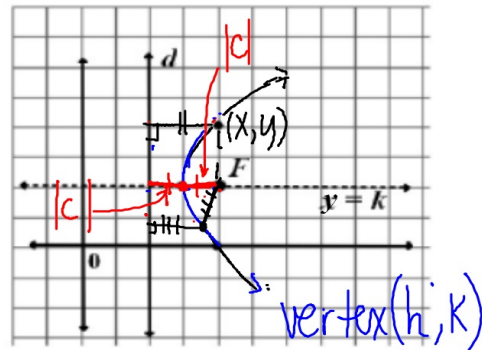
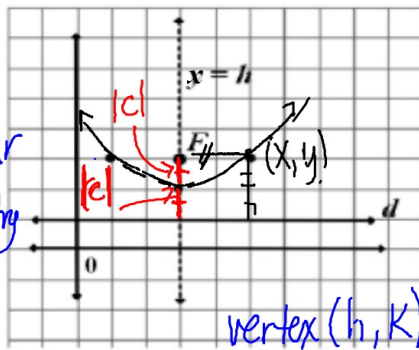


Definition of Parabola: A parabola is the set of points in a plane equidistant from a fixed point (focus) and a fixed line (directrix).

d = directrix
 F = focus

directrix is perpendicular to axis of symmetry



| | | |
|---|--|--|
| Equation in vertex form | $y = a(x-h)^2 + k$ | $x = a(y-k)^2 + h$ |
| Axis of symmetry | $x = h$ | $y = k$ |
| Direction of opening | $a > 0 \curvearrowright$ $a < 0 \curvearrowleft$ | $a > 0 \curvearrowright$ $a < 0 \curvearrowleft$ |
| $ c $ = distance from vertex to directrix and distance from vertex to focus; $c = \frac{1}{4a}$ | | |

1 $4x = y^2 + 8$ vertex form

$x = \frac{1}{4}(y-0)^2 + 2$ form

vertex (2,0) axis of symmetry $y=0$

$C = \frac{1}{4 \cdot 1} = \frac{1}{4}$ Focus (3,0)

$C = 1$ directrix $x=1$

$x=1$

$F(3,0)$

$y=0$

| x | y |
|---|----|
| 3 | 2 |
| 3 | -2 |

2 $x^2 - 6x - y + 10 = 0$ CTS

$x^2 - 6x + 9 = y - 10 + 9$

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

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

vertex (3,1) axis $x=3$

$F(3, \frac{1}{4})$

$y = \frac{3}{4}$

$C = \frac{1}{4 \cdot 1} = \frac{1}{4}$

x | y

| | |
|---|---|
| 4 | 2 |
| 2 | 2 |

3 $y^2 + 4y + 8x - 4 = 0$

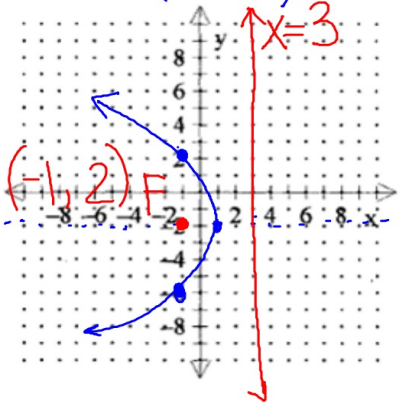
$$y^2 + 4y + 4 = -8x + 4 + 4$$

$$(y+2)^2 = -8x + 8$$

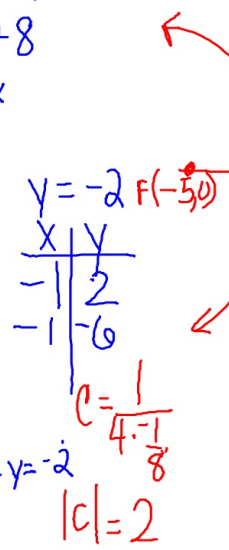
$$(y+2)^2 - 8 = -8x$$

$$-\frac{1}{8}(y+2)^2 + 1 = x$$

axis $V(1, -2)$



4 Write the equation of a parabola with vertex (0, 0) and directrix $x = 5$.



$$c = \frac{1}{4a}$$

$$5 = \frac{1}{4a}$$

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

$$x = \frac{1}{20}(y-0)^2 + 0$$

$$x = \frac{1}{20}y^2$$