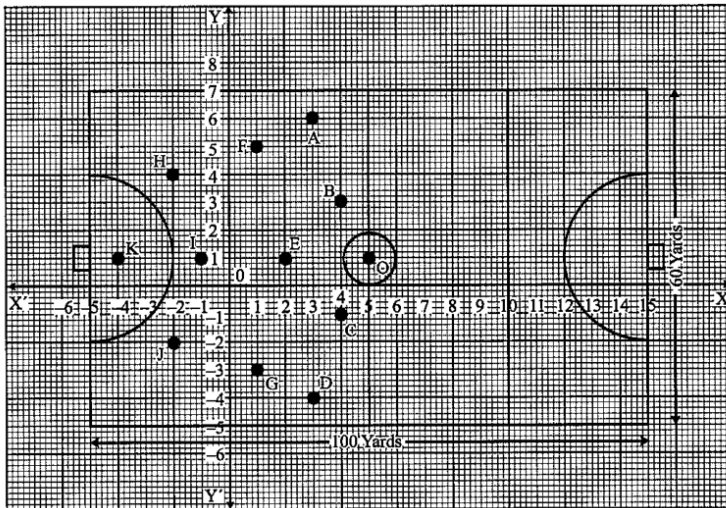
Position you might play include:

Forward: As shown by players A, B, C and D.

Midfielders : As shown by players E, F and.

Fullbacks:As shown by players H, I and J.

Goalie: As shows by player K

Using the picture of a hockey field below, answer the questions that follow:

The point on X-axis equidistant from I and E is:

A. $\left(\dfrac{1}{2}, 0\right)$

B. $\left(0, \dfrac{-1}{2}\right)$

C. $\left(\dfrac{-1}{2}, 0\right)$

D. $\left(0, \dfrac{1}{2}\right)$

Answer: A

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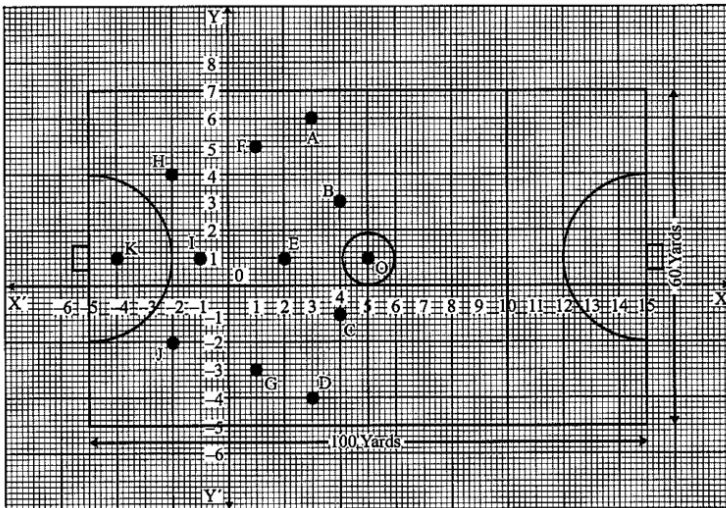
Position you might play include:

Forward: As shown by players A, B, C and D.

Midfielders : As shown by players E, F and.

Fullbacks:As shown by players H, I and J.

Goalie: As shows by player K

Using the picture of a hockey field below, answer the questions that follow:

What are the coordinates of the position of a player Q such that his distance from K is twice

his distance from E and K, Q and E are collinear?

A. (1, 0)

B. (0, 1)

C. (-2, 1)

D. (-1, 0)

Answer: B

99. Case Study-2: A hockey field is the playing surface for the game of hockey. Historically, the game was played on natural turf (grass) but nowadays it is predominantly played on an artificial turf.

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Each team plays with 11 players on the field during the game including the goalie.

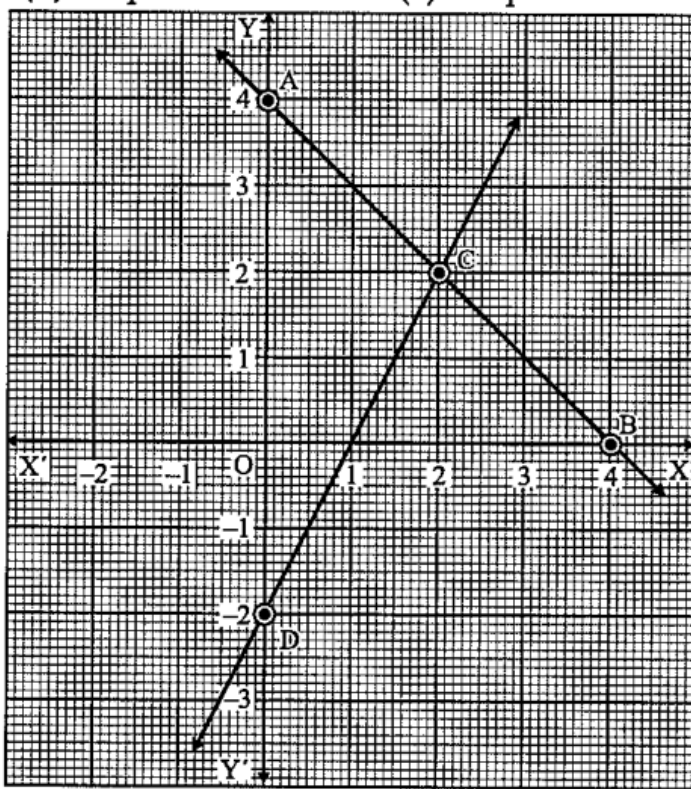Position you might play include:

Forward: As shown by players A, B, C and D.

Midfielders : As shown by players E, F and.

Fullbacks:As shown by players H, I and J.

Goalie: As shows by player K

Using the picture of a hockey field below, answer the questions that follow:

The point on y-axis equidistant from B and C is:

A. (-1, 0)

B. (0, -1)

C. (1, 0)

D. (0, 1)

Answer: D

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1. Find the value of $a_{25} - a_{15}$ for the AP: 6, 9, 12, 15, ...

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2. If 7 times the seventh term of the AP is equal to 5 times the fifth term, then find the value of its 12th term.
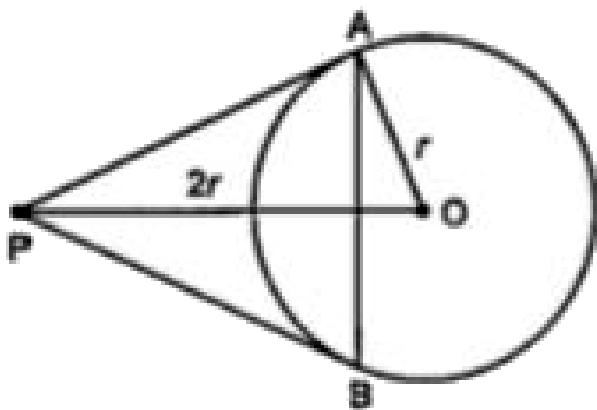
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3. Find the value of m so that the quadratic equation $mx(5x - 6) = -9$ has two equal roots

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4. From a point P, two tangents PA and PB are drawn to a circle C(O,r). If OP= 2r, then find $\angle APB$. What type of triangle is APB?

5. The curved surface area of a right circular cone is 12320 cm^2. If the radius of its base is 56cm, then find its height.

6. Mrs Garg recorded the marks obtained by her students in the following table. She calculated the modal marks of the students of the class as 45. While printing the data, a blank was left. Find the missing frequency in

the table given below

Marks Obtained	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100
Number of Students	5	10	–	6	3

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7. If Ritu were young by 5 years than what she really is, then the square of her age would have been 11 more than five times her present age. What is her present age ?

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8. 2) Solve for x : $9x^2 - 6px + (p^2 - q^2) = 0$

Section B

1. Following is the distribution of the long jump competition in whch 250 students participated. Find the median distance jumped by the students. Interpret the median

Distance (in m)	0-1	1-2	2-3	3-4	4-5
Number of Students	40	80	62	38	30

2. Construct a pair of tangents to a circle of radius 3 cm which are inclined to each other at an angle of 60°

3. The distribution given below shows the runs scored by batsmen in one-day cricket matches. Find the mean number of runs.

Runs scored	0 – 40	40 – 80	80 – 120	120 – 160	160 – 200
Number of batsmen	12	20	35	30	23

4. Two vertical poles of different heights are standing 20 m away from each other on the level ground. The angle of elevation of the top of the first pole from the foot of the second pole is $60°$ and angle of elevation of the top of the second pole from the foot of the first pole is $30°$. Find the difference between the heights of two poles. (Take $\sqrt{3} = 1.73$)

5. A boy 1.7 m tall is standing on a horizontal ground, 50 m away from a building. The angle of elevation of the top of the building from his eye is $60°$. Calculate the height of the building. (Take $\sqrt{3}$ = 1.73)

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Section C

1. The internal and external radii of a hollow spherical shell are 3 cm and 5 cm-respectively. It is melted and recast into a solid cylinder of diameter 14 cm, find the height of the cylinder. Also find the total surface area of the cylinder.
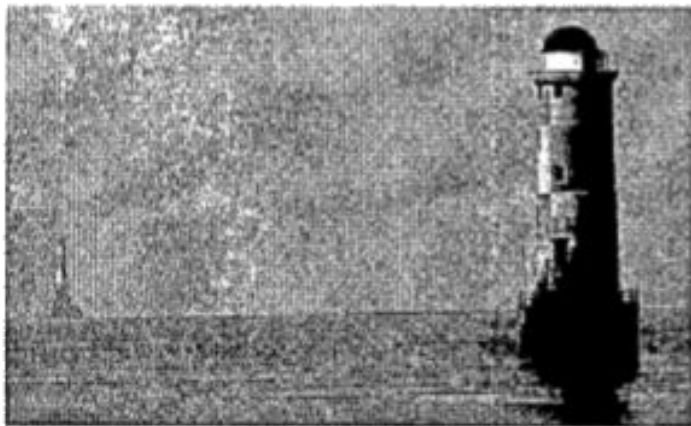
2. Case Study-1 : Trigonometry in the form of triangulation forms the basis of navigation, whether it is by land, sea or air. GPS a radio

navigation system helps to locate our position on earth with the help of satellites.

A guard, stationed at the top of a 240 m tower, observed an unidentified boat coming towards it. A clinometer or inclinometer is an instrument used for measuring angles or slopes (tilt). The guard used the clinometer to measure the angle of depression of the boat coming towards the lighthouse and found it to be $30°$

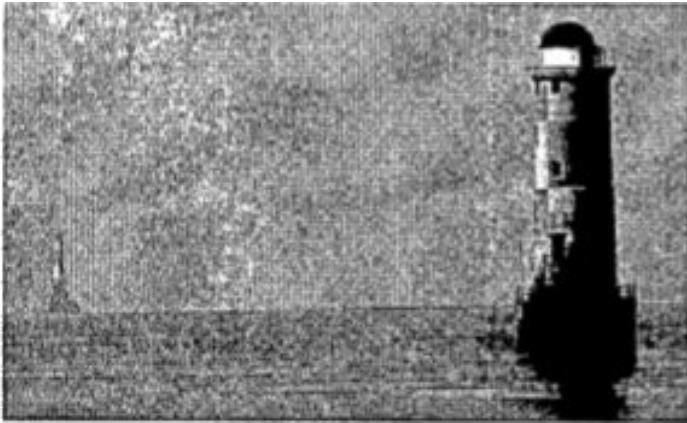(Lighthouse of Mumbai Harbour. Picture credit - Times of India Travel)

Make a labelled figure on the basis of the given information and calculate the distance of the boat from the foot of the observation tower.

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3. Case Study-1 : Trigonometry in the form of triangulation forms the basis of navigation, whether it is by land, sea or air. GPS a radio navigation system helps to locate our position on earth with the help of satellites.

A guard, stationed at the top of a 240 m tower, observed an unidentified boat coming towards it. A clinometer or inclinometer is an instrument used for measuring angles or slopes (tilt). The guard used the clinometer to measure the angle of depression of the boat coming towards the lighthouse and found it

to be $30°$

(Lighthouse of Mumbai Harbour. Picture credit

- Times of India Travel)

After 10 minutes the award observed that the

boat vara annroaching the tortor and ite

dietanca from tower and its distance from

tower is reduced by $240(\sqrt{3} - 1)$ m. He

immediately raised the alarm. What was the

new angle of depression of the boat from the top of the observation tower?

4. Case Study-2: Push-ups are a fast and effective exercise for building strength. These are helpful in almost all sports including athletics. While the push-up primarily targets the muscles of the chest, arms, and shoulders, support required from other muscles helps in toning up the whole body.

Nitesh wants to participate in the push-up challenge. He can currently make 3000 push-ups in one hour. But he wants to achieve a target of 3900 push-ups in 1 hour for which he practices regularly. With each day of practice, he is able to make 5 more push-ups in one hour as compared to the previous day. If on first day of practice he makes 3000 push-ups and continues to practice regularly till his target is achieved. Keeping the above situation in mind answer the following

questions:

Form an A.P. representing the number of push-ups per day and hence find the minimum number of days he needs to practice before the day his goal is accomplished.

5. Case Study-2: Push-ups are a fast and effective exercise for building strength. These are helpful in almost all sports including athletics. While the push-up primarily targets

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and continues to practice regularly till his target is achieved. Keeping the above situation in mind answer the following questions:

Find the total number of push-ups performed by Nitesh up to the day his goal is achieved.

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