Answer to Question #91574 – Math – Geometry

Question

Which of the following statement is true about the curve defined by 6y2=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

 $6y^2 = x(x-2)$

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= $\frac{dy}{dx}$

On differentiating equation of curve

$$6 \times 2y \times \frac{dy}{dx} = 2x-2$$

$$12y \times \frac{dy}{dx} = 2(x-1)$$

$$\frac{dy}{dx} = \frac{2(x-1)}{12y}$$

$$\frac{dy}{dx} = \frac{(x-1)}{6y}$$

At (0,0) slope of tangent $=\frac{dy}{dx}$ at (0,0) $=\frac{-1}{0}=-\infty$

Therefore at origin this curve have vertical tangent at x=0 .therefore 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

 $6(-y)^2 = x(x-2)$ $6y^2 = x(x-2)$

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

 $6(y)^2 = -x(-x-2)$

$$6y^2 = x(x+2)$$

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 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.