

## Chapter 10 TEST REVIEW

Algebra II B (E. Gervais)

Name \_\_\_\_\_

Hour \_\_\_\_\_

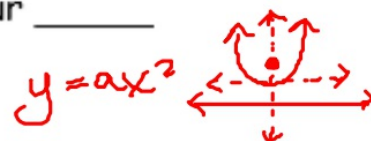
- 1) Find the focus and directrix of the equation  $y = \frac{1}{8}x^2$ .

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

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

$$4c = 8$$

$$c = 2$$



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

- 2) Smallville is located on a map at coordinates  $(-25, 5)$ . Metropolis is located at  $(4, 15)$ .  
If one unit represents 18.5 miles. How far apart are the two towns?

Round your answer to the nearest mile.

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$d = \sqrt{(4 - (-25))^2 + (15 - 5)^2}$$

$$d = \sqrt{(29)^2 + (10)^2}$$

$$d = \sqrt{841 + 100} = \sqrt{941} = 30.6 \checkmark$$

$$\rightarrow 30.6 \times 18.5$$



2. 567.5 miles

$$r = \sqrt{8} \quad r^2 = ?$$

3) Find the equation of the circle with center (5, -4) and radius of  $\sqrt{8}$ .

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

$$(x-5)^2 + (y+4)^2 = (\sqrt{8})^2$$

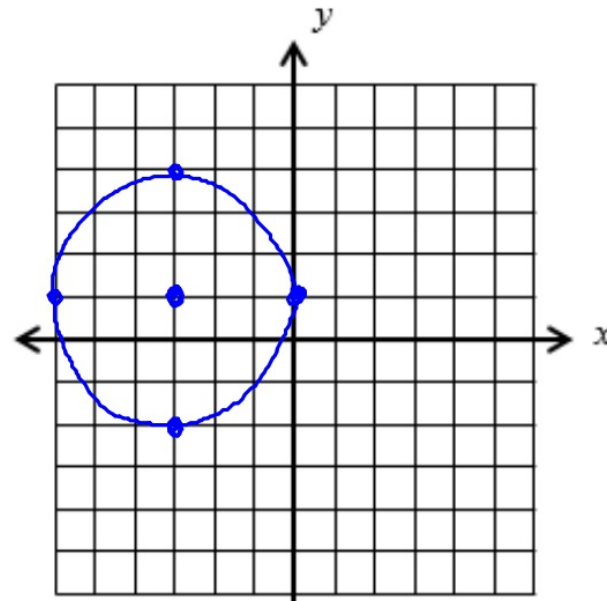
3.  $(x-5)^2 + (y+4)^2 = 8$

4) Graph the circle:  $(x+3)^2 + (y-1)^2 = 9$

Center:  $(-3, 1)$

Radius = 3

$$\sqrt{r^2} = \sqrt{9}$$
$$r = 3$$



5) Graph the ellipse:  $\frac{(x-1)^2}{16} + \frac{(y+2)^2}{25}$   $a^2=25$   
 $b^2=16$   
 $b=4$   
 $a=5$

Center:  $(1, -2)$

Vertices:  $(1, 3)$   $(1, -7)$

Co-vertices:  $(5, -2)$   $(-3, -2)$

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

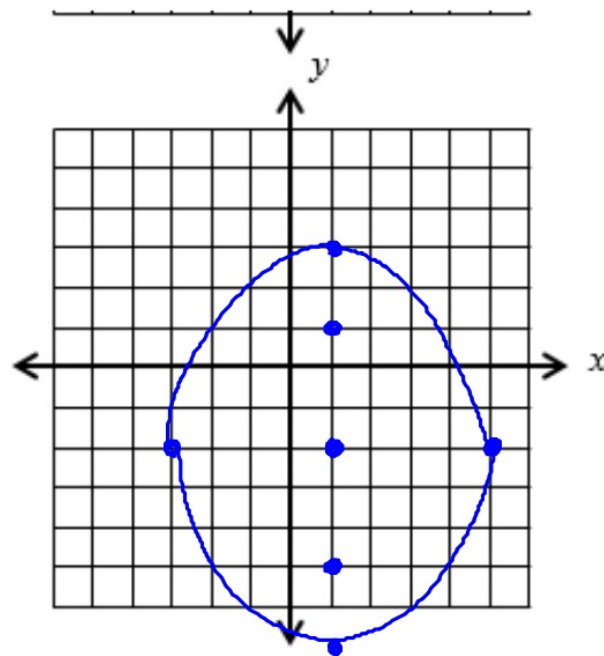
$$c^2 = a^2 - b^2$$

$$c^2 = 25 - 16$$

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

$$c = 3$$

~~$(0, 3)$~~   ~~$(0, -3)$~~



$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

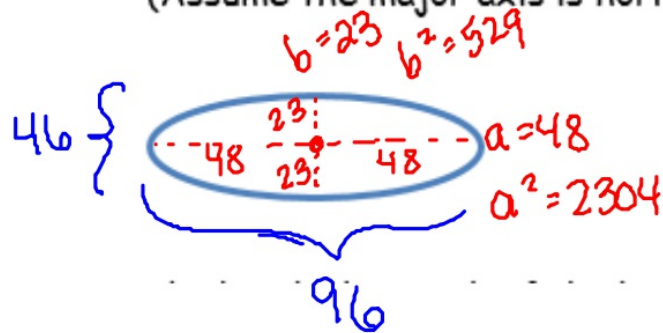
$$a = 8 \quad a^2 = 64 \quad (\text{x-axis})$$

- 6) Find an equation of the ellipse with vertices at  $(-8, 0)$  and  $(8, 0)$ , and co-vertices at  $(0, -3)$  and  $(0, 3)$ .  $b^2 = 9$

$$\frac{x^2}{64} + \frac{y^2}{9} = 1$$

6. \_\_\_\_\_

- 7) Statuary Hall is an elliptical room in the United States Capitol in Washington, D.C. The room is also called the Whispering Gallery because a person standing at one focus of the room can hear even a whisper spoken by a person standing at the other focus. Statuary Hall is 46 feet wide and 96 feet long. Write an equation that models the shape of the room. (Assume the major axis is horizontal - it might help to sketch a picture)



$$\frac{x^2}{2304} + \frac{y^2}{529} = 1$$

7. \_\_\_\_\_

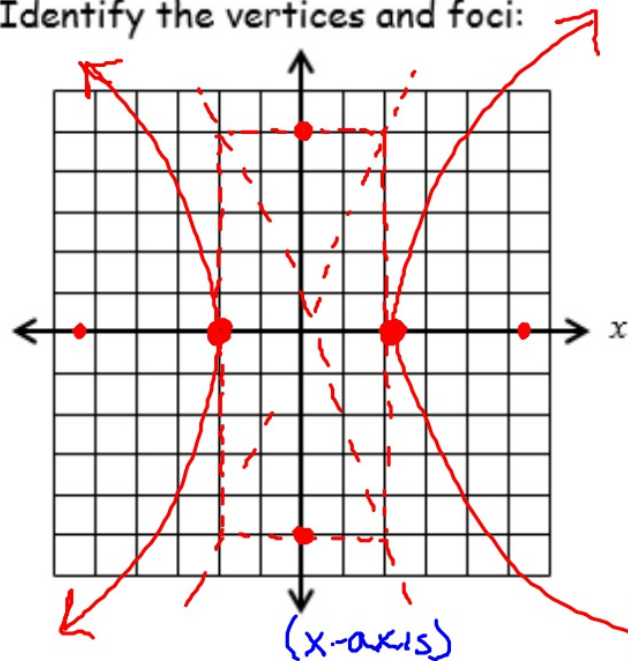
8) Sketch the graph of the hyperbola. Identify the vertices and foci:

A)  $\frac{x^2}{4} - \frac{y^2}{25} = 1$

$a^2 = 4$   
 $a = 2$   
 $b^2 = 25$   
 $b = 5$   
 $c^2 = a^2 + b^2$   
 $c^2 = 4 + 25$   
 $c^2 = 29$   
 $c = 5.3$

Vertices:  $(2, 0)$   $(-2, 0)$

Foci:  $(5.3, 0)$   $(-5.3, 0)$



$c = 8$   $c^2 = 64$

9) Write the equation of the hyperbola with a vertex at  $(3, 0)$  and a focus point at  $(8, 0)$ .

$b^2 = \dots$   
 $c^2 = a^2 + b^2$   
 $64 = 9 + b^2$   
 $-9 \quad -9$   


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 $55 = b^2$

$a = 3$   
 $a^2 = 9$

$$\frac{x^2}{9} - \frac{y^2}{55} = 1$$

9. \_\_\_\_\_

10) Classify the conic: (in other words, what is the shape of the graph?)

A)  $16x^2 - y^2 - 128 = 0$        $16x^2 - y^2 = 128$   
      +128    +128

B)  $x^2 - 49 = -y^2$        $x^2 + y^2 = 49$   
      +y<sup>2</sup>+49    +y<sup>2</sup>+49

C)  $27x^2 + 9y^2 = 243$   
       $\frac{27x^2}{273} + \frac{9y^2}{273} = \frac{243}{273}$

$$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$$

A) Hyperbola

B) Circle       $x^2 + y^2 = r^2$

C) Ellipse

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

11. **Multiple Choice** Which of the following is an equation of the ellipse with foci at (2, 4) and (-6, 4) and vertices at (-8, 4) and (4, 4)?

Use this graph to help figure out the answer to number 11. ☺

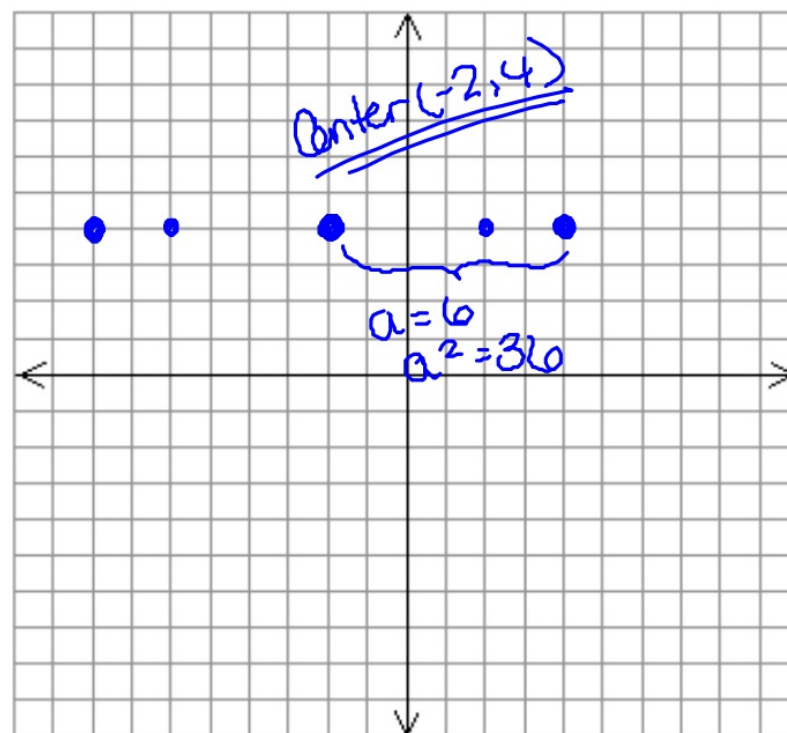
A  $\frac{(x + 4)^2}{20} + \frac{(y - 2)^2}{36} = 1$

B  $\frac{(x + 4)^2}{36} + \frac{(y - 2)^2}{20} = 1$

C  $\frac{(x + 2)^2}{36} + \frac{(y - 4)^2}{20} = 1$

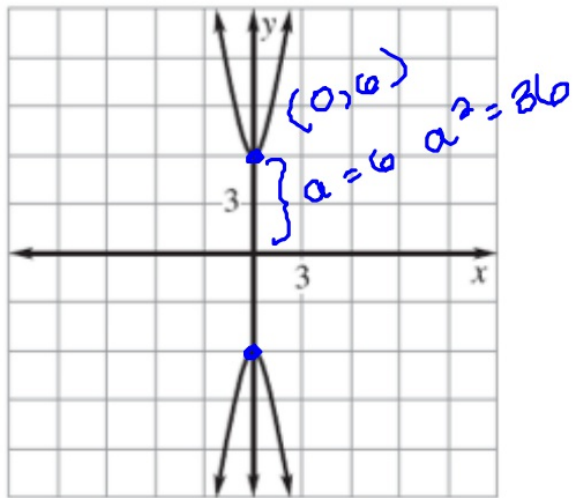
D  $\frac{(x + 2)^2}{20} + \frac{(y - 4)^2}{36} = 1$

E  $\frac{(x - 2)^2}{36} + \frac{(y + 4)^2}{20} = 1$





12. **Multiple Choice** Which equation is graphed?



Vertical Hyperbola

$$\frac{y^2}{a^2} - \frac{x^2}{b^2} = 1$$

- $\frac{y^2}{36} - \frac{36x^2}{36} = \frac{36}{36}$   $\frac{y^2}{36}$  ✓  
  $36x^2 - y^2 = 36$   
  $\frac{36y^2}{36} - x^2 = \frac{36}{36}$   $\frac{y^2}{1}$   
  $x^2 - 36y^2 = 36$   
 None of these