Pre-Calculus Name_____

Conic Sections Review

Date_____ Period____

Use the information provided to write the standard form equation of each conic section.

1) $y = 3x^2 + 18x + 31$

2) $x^2 + y^2 + 22x - 18y + 139 = 0$

3) $4x^2 + y^2 - 24x - 20y + 72 = 0$

4) $-9x^2 + y^2 + 54x + 2y - 116 = 0$

Identify the vertex, focus, and directrix of each. Then sketch the graph.

5) $4(y + 5) = (x + 4)^2$

6) $-4(y - 1) = (x + 2)^2$

7) $-(x - 5) = (y + 3)^2$

8) $3(x - 6) = (y - 4)^2$

Identify the center and radius of each. Then sketch the graph.

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

10) $(x - 1)^2 + (y + 3)^2 = 16$

Identify the center, vertices, and co-vertices. Then sketch the graph.

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

12) $\frac{x^2}{36} + \frac{(y - 2)^2}{9} = 1$

Identify the vertices of each. Then sketch the graph.

13) $\frac{x^2}{25} - \frac{y^2}{9} = 1$

14) $\frac{(x - 1)^2}{9} - \frac{y^2}{25} = 1$

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

16) $\frac{(y - 2)^2}{4} - (x - 2)^2 = 1$

Use the information provided to write the transformational form equation of each parabola.

17) Vertex: $(-5, 4)$, Focus: $\left(-5, \frac{7}{2}\right)$

18) Vertex: $(-6, -8)$, Directrix: $y = -\frac{15}{2}$

19) Focus: $(10, 5)$, Directrix: $y = 7$

20) Vertex: $(9, -1)$, Directrix: $y = 0$

Use the information provided to write the standard form equation of each ellipse.

21) Vertices: $(17, -3)$, $(-9, -3)$
Co-vertices: $(4, 6)$, $(4, -12)$

22) Center: $(-2, 1)$
Vertex: $(-2, -9)$
Co-vertex: $(6, 1)$

23) Vertices: $(15, 5)$, $(5, 5)$
Foci: $(13, 5)$, $(7, 5)$

24) Foci: $(8, -2)$, $(-2, -2)$
Co-vertices: $(3, 10)$, $(3, -14)$

Use the information provided to write the standard form equation of each hyperbola.

25) Vertices: $(9, -5)$, $(-11, -5)$
Endpoints of Conjugate Axis: $(-1, -2)$
$(-1, -8)$

26) Vertices: $(6, 8)$, $(6, -14)$
Conjugate Axis is 20 units long

27) Center at $(-2, 7)$
Transverse axis is vertical and 8 units long
Conjugate axis is 12 units long

28) Vertices: $(-1, 5)$, $(-11, 5)$
Foci: $(7, 5)$, $(-19, 5)$

Answers to Conic Sections Review

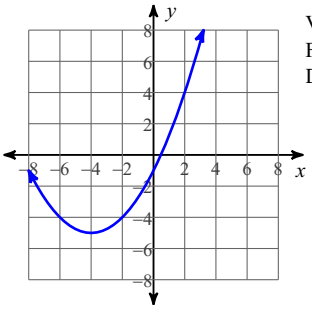
1) $\frac{1}{3}(y-4)=(x+3)^2$

2) $(x+11)^2+(y-9)^2=63$

3) $\frac{(x-3)^2}{16}+\frac{(y-10)^2}{64}=1$

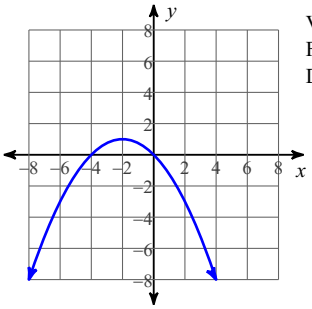
4) $\frac{(y+1)^2}{36}-\frac{(x-3)^2}{4}=1$

5)



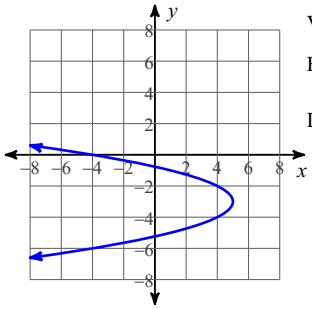
Vertex: $(-4, -5)$
Focus: $(-4, -4)$
Directrix: $y=-6$

6)



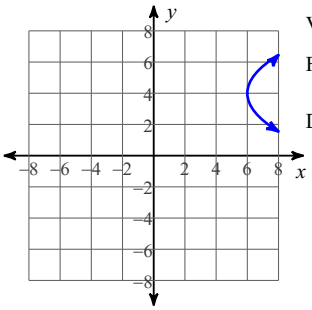
Vertex: $(-2, 1)$
Focus: $(-2, 0)$
Directrix: $y=2$

7)



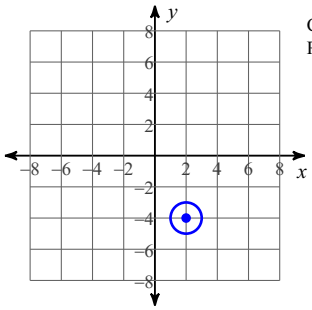
Vertex: $(5, -3)$
Focus: $\left(\frac{19}{4}, -3\right)$
Directrix: $x=\frac{21}{4}$

8)



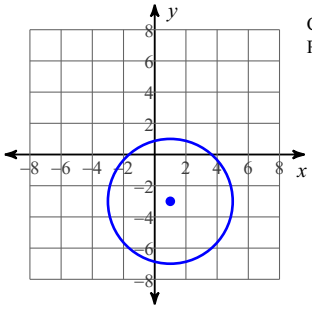
Vertex: $(6, 4)$
Focus: $\left(\frac{27}{4}, 4\right)$
Directrix: $x=\frac{21}{4}$

9)



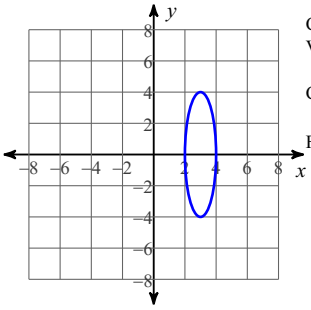
Center: $(2, -4)$
Radius: 1

10)



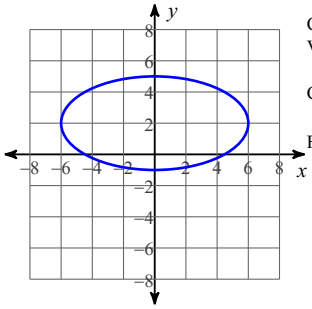
Center: $(1, -3)$
Radius: 4

11)



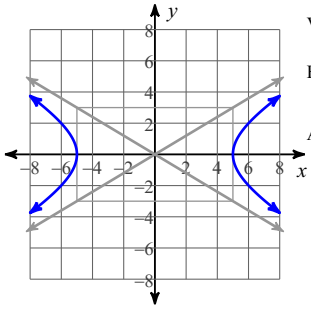
Center: $(3, 0)$
Vertices: $(3, 4)$
$(3, -4)$
Co-vertices: $(4, 0)$
$(2, 0)$
Foci: $(3, \sqrt{15})$
$(3, -\sqrt{15})$

12)



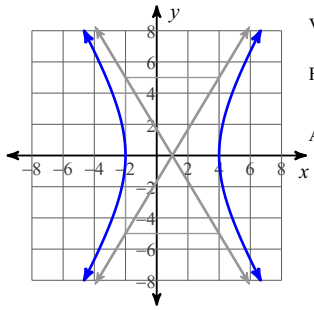
Center: $(0, 2)$
Vertices: $(6, 2)$
$(-6, 2)$
Co-vertices: $(0, 5)$
$(0, -1)$
Foci: $(3\sqrt{3}, 2)$
$(-3\sqrt{3}, 2)$

13)



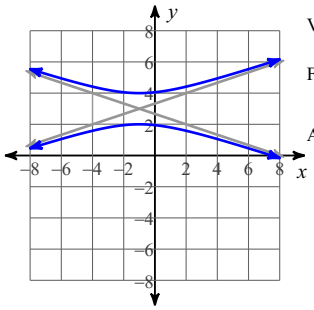
Vertices: $(5, 0)$
$(-5, 0)$
Foci: $(\sqrt{34}, 0)$
$(-\sqrt{34}, 0)$
Asym.: $y=\frac{3}{5}x$
$y=-\frac{3}{5}x$

14)



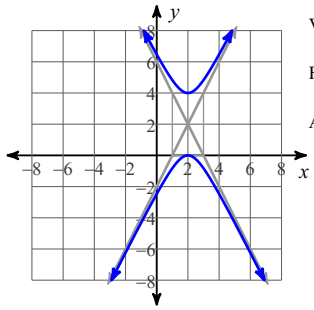
Vertices: $(4, 0)$
$(-2, 0)$
Foci: $(1 + \sqrt{34}, 0)$
$(1 - \sqrt{34}, 0)$
Asym.: $y = \frac{5}{3}x - \frac{5}{3}$
$y = -\frac{5}{3}x + \frac{5}{3}$

15)



Vertices: $(-1, 4)$
$(-1, 2)$
Foci: $(-1, 3 + \sqrt{10})$
$(-1, 3 - \sqrt{10})$
Asym.: $y = \frac{1}{3}x + \frac{10}{3}$
$y = -\frac{1}{3}x + \frac{8}{3}$

16)



Vertices: $(2, 4)$
$(2, 0)$
Foci: $(2, 2 + \sqrt{5})$
$(2, 2 - \sqrt{5})$
Asym.: $y = 2x - 2$
$y = -2x + 6$

17) $-2(y - 4) = (x + 5)^2$

18) $-2(y + 8) = (x + 6)^2$

19) $-4(y - 6) = (x - 10)^2$

20) $y = -\frac{1}{4}(x - 9)^2 - 1$

21) $\frac{(x - 4)^2}{169} + \frac{(y + 3)^2}{81} = 1$

22) $\frac{(x + 2)^2}{64} + \frac{(y - 1)^2}{100} = 1$

23) $\frac{(x - 10)^2}{25} + \frac{(y - 5)^2}{16} = 1$

24) $\frac{(x - 3)^2}{169} + \frac{(y + 2)^2}{144} = 1$

25) $\frac{(x + 1)^2}{100} - \frac{(y + 5)^2}{9} = 1$

26) $\frac{(y + 3)^2}{121} - \frac{(x - 6)^2}{100} = 1$

27) $\frac{(y - 7)^2}{16} - \frac{(x + 2)^2}{36} = 1$

28) $\frac{(x + 6)^2}{25} - \frac{(y - 5)^2}{144} = 1$