Pre-Calculus
9.2 – 9.3 Quiz Review

Name____________________
Date____________ **Period**_____

Identify each equation as a hyperbola or ellipse. Then complete the square to find the standard form of the equation.

1.) $4x^2+y^2+24x-36y+36=0$

$4(x^2+6x+9)+y^2-36y+324=-36$ $+36$ $+324$

$4(x+3)^2+(y-18)^2=324$

$$\boxed{\frac{(x+3)^2}{81}+\frac{(y-18)^2}{324}=1}$$

Ellipse

2.) $4x^2-25y^2-8x-100y-196=0$

$4(x^2-2x+1)-25(y^2+4y+4)=196$ $+4$ -100

$4(x-1)^2-25(y+2)^2=100$

$$\boxed{\frac{(x-1)^2}{25}-\frac{(y+2)^2}{4}=1}$$

HyperbolA

3.) $x^2+16y^2-10x+96y+153=0$

$x^2-10x+25+16(y^2+6y+9)=-153$ $+25$ $+144$

$(x-5)^2+16(y+3)^2=16$

$$\boxed{\frac{(x-5)^2}{16}+\frac{(y+3)^2}{1}=1}$$

Ellipse

4.) $25x^2-9y^2+200x+18y+166=0$

$25(x^2+8x+16)-9(y^2-2y+1)=-16$ 40

$\frac{25(x+4)^2-9(y-1)^2}{225}=\frac{225}{225}$

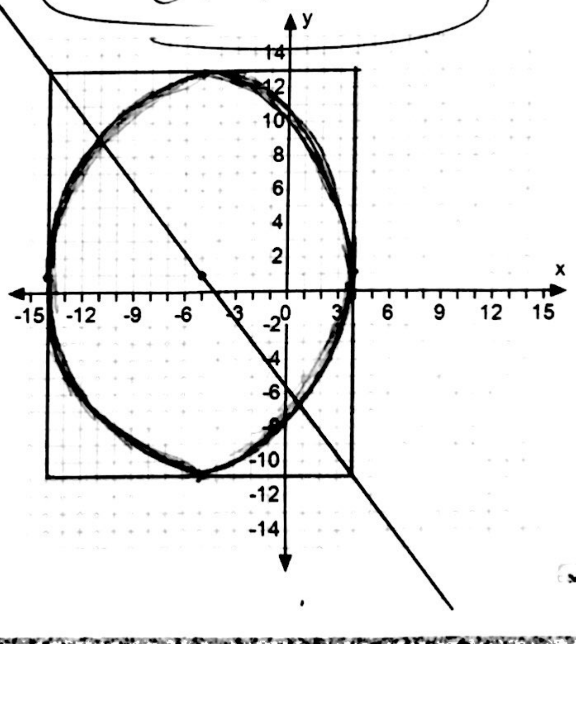
$$\boxed{\frac{(x+4)^2}{9}-\frac{(y-1)^2}{25}=1}$$

HyperbolA

Find the center, vertices, co-vertices, and foci. Then graph the ellipse.

Ellipse

5.) $\dfrac{(x+5)^2}{81}+\dfrac{(y-1)^2}{144}=1$ $c^2=a^2-b^2$



Center: $(-5,1)$

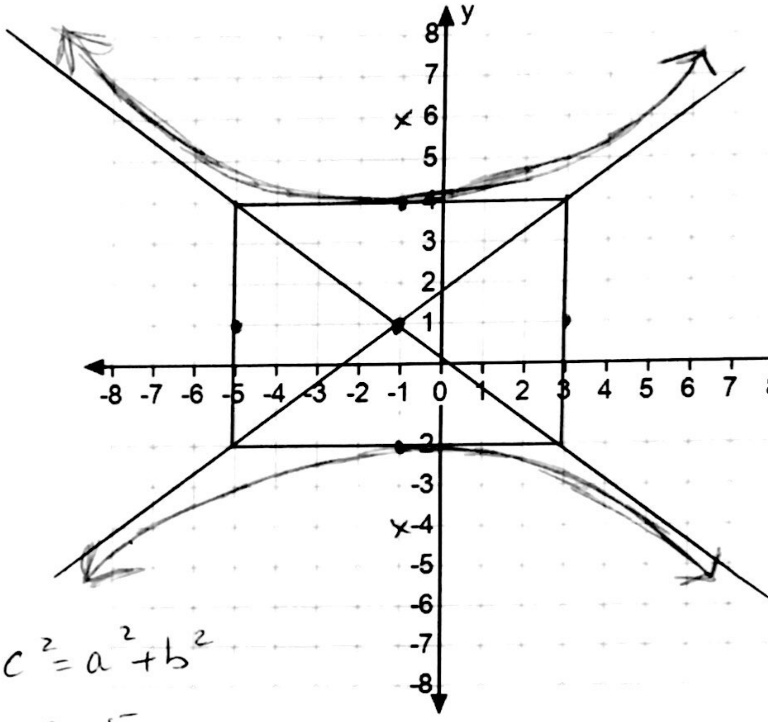
Vertices: $(-5,13)$ $(-5,-11)$

Co-Vertices: $(-14,1)$ $(4,1)$

Foci: $(-5, 1\pm\sqrt{63})$

Graph the hyperbola and find the indicated values.

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



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

$c = 5$

Center: $(-1, 1)$

Lines Containing Axes:

T: $x = -1$

C: $y = 1$

Vertices:

$(-1, 4)$ $(-1, -2)$

Foci:

$(-1, 6)$ $(-1, -4)$

Equations of Asymptotes:

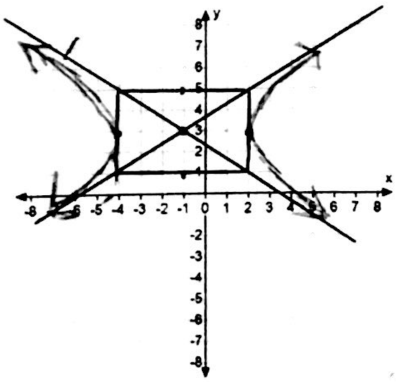
$y - 1 = \pm\frac{3}{4}x(x+1)$

Given the equation of the ellipse or hyperbola, find the center, foci and vertices.

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

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

$c = \sqrt{13}$



Conic: HYPERBOLA

Center: $(-1, 3)$

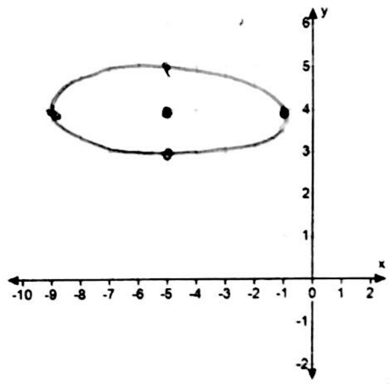
Foci: $(-1 \pm \sqrt{13}, 3)$

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

8.) $\frac{(x+5)^2}{16} + \frac{(y-4)^2}{1} = 1$

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

$c = \sqrt{15}$



Conic: Ellipse

Center: $(-5, 4)$

Foci: $(-5 \pm \sqrt{15}, 4)$

Vertices: $(-9, 4)$ $(-1, 4)$

Typo

Use the information to write the equation of the ellipse in standard form.

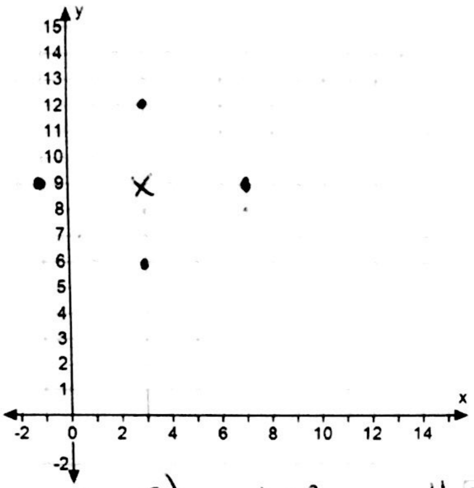
9.) Foci: (7, 9) and (-1, 9)
Co-vertices: (3, 12) and (3, 6)

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

$16 = a^2 - 9$

$a^2 = 25$

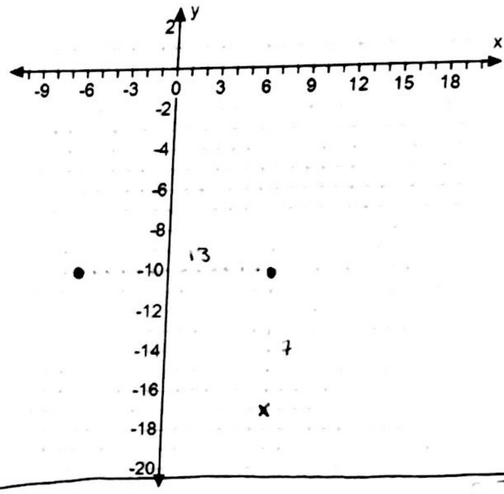
$a = \sqrt{25}$



$c(3,9) \quad b=3 \quad a=4$

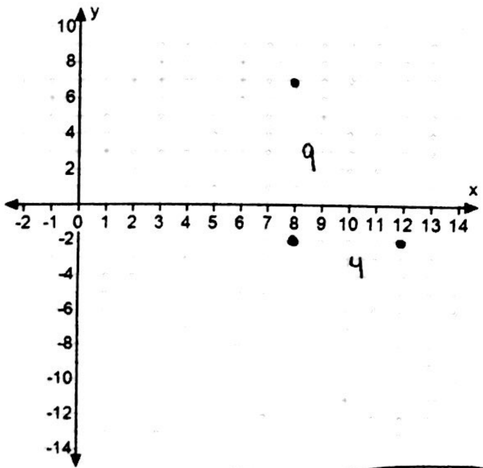
$$\boxed{\frac{(x-3)^2}{25} + \frac{(y-9)^2}{9} = 1}$$

10.) Center: (7, -10)
Vertex: (-6, -10)
Co-Vertex: (7, -17)



$$\boxed{\frac{(x-7)^2}{169} + \frac{(y+10)^2}{49} = 1}$$

11.) Major Axis is vertical
Center: (8, -2)
Major Axis: 18 units
Minor Axis: 8 units



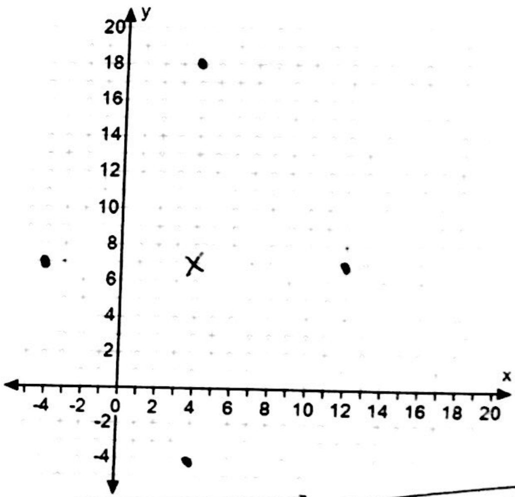
$$\boxed{\frac{(x-8)^2}{16} + \frac{(y+2)^2}{81} = 1}$$

12.) Endpoints of Major Axis: (4, 18) and (4, -4)
Endpoints of Minor Axis: (12, 7) and (-4, 7)

$y = 11$

$x = 8$

$c(4,7)$

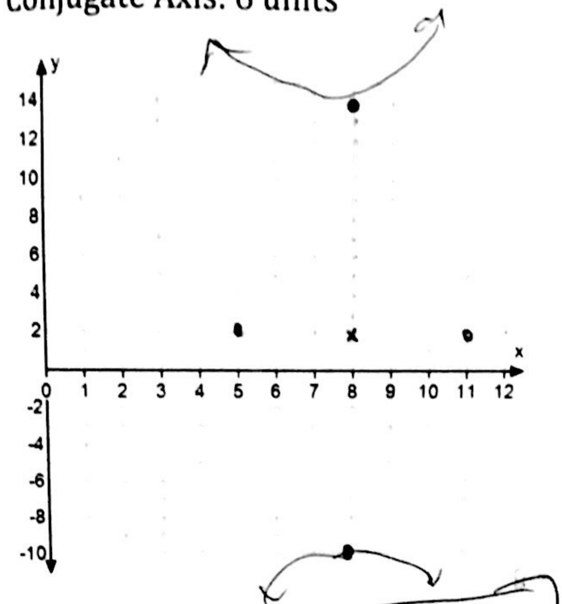


$$\boxed{\frac{(x-4)^2}{64} + \frac{(y-7)^2}{121} = 1}$$

Use the information to write the equation of the hyperbola in standard form.

13.) Vertices: (8, 14) and (8, -10)

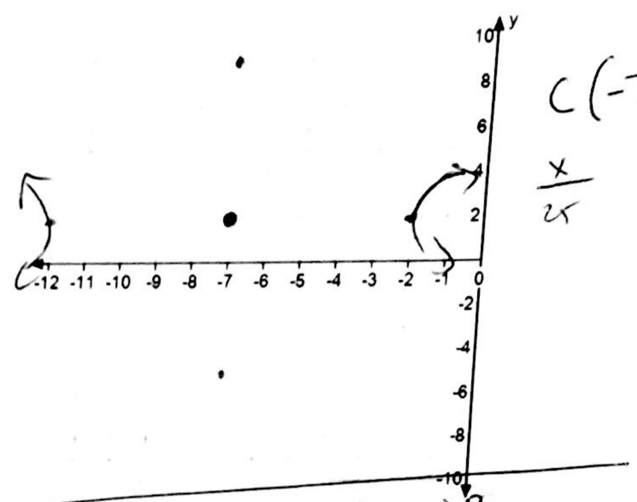
Conjugate Axis: 6 units



$$\frac{(y-2)^2}{144} - \frac{(x-8)^2}{9} = 1$$

14.) Asymptotes: $y-2=\pm\frac{7}{5}(x+7)$

Transverse Axis: 10 units

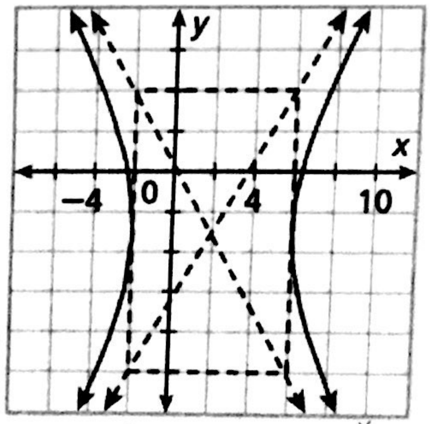


$C(-7,2)$

$\frac{x}{25}$ $\frac{y}{49}$

$$\frac{(x+7)^2}{25} - \frac{(y-2)^2}{49} = 1$$

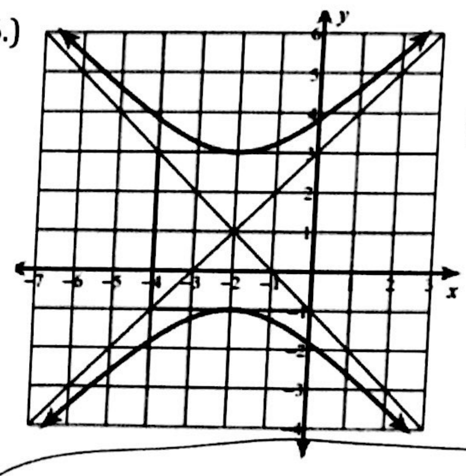
15.)



$C(2,-3)$ $\frac{x}{16}$ $\frac{y}{49}$

$$\frac{(x-2)^2}{16} - \frac{(y+3)^2}{49} = 1$$

16.)



$C(-2,1)$

$\frac{y}{4}$

$\frac{x}{4}$

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

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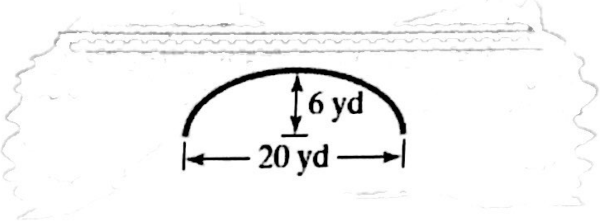
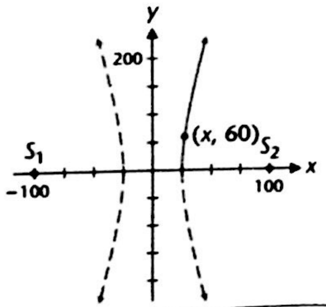
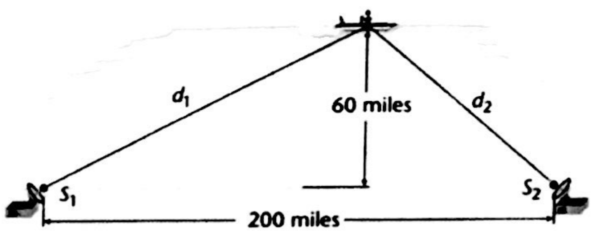
) A semielliptical arch supports a bridge that spans a river 20 yards wide. The center of the arch is 6 yards above the river's center. Write an equation for the ellipse so that the x-axis coincides with the water level and the y-axis passes through the center of the arch.

$$\frac{x^2}{100} + \frac{y^2}{36} = 1$$



18.) A ship is traveling on a course parallel to and 60 miles from a straight shoreline. Two transmitting stations, S1 and S2, are located 200 miles apart on the shoreline (see Fig. 13). By timing radio signals from the stations, the ship's navigator determines that the ship is between the two stations and 50 miles closer to S2 than to S1. Find the equation of the hyperbolic path of the ship then find the distance from the ship to each station. Round answers to one decimal place. Use $d_1 - d_2 = 2a$.





$$\boxed{\frac{x^2}{625} - \frac{y^2}{9375} = 1}$$

$d_1 - d_2 = 2a = 50$

$a = 25$

$c = 100$

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

$b^2 = 9375$

$$\frac{x^2}{625} - \frac{60^2}{9375} = 1$$

$$\frac{x^2}{625} = \frac{173}{125}$$

$x = 29.41 \rightarrow \sqrt{865}$

S1: 142.64 miles

S2: 92.6 miles

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