## Answer to Question \#91574 - Math - Geometry

## Question

Which of the following statement is true about the curve defined by $6 y 2=x(x-2)$
i). The curve passes through $(0,0)$ AND $X=0$ IS TANGENT LINE AT $(0,0)$
ii) The curve is symmetric about $x$-axis
iii) The curve is symmetric about $y$-axis
iv) The curve lies to the left of $y$-axis
a. i) and iii)
b. i) and ii)
c. . ii) and iii)
d. iii) and iv)

## Solution

Given equation of curve
$6 y^{2}=x(x-2)$
Now considering option i)
On substituting $(0,0)$
$6 \times 0^{2}=0 \times(x-2)$
$0=0$
$(0,0)$ satisfies this equation therefore this curve passes through $(0,0)$
We know that
Slope of tangent $=\frac{d y}{d x}$
On differentiating equation of curve
$6 \times 2 \mathrm{y} \times \frac{d y}{d x}=2 \mathrm{x}-2$
$12 \mathrm{y} \times \frac{d y}{d x}=2(\mathrm{x}-1)$

$$
\begin{aligned}
& \frac{d y}{d x}=\frac{2(\mathrm{x}-1)}{12 y} \\
& \frac{d y}{d x}=\frac{(\mathrm{x}-1)}{6 y}
\end{aligned}
$$

At $(0,0)$ slope of tangent $=\frac{d y}{d x}$ at $(0,0)=\frac{-1}{0}=-\infty$
Therefore at origin this curve have vertical tangent at $\mathrm{x}=0$.therefore $\mathrm{x}=0$ is tangent to the curve at origin.
Thus, the option i) is correct.
Now considering option ii)

We can see that
On replacing y by -y equation of curve becomes
$6(-y)^{2}=x(x-2)$
$6 y^{2}=x(x-2)$
Since we can see that equation of curve doesn't change on replacing y by -y therefore we can say that curve is symmetric about x -axis.

Thus, option ii) is correct.

Now considering option iii)
We can see that
On replacing x by -x equation of curve becomes
$6(y)^{2}=-x(-x-2)$
$6 y^{2}=x(x+2)$
Since we can see that equation of curve does change on replacing $x$ by $-x$ therefore we can say that curve is not symmetric about x-axis.

Thus, the option iii) is incorrect.

Now considering option iv)
We can see that
For $\mathrm{x}>2$
Curve will be defined as $(x-2)>0$ and $x>0$
Therefore
$x(x-2)>0$ so $y$ will have real values for all $x>0$
therefore curve lies to the right of $y$-axis also.
Thus, the option iv) is incorrect.
OPTION B) i) and ii) IS CORRECT.

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