Level-2, TEST-COORDINATE SYSTEM AND COORDINATES

Name: _____ **Mob No.** _____

Rough Work

1. The coordinates of the middle points of the sides of a triangle are (4,2), (3,3) and (2,2), then coordinates of centroid are:

(a) (3,7/3) (b) (3,3) (c) (4,3) (d) (3,4)

2. The incentre of the triangle whose vertices are (-36,7), (20,7) and (0,-8) is:

(a) (0, -1) (b) (-1,0) (c) (1,1) (d) $\left(\frac{1}{2}, 1\right)$

3. If the orthocentre and centroid of a triangle are (-3,5) and (3,3) then its circumcentre is:

(a) (6,2) (b) (3,-1) (c) (-3,5) (d) (-3,1)

4. An equilateral triangle has each side equal to a. If the coordinates of its vertices are (x_1,y_1), (x_2,y_2) and (x_3,y_3) then the square of the determinant $\begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix}$ equals:

(a) $3a^4$ (b) $\frac{3a^4}{2}$ (c) $\frac{3}{4}a^4$ (d) $\frac{3}{8}a^4$

5. The vertices of a triangle are A(0,0), B(0,2) and C(2, 0). The distance between circumcentre and orthocentre:

(a) $\sqrt{2}$ (b) $\frac{1}{\sqrt{2}}$ (c) 2 (d) $\frac{1}{2}$

6. A (a,b), B (x_1,y_1) and $C(x_2,y_2)$ are the vertices of a triangle. If a, x_1, x_2 are in GP with common ratio r and b, y_1, y_2 are in GP with common ratio s, then area of ΔABC is:

(a) $ab(r\text{-}1)(s\text{-}1)(s\text{-}r)$

(b) $\frac{1}{2}ab(r+1)(s+1)(s\text{-}r)$

(c) $\frac{1}{2}ab(r\text{-}1)(s\text{-}1)(s\text{-}r)$

(d) $ab(r+1)(s+1)(r\text{-}s)$

7. The points $(x+1,2)$, $(t, x+2)$, $\left(\frac{1}{x+1}, \frac{2}{x+1}\right)$ are collinear, then x is equal to:

(a) -4 (b) -8 (c) 4 (d) 8

8. The vertices of a trianble are (6,0), (0, 6) and (6,6). Then distance between its circumcentre and centroid, is:

(a) $2\sqrt{2}$ (b) 2 (c) $\sqrt{2}$ (d) 1

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9. The nine point centre of the triangle with vertices $(1,\sqrt{3})$, (0,0) and (2,0) is:

(a) $\left(1,\frac{\sqrt{3}}{2}\right)$ (b) $\left(\frac{2}{3},\frac{1}{\sqrt{3}}\right)$ (c) $\left(\frac{2}{3},\frac{\sqrt{3}}{2}\right)$ (d) $\left(1\frac{1}{\sqrt{3}}\right)$

10. The vertices of a triangle are (0,0), (1,0) and (0, 1). Then excentre opposite to (0,0) is:

(a) $\left(1-\frac{1}{\sqrt{2}},1+\frac{1}{\sqrt{2}}\right)$ (b) $\left(1+\frac{1}{\sqrt{2}},1+\frac{1}{\sqrt{2}}\right)$

(c) $\left(1+\frac{1}{\sqrt{2}},1-\frac{1}{\sqrt{2}}\right)$ (d) $\left(1-\frac{1}{\sqrt{2}},1-\frac{1}{\sqrt{2}}\right)$

11. If α, β, γ are the real roots of the equation $x^3-3px^2+3qx-1=0$, then find the centroid of the triangle whose vertices are $\left(\alpha,\frac{1}{\alpha}\right)$, $\left(\beta,\frac{1}{\beta}\right)$ and $\left(\gamma,\frac{1}{\gamma}\right)$.

12. If centroid of a trianble be (1,4) and the coordinates of its any two vertices are (4,-8) and (-9, 7). Find the area of the triangle.

13. Find the centroid and incentre of the triangle whose vertices are (1,2), (2,3) and (3,4).

14. Show that the area of the trianble with vertices (λ,λ-2), (λ+3, λ) and (λ+2, λ+2) is independent of λ.

15. Prove that the points $(a, b+c)$, $(b, c+a)$ and $(c, a+b)$ are collinear.

16. Prove that the points (a,b), (c, d) and $(a-c, b-d)$ are collinear, if $ad=bc$.

17. If the points (x_1,y_1), (x_2y_2) and (x_3y_3) are collinear, show that $\sum\left(\frac{y_1-y_2}{x_1x_2}\right)=0$, i.e. $\frac{y_1-y_2}{x_1x_2}+\frac{y_2-y_3}{x_2x_3}+\frac{y_3-y_1}{x_3x_1}=0$.

18. The coordinates of points A, B, C and D are (-3, 5), (4, -2), $(x,3x)$ and (6, 3) respectively and $\frac{\Delta ABC}{\Delta BCD}=\frac{2}{3}$, Find x.

19. Find the area of the hexagon whose vertices taken in order are (5,0), (4,2), (1,3), (-2, 2), (-3,-1), and (0,-4).