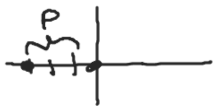
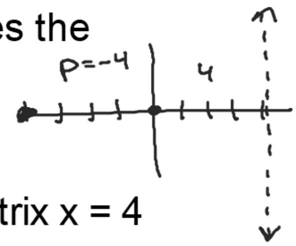
Find an equation in standard form for the parabola that satisfies the given conditions.





Vertex (0, 0), Focus (-3, 0)

$y^2 = 4px$ $\quad p=-3$

$4p=-12$

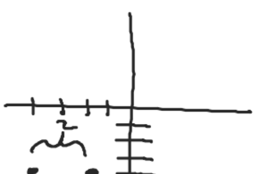
$y^2=-12x$

Vertex (0, 0), directrix x = 4

$y^2=-16x$ $\quad p=-4$

$4p=-16$

Focus (-2, -4), vertex $(\overset{h}{-4},\overset{k}{-4})$



$p=2$

$4p=8$

$(y+4)^2=8(x+4)$

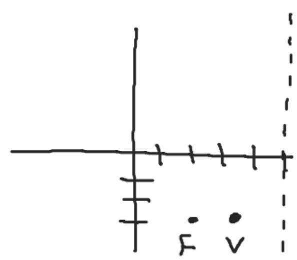
Focus (2, -3), directrix x = 5

$V\left(\frac{7}{2},-3\right)$

$p=-\frac{3}{2}$

$4p=\left(-\frac{3}{2}\right)(4)$

$=-6$



$(y+3)^2=-6\left(x-\frac{7}{2}\right)$

Find an equation in standard form for the parabola that satisfies the given conditions.

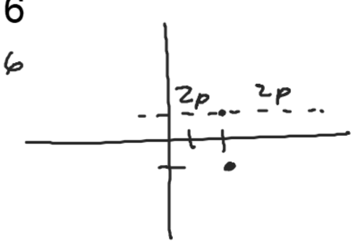
Vertx (2, -1), opens upward, length of the latus rectum = 16

h k

$(x-h)^2=4p(y-k)$

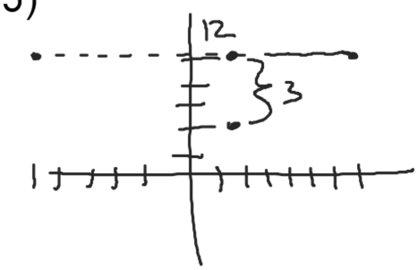
$(x-2)^2=16(y+1)$

$4p=16$



Vertex (1, 2), Endpoints of the latus rectum (-5,5), (7,5)

$(x-1)^2=12(y-2)$



Sketch a graph. Include the vertex, axis of symetry, focus, directrix, and the endpoints of the latus rectum.

Opens Right

$$y^2 = 4x$$

V (0,0)

4p = 4

p = 1

F (1,0)

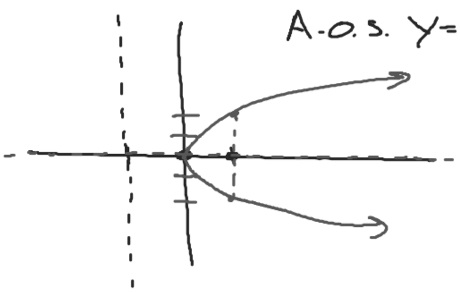
Directrix

x = -1

A.O.S. y = 0

Endpts

(1,2) (1,-2)



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

V(-4,-1)

4p = -12

p = -3

F (-4,-4)

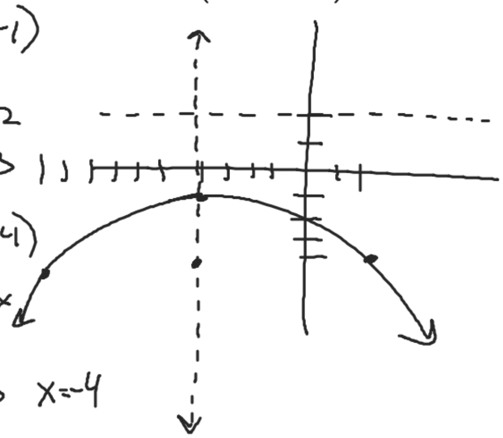
Directrix

y = 2

A.O.S x = -4

Endpt

(2,-4) (-10,-4)



Sketch a graph. Include the vertex, axis of symetry, focus, directrix, and the endpoints of the latus rectum.

$$(y-1)^2 = 8(x+3)$$

$V(-3,1)$

$4p=8$

$p=2$

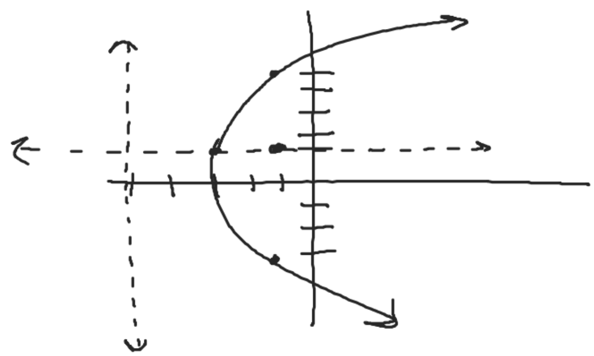
$F(-1,1)$

Directrix $x=-5$

A.O.S $y=1$

Endpt

$(-1,5)$ $(-1,-3)$



Sketch a graph. Include the vertex, axis of symetry, focus, directrix, and the endpoints of the latus rectum.

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

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

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

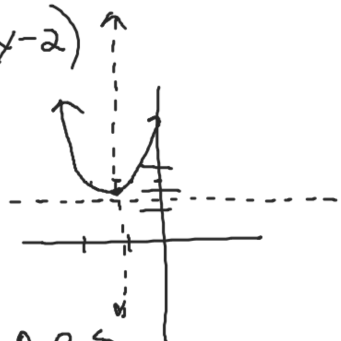
$(x+1)^2 = 1(y-2)$

$V(-1, 2)$

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

$F(-1, 2\frac{1}{4})$

Directrix $y = 1^3/4$



A.O.S $x = -1$

Endpts Latus

$(-\frac{1}{2}, 2^1/4)$ $(-1^1/2, 2^1/4)$

$$y^2 - 2y + 4x - 12 = 0$$

$y^2 - 2y + 1 = -4x + 12 + 1$

$(y-1)^2 = -4x + 13$

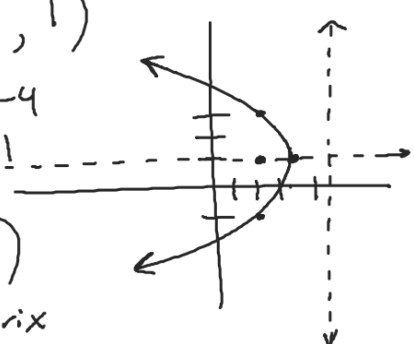
$(y-1)^2 = -4\left(x - \frac{13}{4}\right)$

$V\left(\frac{13}{4}, 1\right)$

$4p = -4$

$p = -1$

$F(\frac{9}{4}, 1)$



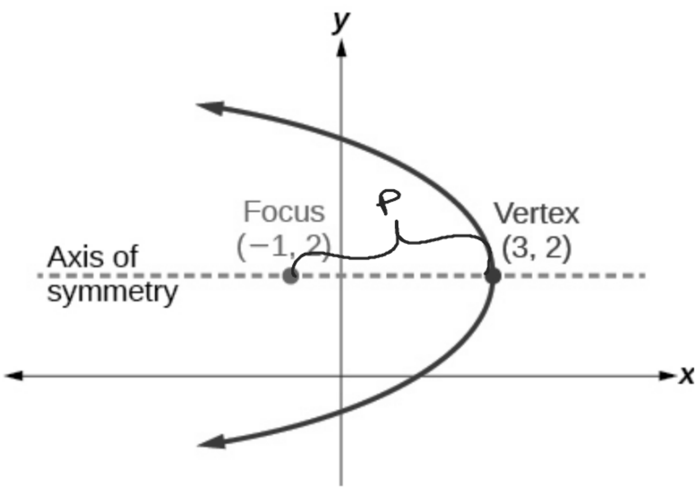
Directrix $x = \frac{17}{4}$

A.O.S $y = 1$

Endpts

$(\frac{9}{4}, 3)$ $(\frac{9}{4}, -1)$

Write the equation for the parabola



$h = 3 \quad k = 2$

$p = -4$

$4p = -16$

$(y-2)^2 = -16(x-3)$

Solving Applied Problems Involving Parabolas

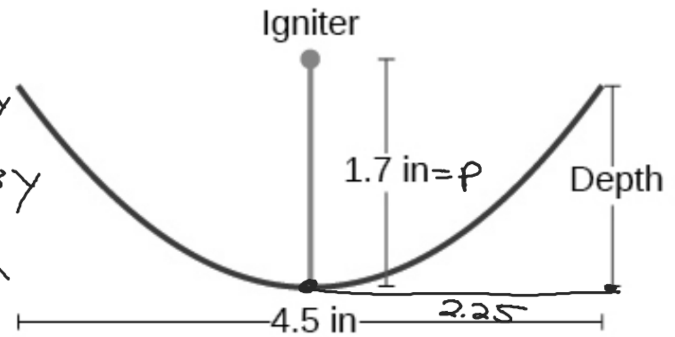
A cross-section of a design for a travel-sized solar fire starter is shown in Figure 13. The sun's rays reflect off the parabolic mirror toward an object attached to the igniter. Because the igniter is located at the focus of the parabola, the reflected rays cause the object to burn in just seconds.

- ⓐ Find the equation of the parabola that models the fire starter. Assume that the vertex of the parabolic mirror is the origin of the coordinate plane.
- ⓑ Use the equation found in part ⓐ to find the depth of the fire starter.

a) $x^2 = 6.8y$

$p = 1.7$

$4p = 6.8$

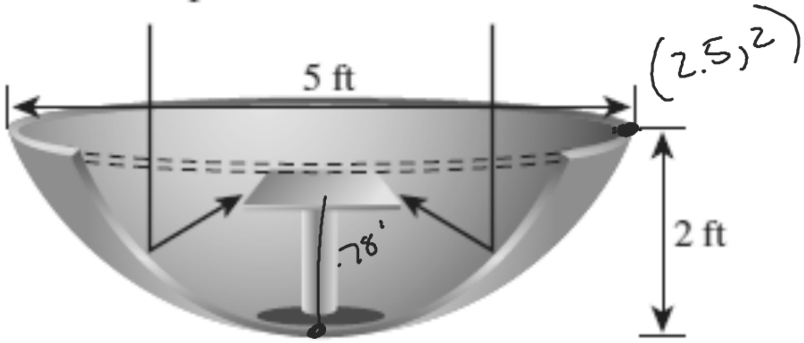


b) $(2.25)^2 = 6.8y$

$5.0625 = 6.8y$

$y = 0.744$ in

. **Designing a Satellite Dish** The reflector of a television satellite dish is a paraboloid of revolution with diameter 5 ft and a depth of 2 ft. How far from the vertex should the receiving antenna be placed?



$x^2 = 4py$

$(2.5)^2 = 4p(2)$

$6.25 = 8p$

$\frac{6.25}{8} = p$

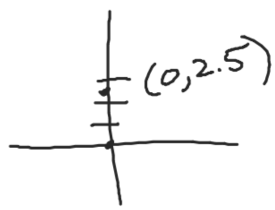
$p = .78 \text{ ft}$

Parabolic Microphones The Sports Channel uses a parabolic microphone to capture all the sounds from golf tournaments throughout a season. If one of its microphones has a parabolic surface generated by the parabola $x^2 = 10y$, locate the focus (the electronic receiver) of the parabola.

$V(0,0)$

$4p=10$

$p = \frac{5}{2} = 2.5$



Graph the hyperbola. Lable the center, vertices, co-vertices, foci, and asymptotes.

$$\frac{x^2}{25} - \frac{y^2}{144} = 1$$

$$\frac{(y-2)^2}{16} - \frac{(x+1)^2}{9} = 1$$

Center $(0,0)$

$a = 5$ Vert $(5,0)$ $(-5,0)$

$b = 12$ Co-Vert $(0,-12)$ $(0,12)$

$c = 13$ Foci $(13,0)$ $(-13,0)$

$y = \pm \frac{12}{5}$