

Determinants - Class XII

Related Questions with Solutions

Questions

Question: 01

If $A(x_1, y_1)$, $B(x_2, y_2)$ and $C(x_3, y_3)$ are the vertices of an equilateral triangle

whose each side is equal to a , then $\begin{vmatrix} x_1 & y_1 & 2 \\ x_2 & y_2 & 2 \\ x_3 & y_3 & 2 \end{vmatrix}^2$ is equal to

- A. $2a^2$
- B. $2a^4$
- C. $3a^2$
- D. $3a^4$

Solutions

Solution: 01

Step I : Find the area of triangle using determinant

Let area of ΔABC be Δ

$$\text{Then, } \Delta = \frac{1}{2} \begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix}$$

$$\Rightarrow 2\Delta = \begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix} \Rightarrow 4\Delta = \begin{vmatrix} x_1 & y_1 & 2 \\ x_2 & y_2 & 2 \\ x_3 & y_3 & 2 \end{vmatrix}$$

Step II : Find the area of equilateral triangle whose side is a

$$\therefore \Delta = \frac{\sqrt{3}}{4} a^2$$

$$\Rightarrow 4\Delta = \sqrt{3} a^2$$

$$\Rightarrow 16\Delta^2 = 3a^4$$

$$\therefore \begin{vmatrix} x_1 & y_1 & 2 \\ x_2 & y_2 & 2 \\ x_3 & y_3 & 2 \end{vmatrix}^2 = 3a^4$$

Correct Options

Answer:01

Correct Options: D