MATHS

BOOKS - CENGAGE

COORDINATE SYSTEM

Single Correct Answer Type

1. The maximum value of

$$y=\sqrt{(x-3)^2+\left(x^2-2\right)^2}-\sqrt{x^2-\left(x^2-1\right)^2}$$

is

A. 3

B. $\sqrt{10}$

C. $2\sqrt{5}$

D. none of these

Answer: B

Watch Video Solution

2. Number of values of α such that the points $(\alpha, 6), (-5, 0)$ and (5,0) form an isosceles triangle is

A. 4

B. 5

C. 6

D. 7

Answer: B

Watch Video Solution

3. The number of triangles which are obtuse and which have the points (8,9),(8,16) and

(20,25) as the feet of perpendiculars drawn from the vertices on the opposite sides is

A. 0

B. 1

C. 2

D. 3

Answer: D

Watch Video Solution

4. If m_1, m_2 be the roots of the equation $x^2 + (\sqrt{3}+2)x + \sqrt{3} - 1 = 0$, then the area of the triangle formed by the lines $y = m_1 x, y = m_2 x$ and $y = 2$ is

A. $\sqrt{33} - \sqrt{11}$ sq. units

B. $\sqrt{11} + \sqrt{33}$ sq. units

C. $2\sqrt{33}$ sq. units

D. 121 sq. units

Answer: B

Watch Video Solution

5. A triangle ABC has vertices $A(5, 1), B(-1, -7)$ and $C(1, 4)$ respectively. L be the line mirror passing through C and parallel to AB and a light ray eliminating from point A goes along the direction of internal bisector of the angle A, which meets the mirror and BC at E, D respectively. If sum of the areas of $\triangle ACE$ and $\triangle ABE$ is K sq units then $\frac{2K}{5} - 6$ is

A. a. 17 sq. units

B. b. 18 sq. units

C. c. $\frac{50}{3}$ sq. units

D. d. 20 sq. units

Answer: C

Watch Video Solution

6. If G is the centroid of triangle with vertices $A(a, 0), B(-1, 0)$ and $C(b, c)$ then $\frac{AB^2 + BC^2 + CA^2}{GA^2 + GB^2 + GC^2} =$

A. 1

B. 2

C. 3

D. 4

Answer: C

Watch Video Solution

7. If $A(5, 2), B(10, 12)$ and $P(x, y)$ is such that $\frac{AP}{PB} = \frac{3}{2}$, then then internal bisector of $\angle APB$ always passes through

A. $(20, 32)$

B. $(8, 8)$

C. $(8, -8)$

D. $(-8, -8)$

Answer: B

Watch Video Solution

8. Let ABC is be a fixed triangle and P be veriable point in the plane of triangle ABC. Suppose a,b,c are lengths of sides BC,CA,AB

opposite to angles A,B,C, respectively. If $a(PA)^2 + b(PB)^2 + c(PC)^2$ is minimum, then point P with respect to ΔABC is

A. centroid

B. circumcentre

C. orthocenter

D. incentre

Answer: D

Watch Video Solution

9. The incentre of a triangle with vertices $(7, 1), (-1, 5)$ and $\left(3+2\sqrt{3}, 3+4\sqrt{3}\right)$ is

A. $\left(3+\frac{2}{\sqrt{3}}, 3+\frac{4}{\sqrt{3}}\right)$

B. $\left(1+\frac{2}{3\sqrt{3}}, 1+\frac{4}{3\sqrt{3}}\right)$

C. $(7, 1)$

D. None of these

Answer: A

Watch Video Solution

10.

$P(\cos\alpha, \sin\alpha), Q(\cos\beta, \sin\beta), R(\cos\gamma, \sin\gamma)$ are vertices of triangle whose orthocenter is $(0, 0)$ then the value of $\cos(\alpha - \beta) + \cos(\beta - \gamma) + \cos(\gamma - \alpha)$ is

A. $-3/2$

B. $-1/2$

C. ½

D. $3/2$

Answer: A

Watch Video Solution

11. Three vertices of a triangle ABC are $A(2, 1), B(7, 1)$ and $C(3, 4)$. Images of this triangle are taken in x-axis, y-axis and the line $y = x$. If G_1, G_2 and G_3 are the centroids of the three image triangles then area of triangle $G_1G_2G_3$ is equal to

A. 10 sq. units

B. 20 sq. units

C. 25sq. Units

D. 30 sq. units

Answer: B

Watch Video Solution

12. A and B are fixed points such that AB=2a. The vertex C of ΔABC such that $\cot A + \cot B$=constant. Then locus of C is

A. straight line perpendicular to AB

B. straight line parallel to AB

C. circle

D. none of these

Answer: B

Watch Video Solution

13. Two vertices of a triangle are (1, 3) and (4, 7). The orthocentre lies on the line $x + y = 3$. The locus of the third vertex is

A. $x^2 - 2xy + 2y^2 - 3x - 4y + 36 = 0$

B. $2x^2 - 4xy + 3y^2 - 4x - y + 42 = 0$

C. $3x^2 + xy - 4y^2 - 2x + 24y - 40 = 0$

D. $x^2 - 4xy + 3y^2 - 2x - y + 40 = 0$

Answer: C

Watch Video Solution

14. Let P be the point $(-3, 0)$ and Q be a moving point (0,3t). Let PQ be trisected at R so that R is nearer to Q. RN is drawn

perpendicular to PQ meeting the x-axis at N. The locus of the mid-point of RN is

A. $(x+3)^2 - 3y = 0$

B. $(y+3)^2 - 3x = 0$

C. $x^2 - y = 1$

D. $y^2 - x = 1$

Answer: D

Watch Video Solution

15. Given $\frac{x}{a}+\frac{y}{b}=1$ and $ax+by=1$ are two variable lines, 'a' and 'b' being the parameters connected by the relation $a^2+b^2=ab$. The locus of the point of intersection has the equation

A. a) $x^2+y^2+xy-1=0$

B. b) $x^2+y^2-xy+1=0$

C. c) $x^2+y^2+xy+1=0$

D. d) $x^2+y^2-xy-1=0$

Answer: A

Watch Video Solution

16. The extremities of a diagonal of a rectangle are (0.0) and (4, 4). The locus of the extremities of the other diagonal is equal to

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

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

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

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

Answer: A

Watch Video Solution

17. The equation of the altitudes AD, BE, CF of a triangle ABC are $x + y = 0, x - 4y = 0$ and $2x - y = 0$, respectively. If. A = (t,-t) where t varies, then the locus of centroid of triangle ABC is (A) $y = -5x$ (B) $y = x$ (C) $x = -5y$ (D) $x = y$

A. $y = -5x$

B. $y = x$

C. $x = -5y$

D. $x = -y$

Answer: C

Watch Video Solution

18. The real value of a for which the value of m satisfying the equation $(a^2-1)m^2-(2a-3)m+a=0$ given the slope of a line parallel to the y-axis is (a) $\frac{3}{2}$ (b) 0 (c) 1 (d) ± 1

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

B. 0

C. 1

D. ± 1

Answer: D

Watch Video Solution

19. If the lines y = 3x + 1 and 2y = x + 3 are equally inclined to the line y = mx + 4, $\left(\frac{1}{2} < m < 3\right)$, then the values of m are

A. $\frac{1+3\sqrt{2}}{7}$

B. $\frac{1-3\sqrt{2}}{7}$

C. $\frac{1\pm3\sqrt{2}}{7}$

D. $\frac{1\pm5\sqrt{2}}{7}$

Answer: D

Watch Video Solution

20. In a triangle ABC, AB is parallel to y-axis, BC is parallel to x-axis, centroid is at (2, 1), If

median through C is $x - y = 1$, then the slope of median through A is

A. 2

B. 3

C. 4

D. 5

Answer: C

Watch Video Solution

21. The number of rational points on the line joining $\left(\sqrt{5}, 3\right)$ and $\left(3, \sqrt{3}\right)$ is

A. 0

B. 1

C. 2

D. infinite

Answer: A

Watch Video Solution

22. The Cartesian coordinates of point having polar coordinates $\left(-2, \frac{2\pi}{3} \right)$ will be

A. $(1, \sqrt{3})$

B. $(\sqrt{3}, 1)$

C. $(1, -\sqrt{3})$

D. $(-1, \sqrt{3})$

Answer: C

Watch Video Solution

23. The line passing through $\left(-1, \frac{\pi}{2}\right)$ and perpendicular to $\sqrt{3}\sin(\theta) + 2\cos(\theta) = \frac{4}{r}$ is

A. $2 = \sqrt{3}r\cos\theta - 2r\sin\theta$

B. $5 = -2\sqrt{3}r\sin\theta + 4r\cos\theta$

C. $2 = \sqrt{3}r\cos\theta + 2r\cos\theta$

D. $5 = 2\sqrt{3}r\sin\theta + 4r\cos\theta$

Answer: A

Watch Video Solution

24. If origin is shifted to $(-2, 3)$ then transformed equation of curve $x^2 + 2y - 3 = 0$ w.r.t. to $(0, 0)$ is

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

B. $x^2 - 4x - 2y - 5 = 0$

C. $x^2 + 4x + 2y - 5 = 0$

D. None of these

Answer: C

Watch Video Solution

Comprehension Type

1. $A(x_1, y_1), B(x_2, y_2), C(x_3, y_3)$ are three vertices of a triangle ABC, $lx + my + n = 0$ is an equation of line L. If L intersects the sides BC,CA and AB of a triangle ABC at P,Q,R respectively, then $\frac{BP}{PC} \times \frac{CQ}{QA} \times \frac{AR}{RB}$ is equal to

A. -1

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

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

D. 1

Answer: A

Watch Video Solution

2. $A(x_1, y_1), B(x_2, y_2), C(x_3, y_3)$ are three vertices of a triangle ABC. $lx + my + n = 0$ is an equation of the line L.

If P divides BC in the ratio 2:1 and Q divides CA in the ratio 1:3 then R divides AB in the ratio (P,Q,R are the points as in problem 1)

A. 2:3 internally

B. 2:3 externally

C. 3:2 internally

D. 3:2 externally

Answer: D

Watch Video Solution

3. Let $A(0, \beta), B(-2, 0)$ and $C(1, 1)$ be the vertices of a triangle. Then

Angle A of the triangle ABC will be obtuse if β lies in

A. $(-1, 2)$

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

C. $\left(-1, \frac{2}{3}\right) \cup \left(\frac{2}{3}, 2\right)$

D. none of these

Answer: C

Watch Video Solution

4. Let $A(0, \beta), B(-2, 0)$ and $C(1, 1)$ be the vertices of a triangle. Then

All the values of β for which angle A of triangle ABC is largest lie in the interval

A. $(-2, 1)$

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

C. $\left(-2, \frac{2}{3}\right) \cup \left(\frac{2}{3}, \sqrt{6}\right)$

D. none of these

Answer: C

Watch Video Solution

Multiple Correct Answers Type

1. Coordinates of points on curve $5x^2 - 6xy + 5y^2 - 4 = 0$ which are nearest to origin are

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

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

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

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

Answer: B::D

Watch Video Solution

2. Under rotation of axes through θ, $x\cos\alpha + y\sin\alpha = P$ changes to $X\cos\beta + Y\sin\beta = P$ then . (a) $\cos\beta = \cos(\alpha - \theta)$ (b) $\cos\alpha = \cos(\beta - \theta)$ (c) $\sin\beta = \sin(\alpha - \theta)$ (d) $\sin\alpha = \sin(\beta - \theta)$

A. $\cos\beta = \cos(\alpha - \theta)$

B. $\cos\alpha = \cos(\beta - \theta)$

C. $\sin\beta = \sin(\alpha - \theta)$

D. $\sin\alpha = \sin(\beta - \theta)$

Answer: A::C

Watch Video Solution