Parabolas

Equations of Parabolas A parabola is a curve consisting of all points in the coordinate plane that are the same distance from a given point (the **focus**) and a given line (the **directrix**). The following chart summarizes important information about parabolas.

Standard Form of Equation	$y = a(x - h)^2 + k$	$x = a(y - k)^2 + h$
Axis of Symmetry	$x = h$	$y = k$
Vertex	(h, k)	(h, k)
Focus	$\left(h, k + \frac{1}{4a}\right)$	$\left(h + \frac{1}{4a}, k\right)$
Directrix	$y = k - \frac{1}{4a}$	$x = h - \frac{1}{4a}$
Direction of Opening	upward if $a > 0$, downward if $a < 0$	right if $a > 0$, left if $a < 0$

1) Vertex at origin, Focus: $\left(0, -\frac{1}{32}\right)$

2) Vertex at origin, Focus: $\left(0, \frac{1}{8}\right)$

3) Vertex at origin, Directrix: $y = \frac{1}{4}$

4) Vertex at origin, Directrix: $y = -\frac{1}{8}$

5) Vertex: $(-5, 8)$, Focus: $\left(-\frac{21}{4}, 8\right)$

6) Vertex: $(-8, -9)$, Focus: $\left(-\frac{31}{4}, -9\right)$

7) Vertex: $(-6, -9)$, Directrix: $x = -\frac{47}{8}$

8) Vertex: $(8, 9)$, Directrix: $y = \frac{73}{8}$

9) Vertex: $(8, -1)$, y-intercept: -17

10) Vertex: $(5, -1)$, y-intercept: $-\frac{27}{2}$

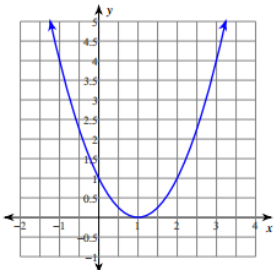
11) Opens left or right, Vertex: $(7, 6)$, Passes through: $(-11, 9)$

12) Opens left or right, Vertex: $(7, 0)$, Passes through: $(6, -1)$

15) Opens up or down, and passes through $(-6, -7)$, $(-11, -2)$, and $(-8, 1)$

16) Opens up or down, and passes through $(11, 15)$, $(7, 7)$, and $(4, 22)$

17)



18)