SOLUTION The given equation is of the form $x^2 = 4ay$, where $4a = 6$, i.e., $a = \frac{3}{2}$.

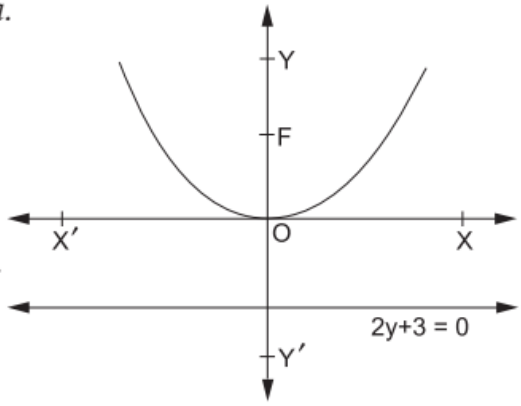
So, this is a case of *upward parabola.*

Its focus is $F(0, a)$, i.e., $F\left(0, \frac{3}{2}\right)$.

Its vertex is $O(0, 0)$.

The equation of the directrix is $y = -a$, i.e., $y = \frac{-3}{2}$, i.e., $2y + 3 = 0$.

Its axis is y-axis, whose equation is $x = 0$.



Length of latus rectum $= 4a = \left(4 \times \frac{3}{2}\right)$ units $= 6$ units.

EXAMPLE 4 *Find the coordinates of the focus and the vertex, the equations of the directrix and the axis, and length of latus rectum of the parabola* $x^2 = -16y$.

SOLUTION The given equation is of the form $x^2 = -4ay$, where $4a = 16$, i.e., $a = 4$.

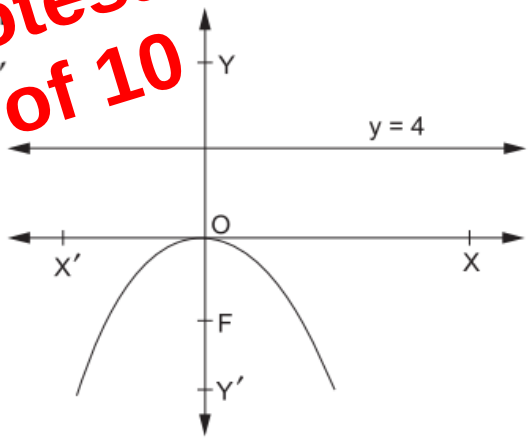
So, it is a case of *downward parabola.*

Its focus is $F(0, -a)$, i.e., $F(0, -4)$.

Its vertex is $O(0, 0)$.

The equation of the directrix is $y = a$, i.e., $y = 4$.

Its axis is y-axis, whose equation is $x = 0$.



Length of latus rectum $= 4a = (4 \times 4)$ units $= 16$ units.

EXAMPLE 5 *Find the equation of the parabola with focus at* $F(3, 0)$ *and directrix* $x = -3$.