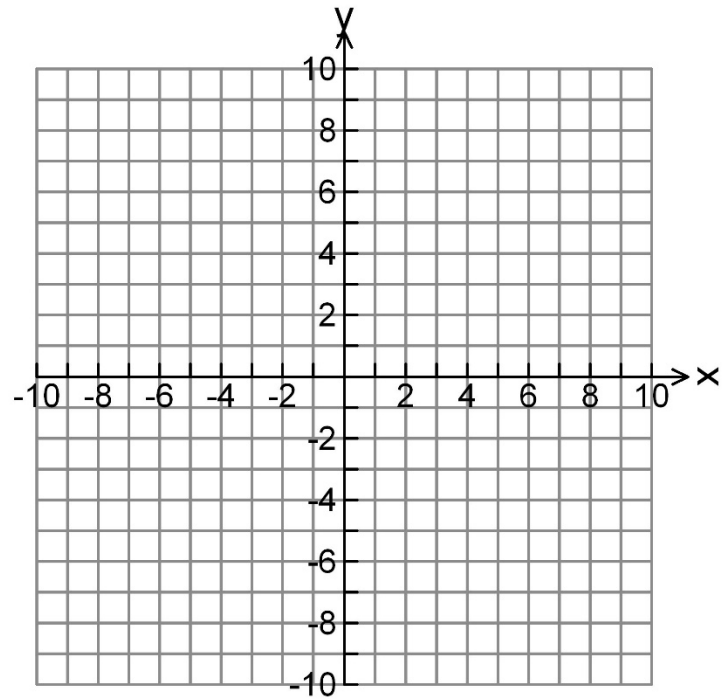


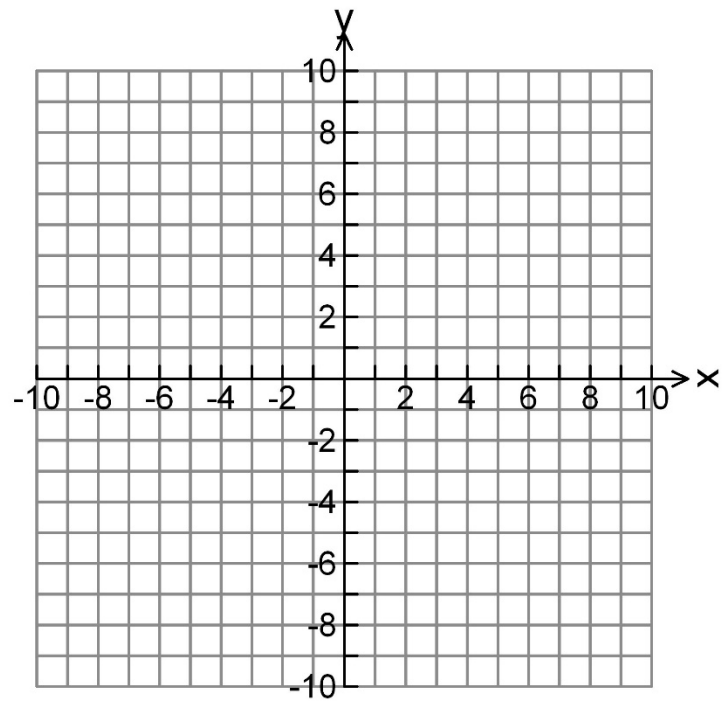
Section 10.1: Parabolas

Video 1: Parabolas with Horizontal Axis of Symmetry

1) Graph $x - 1 = -(y - 3)^2$



2) Graph $x = 2y^2 + 8y + 3$

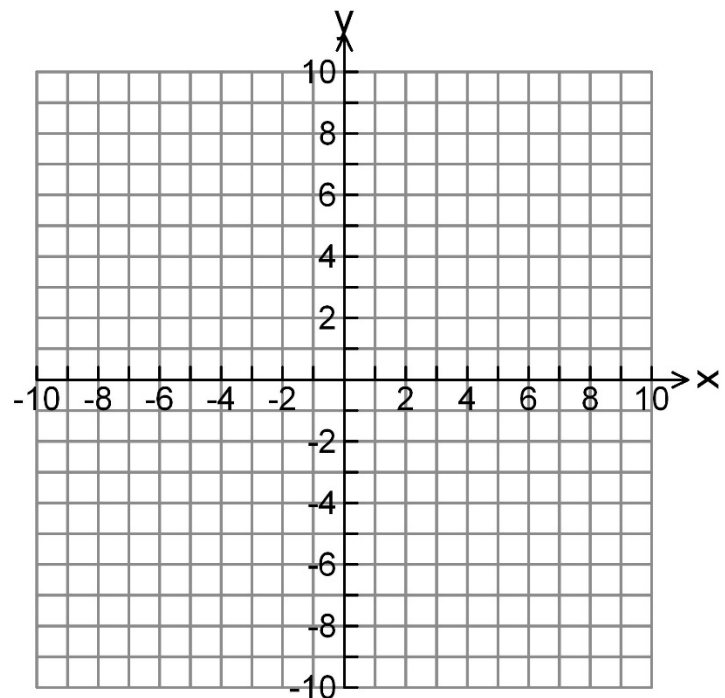


Video 2: Geometric Definition of Parabola with Vertical Axis of Symmetry, Vertex at (0,0)

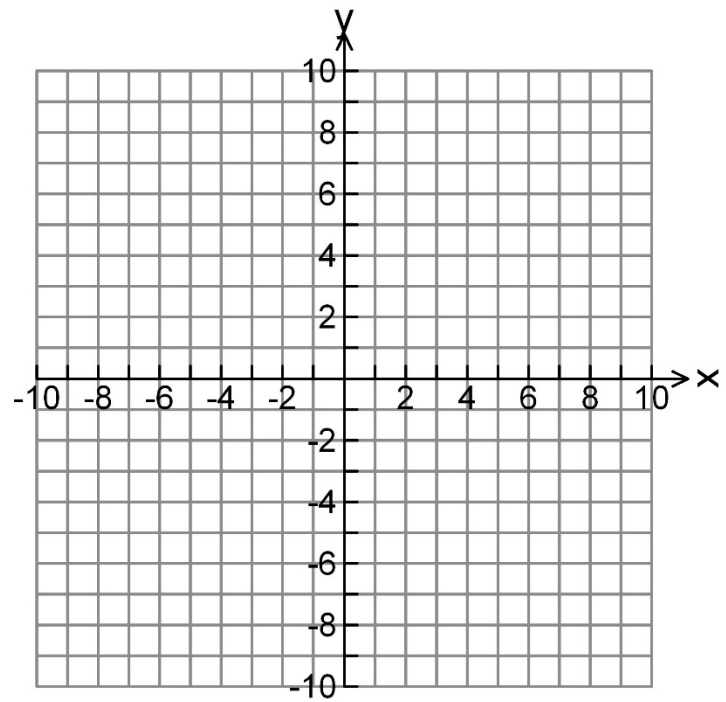
Each point on the parabola is equidistant from a fixed point (**focus**) and a fixed line (**directrix**).

The parabola with vertex $(0,0)$, focus $(0, p)$, and directrix $y = -p$ has the equation $x^2 = 4py$.

3) Graph $x^2 = 12y$.



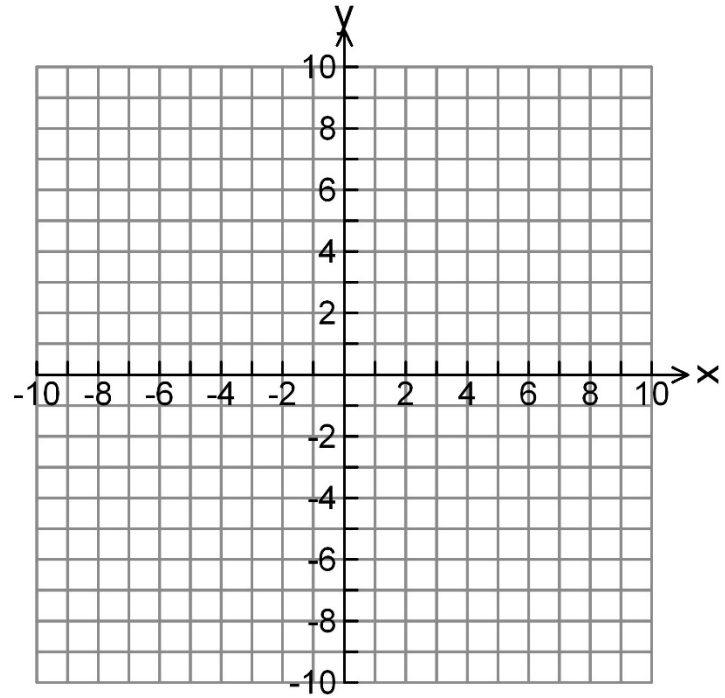
4) Graph $x^2 = -4y$



Video 3: Geometric Definition of Parabola with Horizontal Axis of Symmetry, Vertex at (0,0)

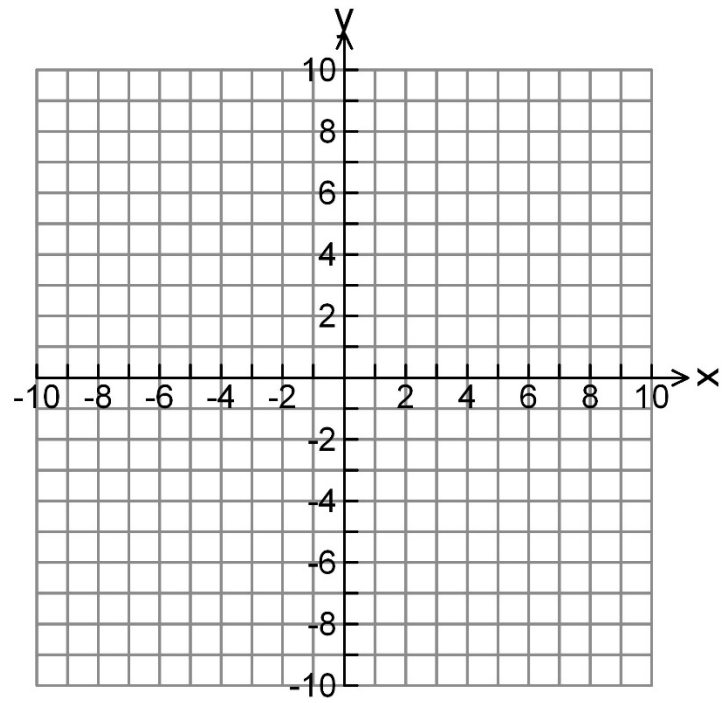
The parabola with vertex $(0,0)$, focus $(p,0)$, and directrix $x = -p$ has the equation $y^2 = 4px$.

5) Graph $y^2 = -16x$

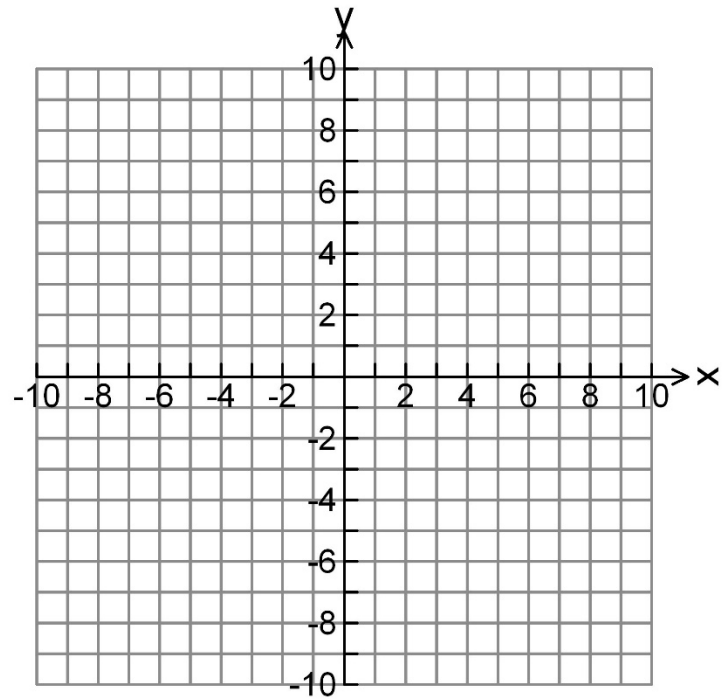


Video 4: Parabolas with Vertex at a Point Other Than (0,0).

6) Graph $(x-3)^2 = 8(y+2)$



7) Graph $(y-4)^2 = -12(x-1)$



Video 5 – Finding the Equation of a Parabola – Vertex at Origin

8) Write an equation of a parabola with vertex at the origin and focus $\left(0, \frac{5}{4}\right)$.

9) Write an equation of a parabola with vertex at the origin, a horizontal axis of symmetry that passes through $(18,3)$.

Video 6 – Finding the Equation of a Parabola – Vertex Not at Origin

10) Write an equation of a parabola with vertex $(2,3)$ and focus $(2,9)$.

11) Write an equation of a parabola with vertex $(-1,2)$ and directrix $x = -5$.

Video 7 – Parabola Applications

12) An arch in the shape of a parabola is 20 feet across the base, and 12 feet tall at its highest point.

How wide is the arch 10 feet up?

13) A radio telescope dish has a diameter of 320 feet and a maximum depth of 40 feet.

Write an equation that models the cross section of the dish if the vertex is placed at the origin and the parabola opens up.

The receiver must be placed at the focus of the parabola. How far from the vertex should the receiver be located?