Name: Key. Date: ______ Block: ______ # ___

10.2 – 10.5 Review
Station #1

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

1. The point (4,–5) is on a circle whose center is the origin. Write the standard form of the equation of the circle.

Pt $(4,-5)$ (x, y)
c $(0,0)$ (h, k)

$(4-0)^2+(-5-0)^2=r^2$
$(4)^2+(-5)^2=r^2$
$16+25=r^2$
$41=r^2$

$\boxed{x^2+y^2=41}$

2. Write the equation of a circle with center (–6,5) and radius 4.

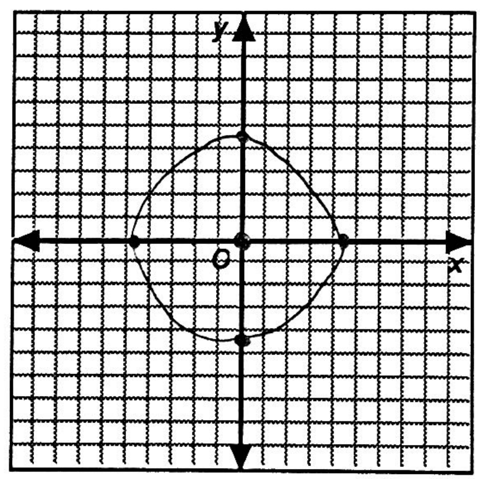
c $(-6,5)$ (h, k)
$r=4$

$\boxed{(x+6)^2+(y-5)^2=16}$

3. Determine the center and radius of the circle. Then sketch the graph of $x^2+y^2=20$.

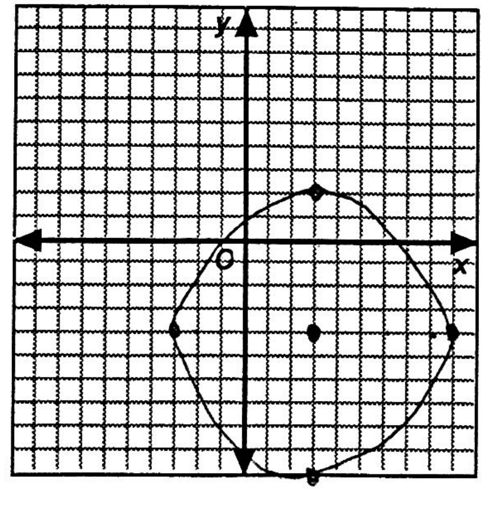
$x^2+y^2=20$
$\sqrt{r^2}=\sqrt{20}$
$r=2\sqrt{5}\approx 4.5$

Center $(0,0)$
$r=2\sqrt{5}$ or ≈ 4.5



4. Determine the center and radius of the circle. Then sketch the graph of $(x-3)^2+(y+4)^2=36$

Ctr $(3,-4)$
$r=6$



$y = \frac{1}{4c}(x-h)^2 + k$ Vertical

$a = \frac{1}{4c}$ Focus $(0, c)$

Directrix: $y = -c$

$x = \frac{1}{4c}(y-k)^2 + h$ Horizontal

$a = \frac{1}{4c}$ Focus: $(c, 0)$

directrix: $x = -c$

Station #2

1. Sketch the graph of the parabola: $y = -\frac{1}{8}x^2$ State the coordinates of the focus and the equation of the directrix.

Vertical

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

$-\frac{1}{8} = \frac{1}{4c}$

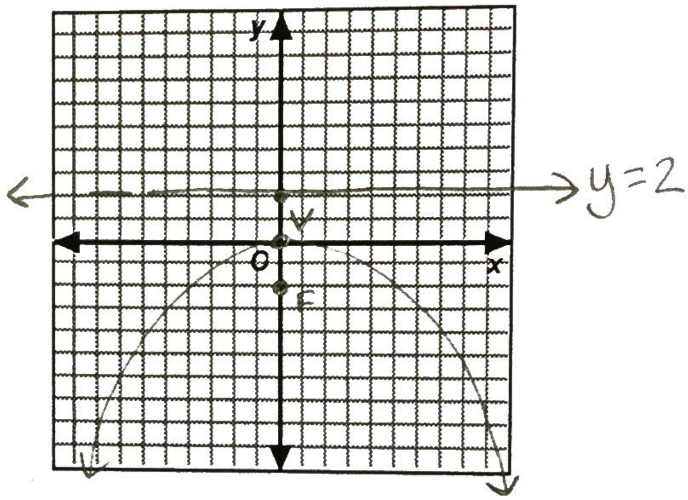
$\frac{-4c}{-4} = \frac{8}{-4}$

$c = -2$

Focus $(0, -2)$

Directrix $y = 2$

Vertex $(0, 0)$



2. Sketch the graph of the parabola: $x = 2y^2$ State the coordinates of the focus and the equation of the directrix.

horizontal

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

$\frac{2}{1} = \frac{1}{4c}$

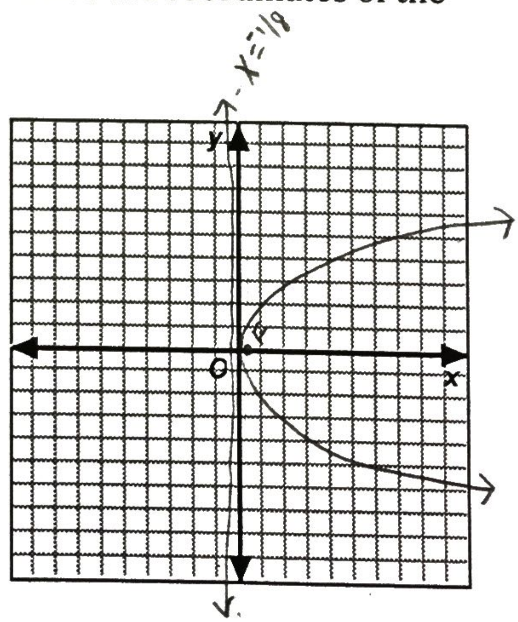
$\frac{8c}{8} = \frac{1}{8}$

$c = 1/8$

Focus $(1/8, 0)$

Directrix $x = -1/8$

Vertex $(0, 0)$



Station #3

1. Write the standard form of the equation of a parabola with the focus $\left(0,\frac{1}{4}\right)$ and vertex at (0,0).

$C = 1/4$

$\boxed{y = 1x^2}$

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

$a = \frac{1}{4(\frac{1}{4})}$

$a = 1$

2. Write the standard form of a parabola with directrix $x=-3$ and vertex at the origin.

(0, 0)

$C = 3$

$a = \frac{1}{4(3)}$

$\boxed{x = \frac{1}{12}y^2}$

$a = \frac{1}{12}$

3. Determine the equation of the directrix of the parabola: $y=-8x^2$

a

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

$\frac{-8}{1} = \frac{1}{4c}$

$\boxed{\text{directrix } y = 1/32}$

$\frac{-32c}{-32} = \frac{1}{-32}$ $\quad c = -1/32$

4. Determine the coordinates of the focus of the parabola: $x=-\frac{1}{2}y^2$

a

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

$\boxed{\text{Focus}(-1/2, 0)}$

$-1/2 = \frac{1}{4c}$

$\frac{-4c}{-4} = \frac{2}{-4}$

$c = -1/2$

$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ horizontal
$V(\pm a, 0)$
$CV(0, \pm b)$
$F(\pm c, 0)$

Station #4

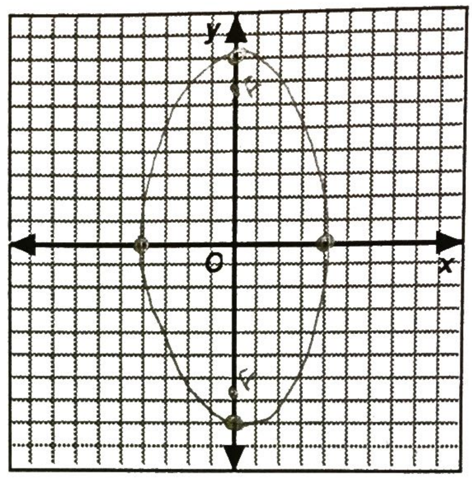
$c^2 = a^2 - b^2$

$\frac{x^2}{b^2} + \frac{y^2}{a^2} = 1$ vertical
$V(0, \pm a)$
$CV(\pm b, 0)$
$F(0, \pm c)$

1. Sketch the graph of the ellipse: $\frac{x^2}{16}+\frac{y^2}{64}=1$. State the coordinates of the vertices, co-vertices, and foci.

Vertices $(0, \pm 8)$
CV $(\pm 4, 0)$
Foci $(0, \pm 4\sqrt{3})$

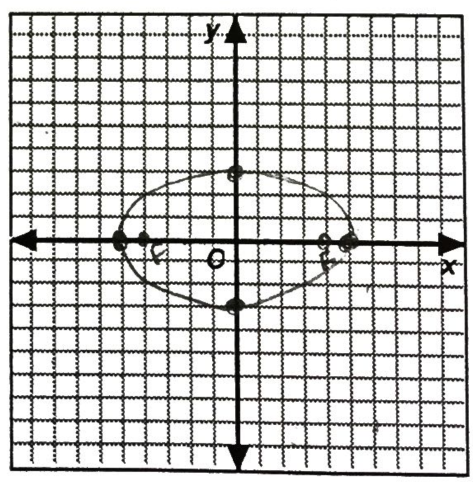
$c^2 = a^2 - b^2$
$c^2 = 64 - 16$
$c^2 = 48$
$c = \pm 4\sqrt{3} \approx 6.9$



2. Sketch the graph of the ellipse: $\frac{x^2}{25}+\frac{y^2}{9}=1$. State the coordinates of the vertices, co-vertices, and foci.

Vertices $(\pm 5, 0)$
CV $(0, \pm 3)$
Foci $(\pm 4, 0)$

$c^2 = a^2 - b^2$
$c^2 = 25 - 9$
$c^2 = 16$
$c = \pm 4$



Station #5

1. Write an equation of an ellipse with center at $(0,0)$, vertices at $(\pm 9,0)$, and co-vertices at $(0,\pm 6)$.

$C(0,0)$
$V(\pm 9,0)$
$CV(0,\pm 6)$

$$\boxed{\frac{x^2}{81}+\frac{y^2}{36}=1}$$

2. Write an equation of an ellipse with center at $(0,0)$, vertices at $(0,\pm 8)$, and foci at $(0,\pm 5)$.

$C(0,0)$
$V(0,\pm 8)$
$F(0,\pm 5)$

$$\boxed{\frac{x^2}{39}+\frac{y^2}{64}=1}$$

F V CV

$c^2=a^2-b^2$

$25=64-b^2$
$-64 \quad -64$
$-39=-b^2$

$b^2=39$

3. Write an equation of an ellipse with center at $(0,0)$, co-vertices at $(0,\pm 4)$, and foci at $(\pm 10,0)$.

$C(0,0)$
$CV(0,\pm 4)$
$F(\pm 10,0)$

$$\boxed{\frac{x^2}{116}+\frac{y^2}{16}=1}$$

F V CV

$c^2=a^2-b^2$

$100=a^2-16$
$+16 \quad +16$
$116=a^2$

$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ horizontal $V(\pm a, 0)$ $F(\pm c, 0)$ Asym $y = \pm \frac{b}{a}x$

$\frac{y^2}{a^2} - \frac{x^2}{b^2} = 1$ Vertical $V(0, \pm a)$ $F(0, \pm c)$ Asym $y = \pm \frac{a}{b}x$

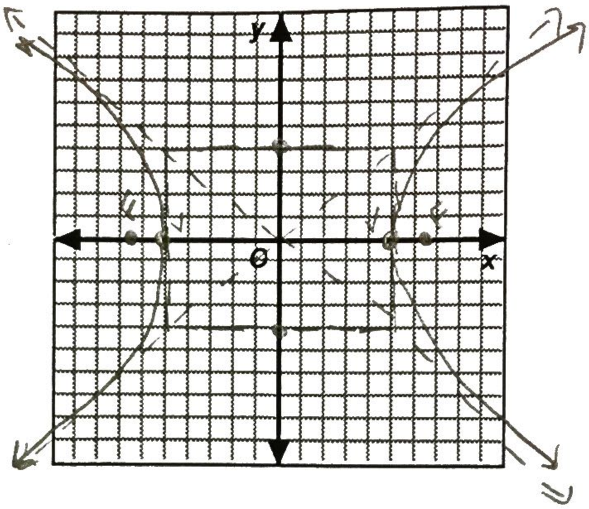
Station #6

$c^2 = a^2 + b^2$

Sketch the graph of the hyperbola: $\frac{x^2}{25} - \frac{y^2}{16} = 1$. State the coordinates of the vertices, and foci.

Vertices $(\pm 5, 0)$
Foci $(\pm\sqrt{41}, 0)$

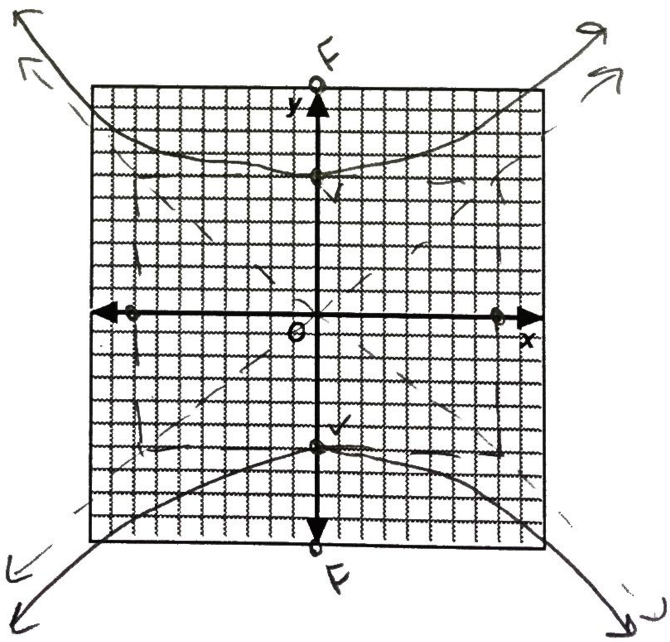
$c^2 = a^2 + b^2$
$c^2 = 25 + 16$
$c^2 = 41$
$c = \pm\sqrt{41} \approx 6.4$



2. Sketch the graph of the hyperbola: $\frac{y^2}{36} - \frac{x^2}{64} = 1$. State the coordinates of the vertices, and foci.

Vertices $(0, \pm 6)$
Foci $(0, \pm 10)$

$c^2 = a^2 + b^2$
$c^2 = 64 + 36$
$c^2 = 100$
$c = \pm 10$



Station #7

1. Write an equation of a hyperbola with center at $(0,0)$, vertices at $(\pm3,0)$, and foci at $(\pm5,0)$.

$C(0,0)$

$V(\pm3,0)$

$F(\pm5,0)$

$$\boxed{\frac{x^2}{9} - \frac{y^2}{16} = 1}$$

$$c^2 = a^2 + b^2$$

$$25 = 9 + b^2$$

$$-9 \quad -9$$

$$b^2 = 16$$

2. Write an equation of a hyperbola with center at $(0,0)$, vertices at $(0,\pm3)$, and foci at $(0,\pm7)$.

$C(0,0)$

$V(0,\pm3)$

$F(0,\pm7)$

$$\boxed{\frac{y^2}{9} - \frac{x^2}{40} = 1}$$

$$c^2 = a^2 + b^2$$

$$49 = 9 + b^2$$

$$-9 \quad -9$$

$$40 = b^2$$