Section 12-2 Parabolas

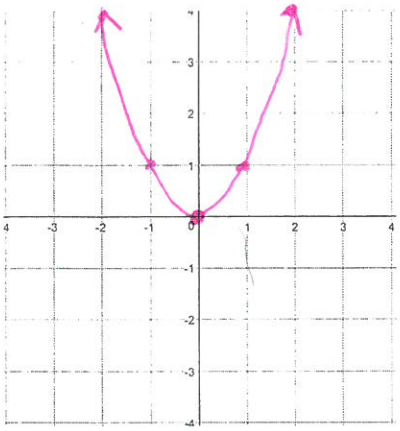
Only 1 variable is squared

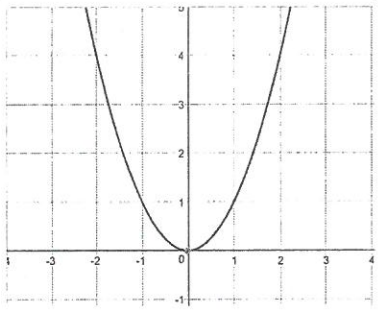
Def: the set of points equidistant from a focus and a given line (called the directrix)

**note: $e = 1$ for all parabolas

$y = x^2$

opens up if x^2 is positive, down if $-x^2$
vertex (0, 0)
--need to find another point to graph
and use line of symmetry for 3rd point



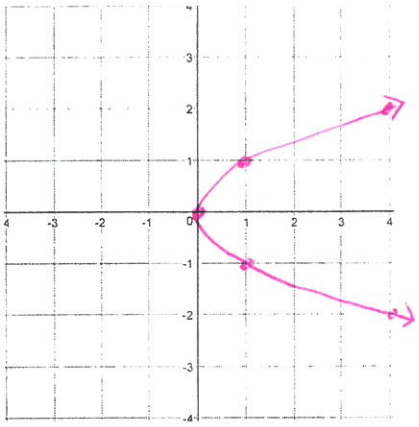


$y = \frac{1}{4p}x^2$ or $x = \frac{1}{4p}y^2$

so $a = \frac{1}{4p}$

$x = y^2$

opens right if y^2 is positive, left if $-y^2$
vertex (0, 0)
--need to find another point to graph
and use line of symmetry for 3rd point



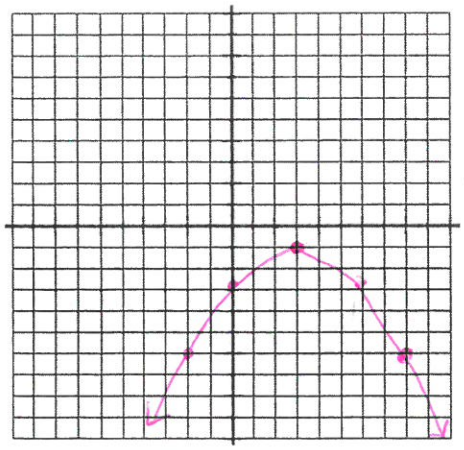
Vertex form of Parabola

$y = a(x - h)^2 + k$
vertex (h, k)

$x = a(y - k)^2 + h$
vertex (h, k)

Graph.

1. $0.2(x - 3)^2 + (y + 1) = 0$

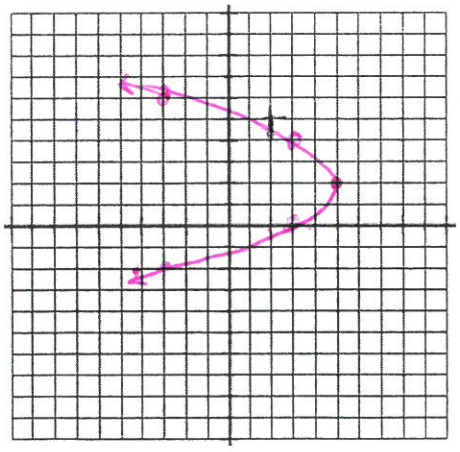


$y + 1 = -0.2(x - 3)^2$

$y = -0.2(x - 3)^2 - 1$

$V = (3, -1)$

2. $(x - 5) + 0.5(y - 2)^2 = 0$

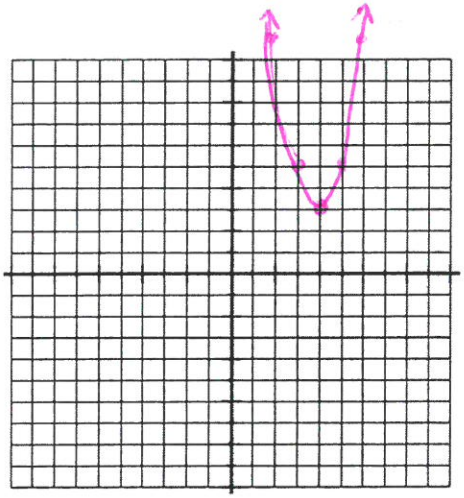


$x - 5 = -0.5(y - 2)^2$

$x = -0.5(y - 2)^2 + 5$

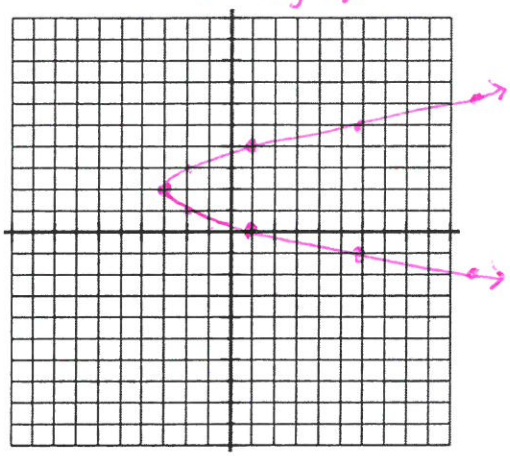
$V = (5, 2)$

3. $y = 2(x-4)^2 + 3$

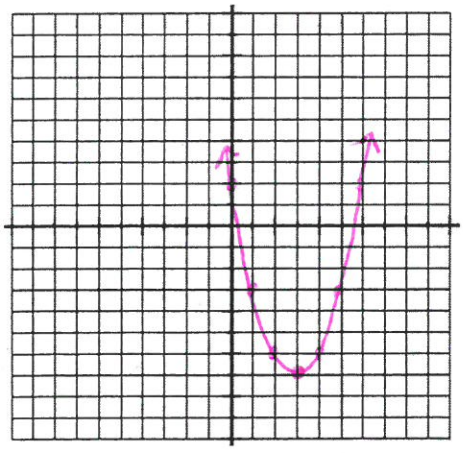


4. $x + 3 = (y-2)^2$

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



5. $y = x^2 - 6x + 2$ in form $y = ax^2 + bx + c$ vertex $\left(\frac{-b}{2a}, y\right)$



$x = \frac{6}{2(1)} = 3$

$y = (3)^2 - 6(3) + 2$

$y = -7$