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## MATHS

## BOOKS - CENGAGE MATHS (ENGLISH)

## COORDINATE SYSTEM

Single Correct Answer Type

1. The maximum value of
$y=\sqrt{(x-3)^{2}+\left(x^{2}-2\right)^{2}}-\sqrt{x^{2}-\left(x^{2}-1\right)^{2}}$
A. 3
B. $\sqrt{10}$
C. $2 \sqrt{5}$
D. none of these

Answer: B

## - Watch Video Solution

2. Number of values of $\alpha$ 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

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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

$$
y=m_{1} x, y=m_{2} x \text { and } y=2 \text { is }
$$

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
5. A triangle $A B C$ 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 $B C$ at $E$ and $D$, respectively. then the sum of the areas of
$\triangle A C E$ and $\triangle A B C$ is
A. 17 sq. units
B. 18 sq. units
c. $\frac{50}{3}$ sq. units
D. 20 sq. units

## Answer: C

## D Watch Video Solution

6. If G is the centroid of triangle with vertices
$A(a, 0), B(-a, 0) \quad$ and $\quad C(b, c) \quad$ then
$A B^{2}+B C^{2}+C A^{2}$
$\overline{G A^{2}+G B^{2}+G C^{2}}=$
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 $\frac{A P}{P B}=\frac{3}{2}$, then then internal bisector of
$\angle A P B$ 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

## D Watch Video Solution

8. Let $A B C$ is be a fixed triangle and $P$ be veriable point in the plane of triangle $A B C$.

Suppose a,b,c are lengths of sides $B C, C A, A B$
opposite to angles $A, B, C$, respectively. If $a(P A)^{2}+b(P B)^{2}+c(P C)^{2}$ is minimum, then point P with respect to $\Delta A B C$ is
A. centroid
B. circumcentre
C. orthocenter
D. incentre

## Answer: D

9. The incentre of a triangle with vertices
$(7,1),(-1,5)$ and $(3+2 \sqrt{3}, 3+4 \sqrt{3})$ is
A. $\left(3+\frac{2}{\sqrt{3}}, 3+\frac{4}{\sqrt{3}}\right)$
B. $\left(1+\frac{2}{3 \sqrt{3}}, 1+\frac{4}{3 \sqrt{3}}\right)$
C. $(7,1)$
D. None of these

Answer: A
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

$$
\cos (\alpha-\beta)+\cos (\beta-\gamma)+\cos (\gamma-\alpha) \text { is }
$$

A. $-3 / 2$
B. $-1 / 2$
C. $1 / 2$
D. $3 / 2$

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11. Three vertices of a triangle $A B C$ 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
$G_{1} G_{2} G_{3}$ is equal to
A. 10 sq. units
B. 20 sq. units
C. 25 sq . Units

## D. 30 sq. units

## Answer: B

## D Watch Video Solution

12. $A$ and $B$ are fixed points such that $A B=2 a$.

The vertex C of $\triangle A B C$ such that $\cot A+\cot B=$ constant. Then locus of $C$ is
A. straight line perpendicular to $A B$
B. straight line parallel to $A B$
C. circle
D. none of these

## Answer: B

## D 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

$$
\text { A. } x^{2}-2 x y+2 y^{2}-3 x-4 y+36=0
$$

$$
\begin{aligned}
& \text { B. } 2 x^{2}-4 x y+3 y^{2}-4 x-y+42=0 \\
& \text { C. } 3 x^{2}+x y-4 y^{2}-2 x+24 y-40=0 \\
& \text { D. } x^{2}-4 x y+3 y^{2}-2 x-y+40=0
\end{aligned}
$$

## Answer: C

## - Watch Video Solution

14. Let $P$ be the point $(-3,0)$ and $Q$ be a moving point ( $0,3 \mathrm{t}$ ). Let PQ be trisected at R so that $R$ is nearer to $Q$. $R N$ is drawn
perpendicular to $P Q$ meeting the $x$-axis at $N$. The locus of the mid-point of RN is

$$
\begin{aligned}
& \text { А. }(x+3)^{2}-3 y=0 \\
& \text { В. }(y+3)^{2}-3 x=0 \\
& \text { С. } x^{2}-y=1 \\
& \text { D. } y^{2}-x=1
\end{aligned}
$$

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

$$
\begin{aligned}
& \text { A. } x^{2}+y^{2}+x y-1=0 \\
& \text { B. } x^{2}+y^{2}-x y+1=0 \\
& \text { C. } x^{2}+y^{2}+x y+1=0 \\
& \text { D. } x^{2}+y^{2}-x y-1=0
\end{aligned}
$$

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

$$
y=-5 x \text { (B) } y=x \text { (C) } x=-5 y \text { (D) } x=y
$$

A. $y=-5 x$
B. $y=x$
C. $x=-5 y$

$$
\text { D. } x=-y
$$

## Answer: C

## - Watch Video Solution

18. The real value of a for which the valye of $m$
$\left(a^{2}-1\right) m^{2}-(2 a-3) m+a=0$ gives the
slope of a line parallel to the $y$-axis is
A. $\frac{3}{2}$
B. 0
C. 1
D. $\pm 1$

## Answer: D

## - Watch Video Solution

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

$$
\begin{aligned}
& \text { A. } \frac{1+3 \sqrt{2}}{7} \\
& \text { B. } \frac{1-3 \sqrt{2}}{7} \\
& \text { C. } \frac{1 \pm 3 \sqrt{2}}{7} \\
& \text { D. } \frac{1 \pm 5 \sqrt{2}}{7}
\end{aligned}
$$

## Answer: D

## D Watch Video Solution

20. In a triangle $A B C, A B$ is parallel to $y$-axis, $B C$ 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
(D) Watch Video Solution
21. The number of rational points on the line joining $(\sqrt{5}, 3)$ and $(3, \sqrt{3})$ is
A. 0
B. 1
C. 2
D. infinite

Answer: A

D 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

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

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

## Answer: A

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

$$
\begin{aligned}
& \text { A. } x^{2}-4 x+2 y+4=0 \\
& \text { B. } x^{2}-4 x-2 y-5=0 \\
& \text { C. } x^{2}+4 x+2 y-5=0
\end{aligned}
$$

D. None of these

## Answer: C

Comprehension Type

1. $A\left(x_{1}, y_{1}\right), B\left(x_{2}, y_{2}\right), C\left(x_{3}, y_{3}\right)$ are three vertices of a triangle $\mathrm{ABC}, l x+m y+n=0$ is an equation of line $L$. If $L$ intersects the sides $B C, C A$ and $A B$ of a triangle $A B C$ at $P, Q, R$ respectively, then $\frac{B P}{P C} \times \frac{C Q}{Q A} \times \frac{A R}{R B}$ is equal to
A. -1
B. $-\frac{1}{2}$
C. $\frac{1}{2}$
D. 1

## Answer: A

## D Watch Video Solution

2. $A\left(x_{1}, y_{1}\right), B\left(x_{2}, y_{2}\right), C\left(x_{3}, y_{3}\right)$ are three vertices of a triangle ABC . $l x+m y+n=0$ is an equation of the line $L$.

If $P$ divides $B C$ in the ratio $2: 1$ and $Q$ divides $C A$
in the ratio $1: 3$ then $R$ divides $A B$ in the ratio
( $\mathrm{P}, \mathrm{Q}, \mathrm{R}$ 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 $A B C$ will be obtuse if $\beta$
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 $\beta$ for which angle A of triangle $A B C$ is largest lie in the interval
A. $(-2,1)$

$$
\begin{aligned}
& \text { в. }\left(-2, \frac{2}{3}\right) \cup\left(\frac{2}{3}, 1\right) \\
& \text { С. }\left(-2, \frac{2}{3}\right) \cup\left(\frac{2}{3}, \sqrt{6}\right)
\end{aligned}
$$

D. none of these

Answer: C

## Multiple Correct Answers Type

1. Coordinates of points on curve
$5 x^{2}-6 x y+5 y^{2}-4=0$ 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. $\left(\frac{1}{2},-\frac{1}{2}\right)$

## D Watch Video Solution

2. Under rotation of axes through $\theta$, $x \cos \alpha+y \sin \alpha=P \quad$ changes to
$X \cos \beta+Y \sin \beta=P \quad$ then
$\cos \beta=\cos (\alpha-\theta)$ (b) $\cos \alpha=\cos (\beta-\theta)$ (c)
$\sin \beta=\sin (\alpha-\theta)(\mathrm{d}) \sin \alpha=\sin (\beta-\theta)$
A. $\cos \beta=\cos (\alpha-\theta)$
B. $\cos \alpha=\cos (\beta-\theta)$

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

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

Answer: A::C

