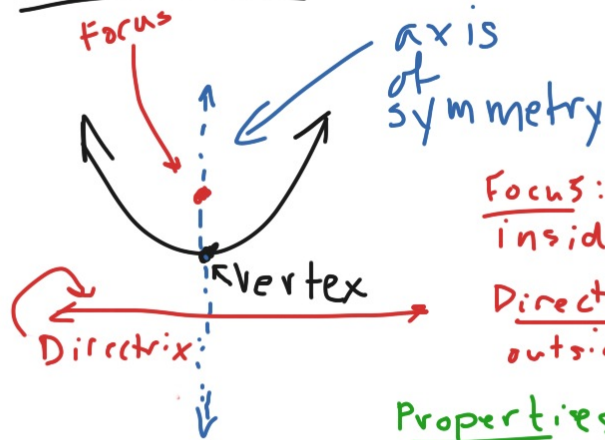


Parabolas



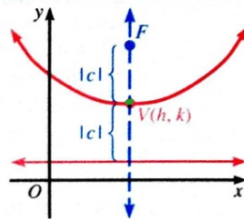
Focus: Point on inside of parabola
Directrix: Line on outside of parabola.

Properties: Any point on the parabola is the same distance away from the focus and the directrix.

The parabola whose equation is

$$y - k = a(x - h)^2, \text{ where } a = \frac{1}{4c}, \quad c = \frac{1}{4a}$$

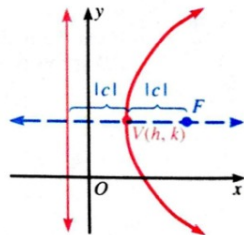
- opens upward if $a > 0$, downward if $a < 0$;
- has vertex $V(h, k)$,
- focus $F(h, k + c)$,
- directrix $y = k - c$,
- and axis of symmetry $x = h$.



The parabola whose equation is

$$x - h = a(y - k)^2, \text{ where } a = \frac{1}{4c}, \quad c = \frac{1}{4a}$$

- opens to the right if $a > 0$, to the left if $a < 0$;
- has vertex $V(h, k)$,
- focus $F(h + c, k)$,
- directrix $x = h - c$,
- and axis of symmetry $y = k$.



Ex 1 Find the vertex, focus, directrix, and axis of symmetry of the parabola, then graph.

$$x^2 - 6x - 4y + 5 = 0$$

complete the square for x or y



get into $y - k = a(x - h)^2$ form

$(x - \quad)^2 = \quad$

or $x - h = a(y - k)^2$



Find vertex, C, Focus, directrix, and ax of sym.



Graph