Name Key Per. ____ Date_________ Score ______

Conics Worksheet (Circles, Parabolas, Hyperbolas, and Ellipses)

Graph the conic. Identify the important characteristics.

1. $(y-1)^2 = -12x$ Left Parabola

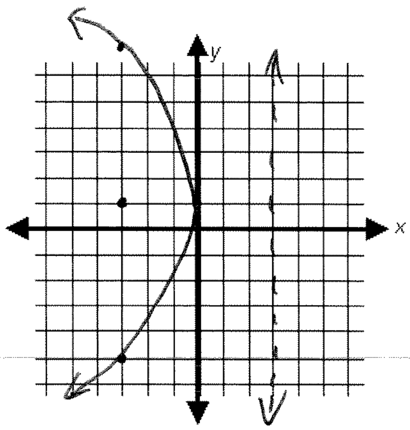
$-12 = 4p$

$p = -3$

vertex: $(0,1)$

Focus: $(-3,1)$

Directrix: $x=3$



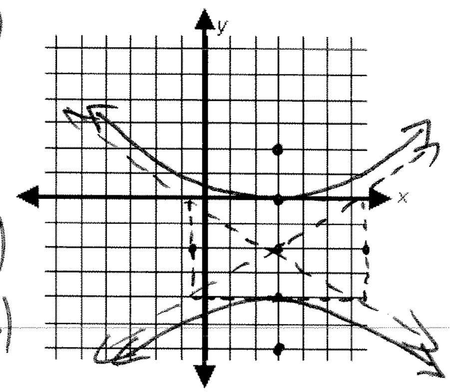
2. $\dfrac{(y+2)^2}{4} - \dfrac{(x-3)^2}{12} = 1$ vertical Hyperbola

Center: $(3,-2)$

Vertices: $(3,0)$, $(3,-4)$

Asymptotes: $y+2 = \pm\frac{\sqrt{3}}{3}(x-3)$

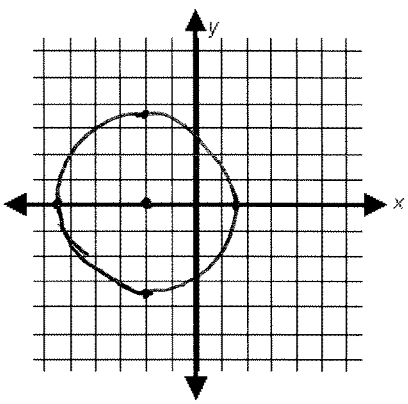
Foci: $(3,2), (3,-6)$



3. $(x+2)^2 + y^2 = 13$

Center: $(-2,0)$

Radius: $\sqrt{13}$



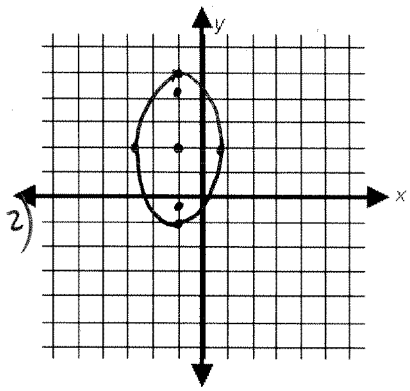
4. $\dfrac{(x+1)^2}{3} + \dfrac{(y-2)^2}{9} = 1$

center: $(-1,2)$

vertices: $(-1,-1)$, $(-1,5)$

Co-Vertices: $(-1\pm\sqrt{3}, 2)$

Foci: $(-1, 2\pm\sqrt{6})$

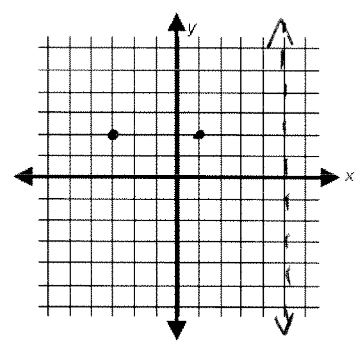


5. Parabola with focus at (-3, 2) and directrix at $x = 5$.

$p=-4 \quad h=1 \quad k=2$

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

$\boxed{(y-2)^2 = -16(x-1)}$



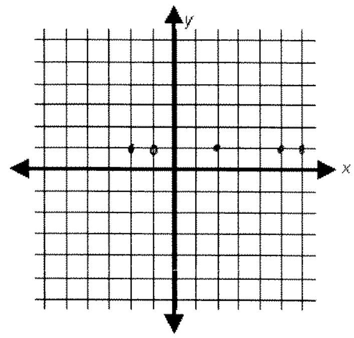
6. Hyperbola with vertices (-1, 1) and (5, 1) and foci (-2, 1) and (6, 1).

$h=2 \quad k=1 \qquad a=3 \quad b=? \quad c=4$

$\dfrac{(x-h)^2}{a^2}-\dfrac{(y-k)^2}{b^2}=1$

$a^2+b^2=c^2$
$9+b^2=16$
$b^2=7$
$b=\sqrt{7}$

$\boxed{\dfrac{(x-2)^2}{9}-\dfrac{(y-1)^2}{7}=1}$



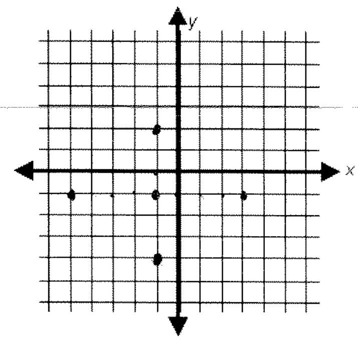
7. Ellipse with foci (–1, –4), (–1, 2) and minor axis of length 8.

$h=-1 \quad k=-1 \qquad a=? \quad b=4 \quad c=3$

$\dfrac{(x-h)^2}{b^2}+\dfrac{(y-k)^2}{a^2}=1$

$a^2-b^2=c^2$
$a^2-16=9$
$a^2=25$
$a=5$

$\boxed{\dfrac{(x+1)^2}{16}+\dfrac{(y+1)^2}{25}=1}$



Identify the conic, write the equation of the conic in standard form and graph.

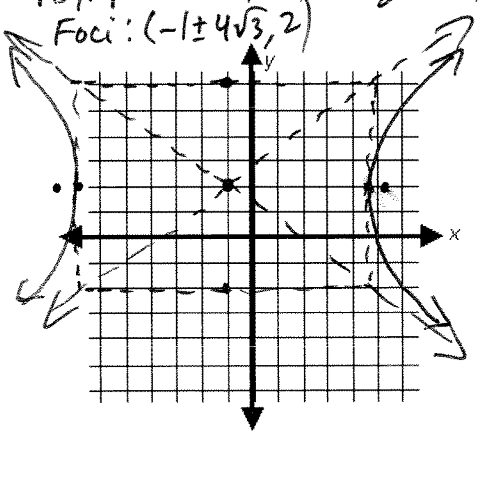
8. $-2x^2+4y^2-4x-16y+78=0$ $\boxed{\text{Hyperbola}}$

$-2(x^2+2x+\underline{1})+4(y^2-4y+\underline{4})=-78-2+16$

$-2(x+1)^2+4(y-2)^2=-64$

$\boxed{\dfrac{(x+1)^2}{32}-\dfrac{(y-2)^2}{16}=1}$

$c=\sqrt{48}=4\sqrt{3}$
center: $(-1,2)$
vertices: $(-1\pm4\sqrt{2},2)$
Asymptotes: $y-2=\pm\frac{\sqrt{2}}{2}(x+1)$
Foci: $(-1\pm4\sqrt{3},2)$



9. $3x^2+2y^2-12x-4y-10=0$ $\boxed{\text{Ellipse}}$

$3(x^2-4x+\underline{4})+2(y^2-2y+\underline{1})=10+12+1$

$3(x-2)^2+2(y-1)^2=24$

$\boxed{\dfrac{(x-2)^2}{8}+\dfrac{(y-1)^2}{12}=1}$

$c=\sqrt{4}=2$
center: $(2,1)$
vertices: $(2,1\pm2\sqrt{3})$
co-vertices: $(2\pm2\sqrt{2},1)$
Foci: $(2,3),(2,-1)$