Pre-Calculus: Ch#10 Review

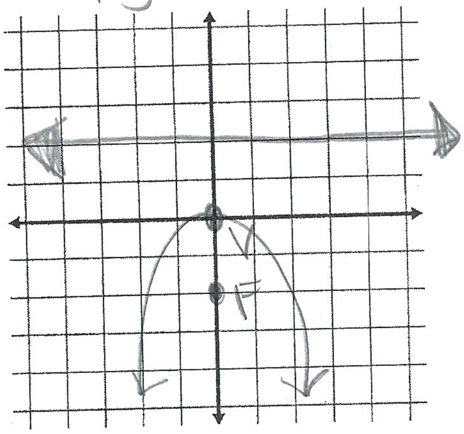
Name Answer key (1)

Period# ____

1. Find the vertex, focus and directrix of the parabola. Then sketch the graph.

$x^2 = -8y$

$x^2 = 4py$ $\qquad \frac{4p}{4} = \frac{-8}{4}$ $\qquad p = -2$



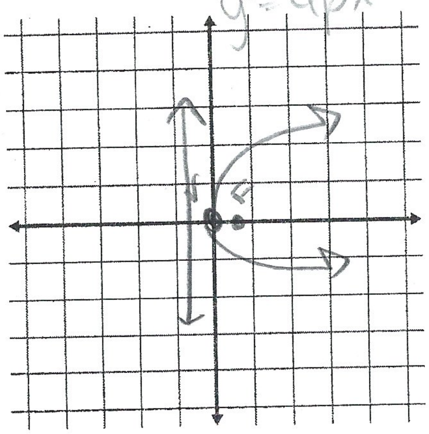
Vertex: $(0,0)$

Focus: $(0,-2)$ $\qquad (0,p)$

Directrix: $y=2$ $\qquad y=-p$

2. Find the vertex, focus and directrix of the parabola. Then sketch the graph.

$\frac{3y^2}{3} = \frac{5x}{3}$ $\qquad y^2 = \frac{5}{3}x$ $\qquad y^2 = 4px$ $\qquad 4p = \frac{5}{3} \div 4$ $\qquad p = \frac{5}{12}$



Vertex: $(0,0)$

Focus: $(\frac{5}{12},0)$ $\qquad (p,0)$

Directrix: $x=-\frac{5}{12}$ $\qquad x=-p$

3. Write an equation that satisfies the given properties.
A parabola with vertex (0, 0) and directrix y=-1.

$x^2 = 4py$ $\qquad y=-p$

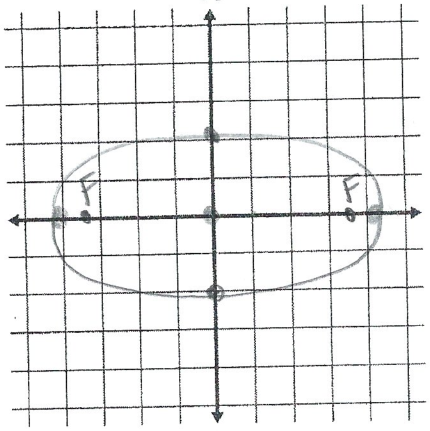
$x^2 = 4(1)y$ $\qquad p=1$

Equation: $x^2 = 4y$

4. Find the vertices, foci, major and minor lengths of the ellipse. Then sketch the graph.

$\frac{x^2}{16} + \frac{4y^2}{16} = \frac{16}{16}$ $\qquad \frac{x^2}{\sqrt{16}} + \frac{y^2}{\sqrt{4}} = 1$

$a = 4 \quad b = 2$



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

Foci: $(2\sqrt{3},0)$ $(-2\sqrt{3},0)$

Major axis = 8

Minor axis = 4

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

$c^2 = 4^2 - 2^2$

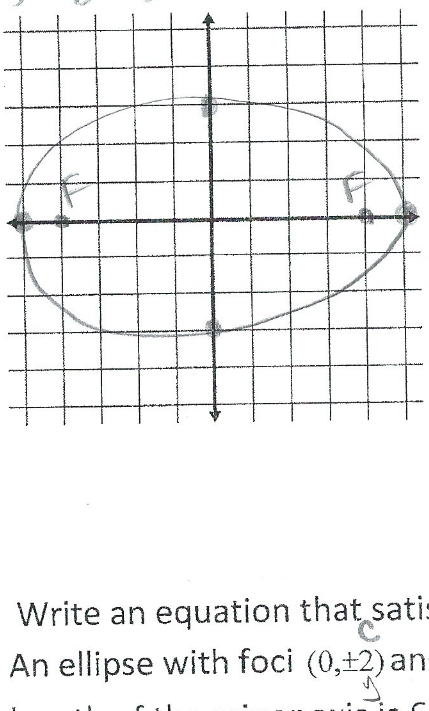
$c^2 = 16 - 4$

$\sqrt{c^2} = \sqrt{12}$ $\qquad c = \sqrt{12} = 2\sqrt{3}$

5. Find the vertices, foci, major and minor lengths of the ellipse. Then sketch the graph.

$\frac{x^2}{\sqrt{25}} + \frac{y^2}{\sqrt{9}} = 1$

$a = 5 \quad b = 3$



Vertices: $(5,0)$ $(-5,0)$

Foci: $(4,0)$ $(-4,0)$

Major axis = 10

Minor axis = 6

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

$c^2 = 5^2 - 3^2$

$c^2 = 25 - 9$ $\qquad c = 4$

$\sqrt{c^2} = \sqrt{16}$

6. Write an equation that satisfies the given properties.

An ellipse with foci $(0, \pm 2)$ and length of the minor axis is 6.

c, y

$c^2 = a^2 - b^2$ $\qquad 2b = 6$

$2^2 = a^2 - 3^2$ $\qquad b = 3$

$4 = a^2 - 9$

$+9 \quad +9$ $\qquad \sqrt{a^2} = \sqrt{13}$ $\qquad a = \sqrt{13}$

$a = \sqrt{13}$ y

$b = 3$ x

$c = 2$

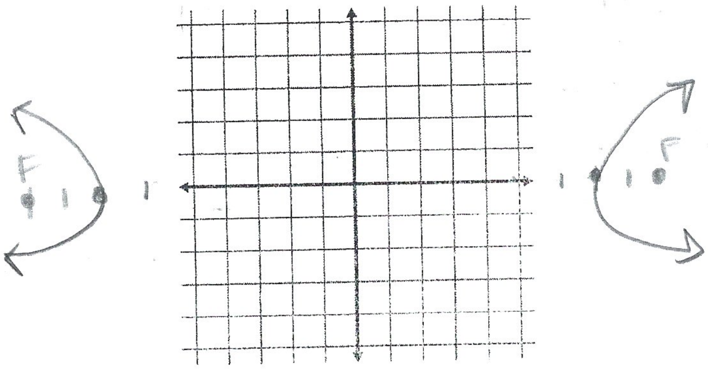
$\frac{x^2}{3^2} + \frac{y^2}{\sqrt{13}^2} = 1$

Equation: $\frac{x^2}{9} + \frac{y^2}{13} = 1$

7. Find the vertices, foci and asymptotes of the hyperbola. Then sketch the graph.

$$\frac{x^2}{\sqrt{49}} - \frac{y^2}{\sqrt{32}} = 1$$

$a = 7 \quad b = 4\sqrt{2}$



Vertices: (7,0) (-7,0)

Foci: (9,0) (-9,0)

Major axis= 14

Asymptotes: $y = \pm \frac{4\sqrt{2}}{7}x$

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

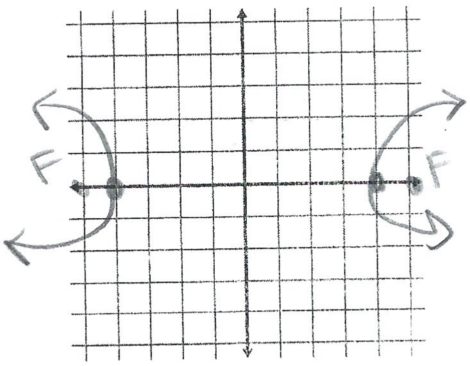
$c^2 = 49 + 32$

$\sqrt{c^2} = \sqrt{81} \quad c = 9$

8. Find the vertices, foci and asymptotes of the hyperbola. Then sketch the graph.

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

$a = 4 \quad b = 3$



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

Foci: (5,0) (-5,0)

Major axis= 8

Asymptotes: $y = \pm \frac{3}{4}x$

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

$c^2 = 16 + 9$

$\sqrt{c^2} = \sqrt{25}$

$c = 5$

9. Write an equation that satisfies the given properties.
A hyperbola with foci $(0, \pm 10)$ and vertices $(0, \pm 8)$.

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

$10^2 = 8^2 + b^2$

$100 = 64 + b^2$

$-64 \quad -64$

$\sqrt{36} = \sqrt{b^2}$

$6 = b$

$a = 8y$

$b = 6x$

$c = 10$

Equation: $\frac{y^2}{64} - \frac{x^2}{36} = 1$

10. Find the center, vertices, foci, major and minor lengths of the ellipse. Then graph.

$$\frac{(x-2)^2}{\sqrt{25}}+\frac{(y+3)^2}{\sqrt{16}}=1$$

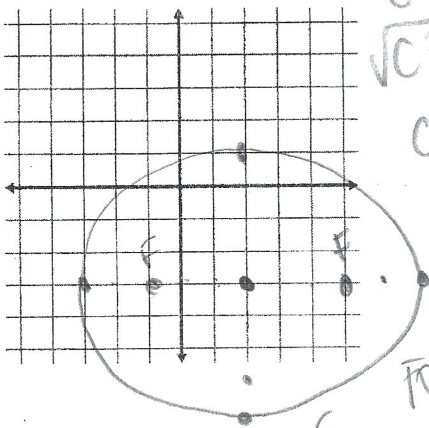
$a=5$ $b=4$

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

$c^2=25-16$

$\sqrt{c^2}=\sqrt{9}$

$c=3$



Center: $(2,-3)$

Vertices: $(7,-3)$ $(-3,-3)$

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

Major axis = 10

Minor axis = 8

focus

$(h\pm c,k)=(2+3,-3)$ $(2-3,-3)$

11. Find the center, vertices, foci and major axis of the hyperbola. Then graph.

$$\frac{(x+1)^2}{\sqrt{9}}-\frac{(y-3)^2}{16}=1$$

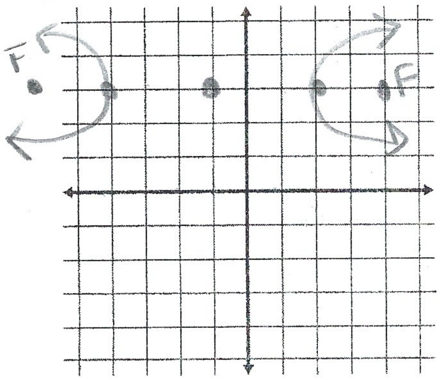
$a=3$

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

$c^2=9+16$

$\sqrt{c^2}=\sqrt{25}$

$c=5$



Center: $(-1,3)$

Vertices: $(2,3)$ $(-4,3)$

Foci: $(4,3)$ $(-6,3)$

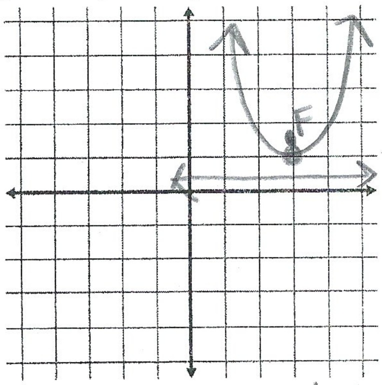
Major axis= 6

focus

$(h\pm c,k)=(-1\pm5,3)$

12. Find the vertex, focus and directirx of the parabola. Then graph.

$y=4(x-3)^2+1$



focus

$\left(h,k+\frac{1}{4a}\right)$

$\left(3,1+\frac{1}{4\cdot4}\right)$

$\left(3,1\frac{1}{16}\right)$

Vertex: $(3,1)$

Focus: $\left(3,1\frac{1}{16}\right)$

Directrix: $y=\frac{15}{16}$

directrix $y=k-\frac{1}{4a}$

$y=\frac{16}{16}-\frac{1}{16}=\frac{15}{16}$