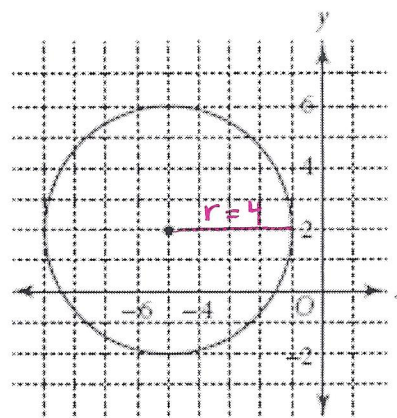1. Write the standard equation for the circle graphed below.

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

center $(-5, -2)$ $r = 4$

$$(x+5)^2 + (y+2) = 16$$

2. Write the standard equation of a circle with the given radius and center. $r = 2.5$; $C(-2, 1)$
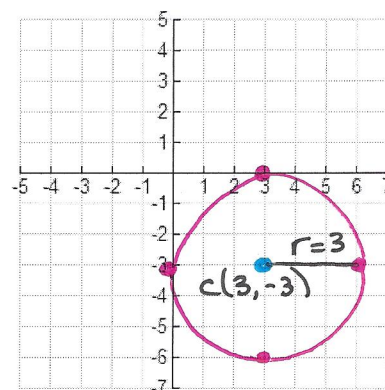 h k

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

$$(x+2)^2 + (y-1)^2 = 6.25$$

3. Graph the equation. Label the center and radius. $(x-3)^2 + (y+3)^2 = 9$
    h k

center $(3, -3)$

$r = 3$

4. Write the standard equation for the circle. Then state the coordinates of its center and give its radius.
   $x^2 + y^2 - 10x - 16y + 88 = 0$

$$x^2 - 10x + \underline{25} + y^2 - 16y + \underline{64} = -88 + \underline{25} + \underline{64}$$

$$(x-5)^2 + (y-8)^2 = 1 \longrightarrow \text{center } (5, 8)\ r = 1$$

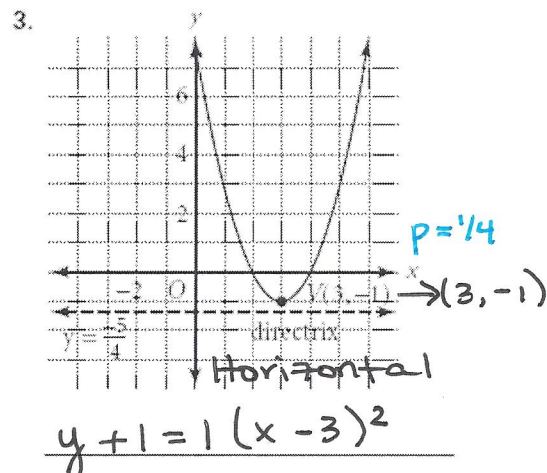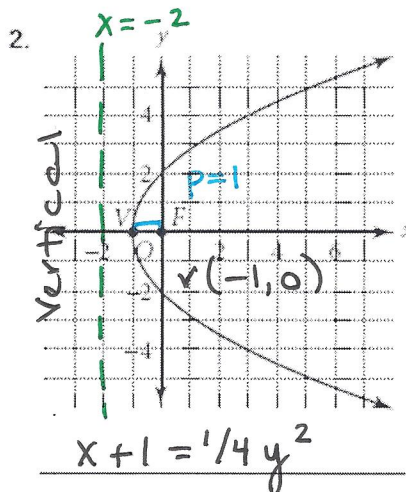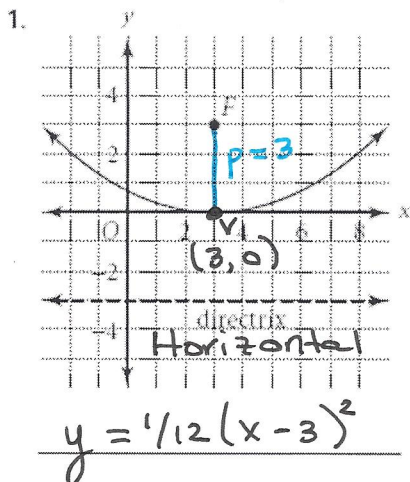5. Write the standard equation of the circle with a diameter with endpoints (-2, -3) and (-1, 5).

center $\left(\dfrac{-2+(-1)}{2}, \dfrac{-3+5}{2}\right) = \left(-\dfrac{3}{2}, 1\right)$
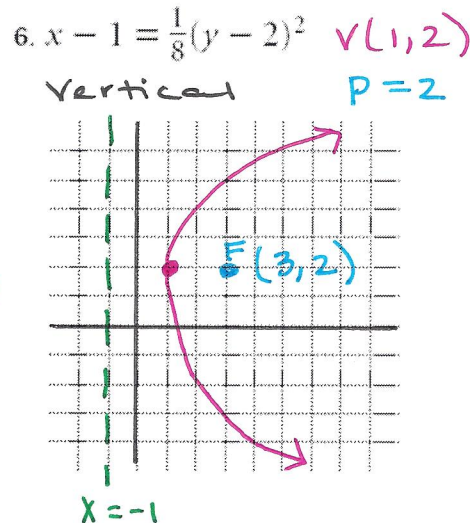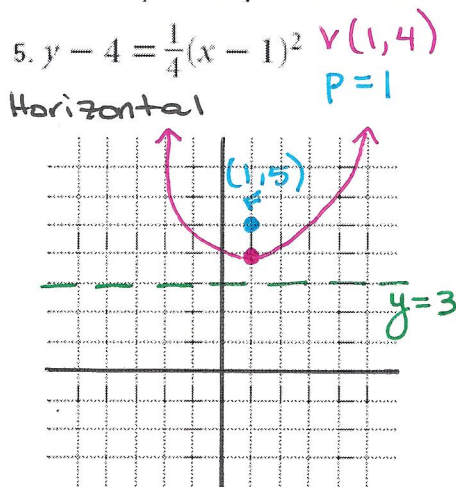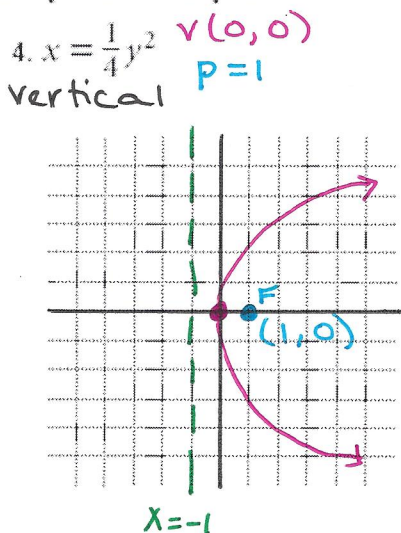$$ h k

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

$$(x+\tfrac{3}{2})^2 + (y-1)^2 = \dfrac{65}{4}$$

$r = \dfrac{\sqrt{(-2-(-1))^2 + (-3-5)^2}}{2} = \dfrac{\sqrt{65}}{2}$

Write the standard equation for each parabola graphed below.

1.

$P=3$

V

$(3,0)$

directrix

Horizontal

$$y = \frac{1}{12}(x-3)^2$$

2.

$x=-2$

Vertical

$P=1$

V F

$r(-1,0)$

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

3.

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

$V(3,-1)$ → $(3,-1)$

$y=\frac{-5}{4}$

directrix

Horizontal

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

Graph each equation. Label the vertex, focus, and directrix.

4. $x = \frac{1}{4}y^2$ $V(0,0)$

vertical $P=1$

F
$(1,0)$

$x=-1$

5. $y - 4 = \frac{1}{4}(x-1)^2$ $V(1,4)$

Horizontal $P=1$

$(1,5)$
F

$y=3$

6. $x - 1 = \frac{1}{8}(y-2)^2$ $V(1,2)$

Vertical $P=2$

$F(3,2)$

$x=-1$

Write the standard equation for the parabola with the given characteristics.

H 7. vertex: $(0,0)$; focus: $(0,6)$ $P=6$ $y = \frac{1}{24}x^2$

V 8. vertex: $(10, 0)$; directrix: $x = 8$ $P=2$ $x-10 = \frac{1}{8}y^2$

V 9. focus: $(3, 0)$; directrix: $x = -3$ $P=3$ $V(0,0)$ $x = \frac{1}{12}y^2$

H 10. vertex: $(5, 2)$; directrix: $y = 1$ $P=1$ $y-2 = \frac{1}{4}(x-5)^2$

V 11. vertex: $(6, -7)$; focus: $(4, -7)$ $P=-2$ $x-6 = \frac{-1}{8}(y+7)^2$

H 12. focus: $(9, 5)$; directrix: $y = -5$ $y = \frac{1}{20}(x-9)^2$
      $V(9,0)$ $P=5$

**#7-12 use a graph to help you
see it ☺