MATHS

BOOKS - CENGAGE MATHS (ENGLISH)

COORDINATE SYSTEM

Single Correct Answer Type

1. The maximum value of

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

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

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 vertices A(5,1),B(-1,-7) and C(1,4). Respectively. L be the line mirror passing through C and parallel to AB. A light ray emanating from point A goes along the direction of the internal bisector of angle A, which meets the mirror and BC at E and D, respectively. then the sum of the areas of ΔACE and ΔABC is

   A. 17 sq. units

   B. 18 sq. units

C. $\dfrac{50}{3}$ sq. units

D. 20 sq. units

Answer: C

▶ **Watch Video Solution**

6. If G is the centroid of triangle with vertices

$A(a, 0), B(-a, 0)$ and $C(b, c)$ then

$$\dfrac{AB^2 + BC^2 + CA^2}{GA^2 + GB^2 + GC^2} =$$

A. 1

B. 2

C. 3

D. 4

Answer: C

---

7. If $A(5, 2)$, $B(10, 12)$ and $P(x, y)$ is such that $\dfrac{AP}{PB} = \dfrac{3}{2}$, then then internal bisector of $\angle APB$ always passes through (a) (20,32) (b) (8,8) (c) (8,-8) (d) (-8,-8)

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 $(3 + 2\sqrt{3}, 3 + 4\sqrt{3})$ is

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

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

C. $(7, 1)$

D. None of these

Answer: A

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. $\frac{1}{2}$

D. $3/2$

Answer: A

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 $\triangle ABC$ 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 $\dfrac{x}{a} + \dfrac{y}{b} = 1$ 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. $x^2 + y^2 + xy - 1 = 0$

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

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

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

Answer: A

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

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

---

18. The real value of a for which the valye of m satisfying the equation $(a^2 - 1)m^2 - (2a - 3)m + a = 0$ gives the slope of a line parallel to the y-axis is

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

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

$y = mx + 4,$ $\left(\dfrac{1}{2} < m < 3 \right)$ then   find   the

values m

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

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

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

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

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
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 $\left(-2, \dfrac{2\pi}{3} \right)$ will be

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

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

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

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

Answer: C

▶ **Watch Video Solution**

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

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 $\dfrac{BP}{PC} \times \dfrac{CQ}{QA} \times \dfrac{AR}{RB}$ is equal to

A. -1

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

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

D. 1

Answer: A

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

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

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

D. none of these

Answer: C

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

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

   D. none of these

Answer: C

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

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

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

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

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

Answer: B::D

---

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