16. Find the coordinates of a point on the parabola $y^2 = 8x$ whose focal distance is 4.

Ans:

Given

Equation of the parabola $y^2 = 8x$

Focal distance $= 4$.

$y^2 = 8x$ (given)

On comparing the given equation of parabola with $y^2 = 4ax$, we get

8x = 4ax

a = 2

$\therefore$ Focal distance $= |x + a| = 4$

$\Rightarrow |x + 2| = 4$

$\Rightarrow x + 2 = \pm 4$

$\Rightarrow x = 2, -6$

But $x \neq -6$ (because the given parabola lies in the positive $x-$axis direction).

For $x = 2, y^2 = 8 \times 2$

$\therefore y^2 = 16$

$\Rightarrow y = \pm 4$

So, the points are $(2, 4)$ and $(2, -4)$