Final Exam Review
Algebra II B

Name:_____
Hour:_____

Tell whether the sequence is arithmetic. If not, explain why.

1. $1, 0, -1, -2, -3, \ldots$

2. $20, 10, 5, 2.5, 1.25, \ldots$

3. $8, 13, 19, 26, 33, \ldots$

Find the first 4 terms for the following arithmetic sequences.

4. $a_1 = 10,\ d = -4$

5. $a_n = -6 + 3n$

For the following arithmetic sequences, find a_1 and d.

6. $7, 10, 13, 16, \ldots$

$a_1 =$ _____ $d =$ _____

7. $2.6, -1.4, -5.4, \ldots$

$a_1 =$ _____ $d =$ _____

Write a rule for the *n*th term of the arithmetic sequence. $a_n = a_1 + d(n-1)$

8. $a_1 = 6,\ d = -2$

9. $2, 6, 10, 14$

10. $\frac{1}{3}, \frac{2}{3}, 1, \frac{4}{3}$

Find the sum of the arithmetic series. $s_n = \frac{n}{2}(a_1 + a_n)$

11. $a_1 = 42,\ a_n = 31,\ n = 16$

12. $a_1 = 40,\ d = -3,\ n = 14$

13. $2 + 6 + 10 + \ldots + 58$
(hint: find n first using $a_n = a_1 + d(n-1)$**)**

Tell whether the sequence is geometric. If not, explain why.

14. $\frac{1}{3}, \frac{2}{3}, \frac{3}{3}, \frac{4}{3}, \ldots$

15. $5, -10, 20, -40, 80, \ldots$

Find the first four terms of each geometric sequence.

16. $a_1 = 3,\ r = -2$

17. $a_n = 36\left(\frac{1}{2}\right)^{n-1}$

Write a rule for the *n*th term of the geometric sequence. $a_n = a_1(r)^{n-1}$

18. $a_1 = 9,\ r = -3$.

19. $2, 4, 8, 16, \ldots$

20. $5, -10, 20, -40, \ldots$.

Find the indicated term. $a_n = a_1(r)^{n-1}$

21. $a_2 = 200,\ r = 5$ Find a_9 **(hint: find a_1 first)**

22. $a_2 = -7,\ r = \frac{1}{2}$ Find $n = 5$. **(hint: find a_1 first)**

Find the sum of the geometric series. $s_n = \frac{a_1\left(1-(r)^n\right)}{(1-r)}$

23. $a_1 = \frac{1}{3},\ r = 3,\ n = 10$

24. $10 + 1 + \frac{1}{10} + \frac{1}{100} + \frac{1}{1000}$

Find s_5.

25. $10+2+\frac{2}{5}+\frac{2}{25}+\frac{2}{125}$

26. $2+4+8+\ldots$

Find s_5.

Find the sum of the following infinite geometric series. $s_n=\frac{a_1}{(1-r)}$ **... remember** $-1<r<1$

27. $2+\frac{2}{3}+\frac{2}{9}+\frac{2}{27}\ldots$

28. $\sum_{1}^{\infty}3\left(\frac{1}{4}\right)^{n-1}=$

29. $\sum_{1}^{\infty}2(3)^{n-1}=$

30. You drop a ball from a basketball rim (10ft above the ground), each time the ball hits the ground it bounces $\frac{3}{4}$ the previous height. How far does the ball travel if it bounces 15 times?

Formula's: **(Arc)** $s = r \cdot \theta \ (in\ radians), \quad R = \frac{\pi}{180} \cdot D, \quad D = \frac{180}{\pi} \cdot R$

Convert Degrees to Radians.

1. 150°

2. 315°

3. 90°

4. 300°

Convert Radians to Degrees.

5. $\frac{\pi}{6}$

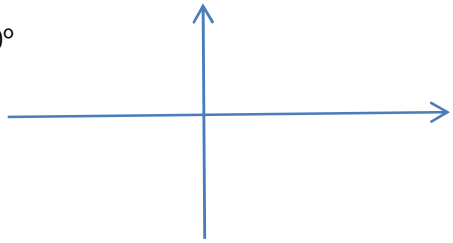
6. $\frac{4\pi}{3}$

7. $\frac{7\pi}{3}$

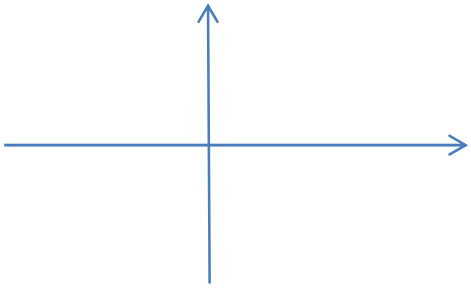
8. $\frac{-5\pi}{6}$

Draw the angle in standard position, then find one positive angle and one negative angle that is Co-terminal with the given angle.

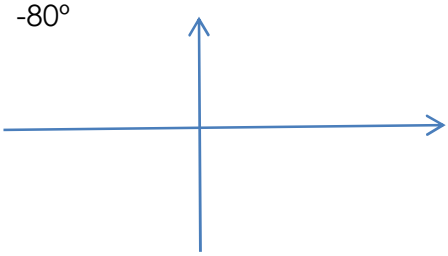
9. 50°



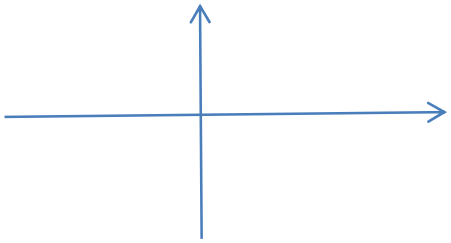
10. 120°



11. -80°

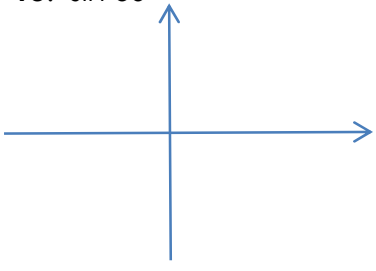


12. 285°

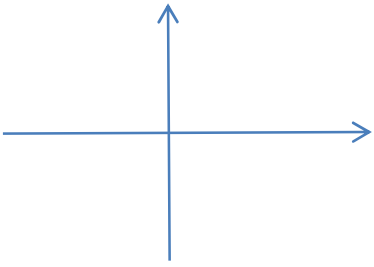


Find the EXACT VALUE of the trig function. SHOW YOUR WORK!!! Make sure you draw the, and label it!

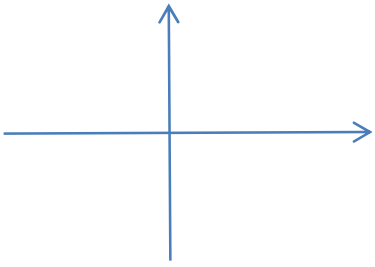
13. sin 60°



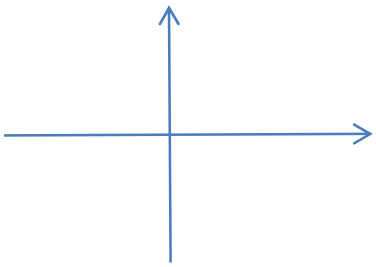
14. cos (30°)



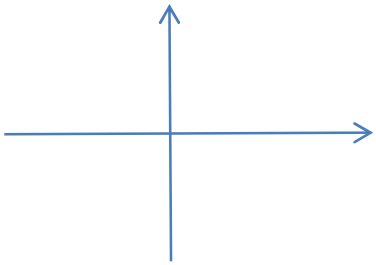
15. tan (45°)



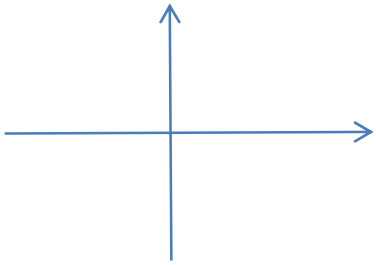
16. tan 225°



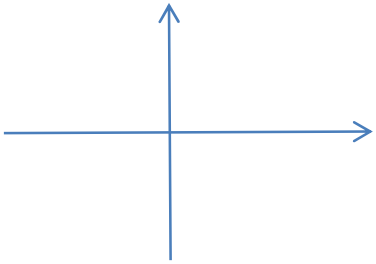
17. sin(300°)



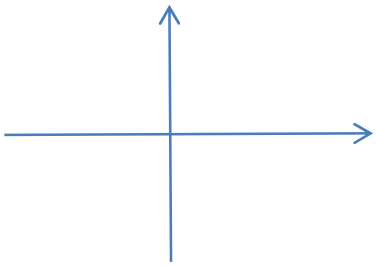
18. cos (120°)



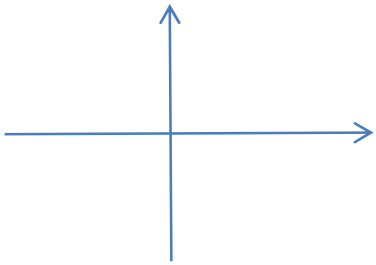
19. tan 315°



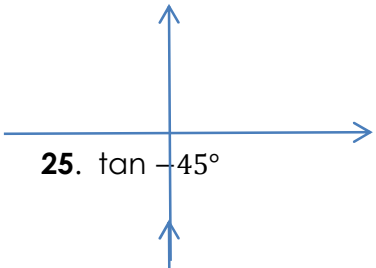
20. sin(150°)



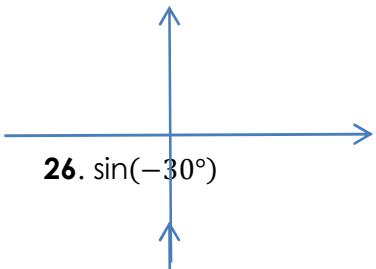
21. cos (30°)



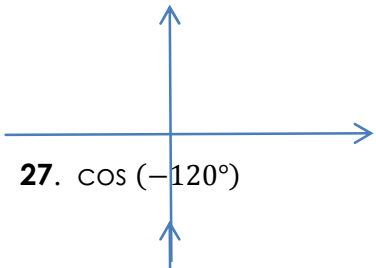
22. tan −225°



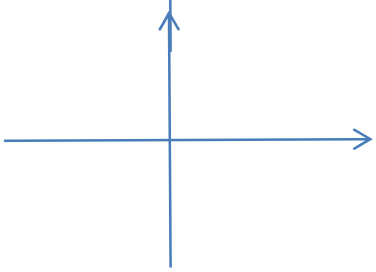
23. sin(−240°)



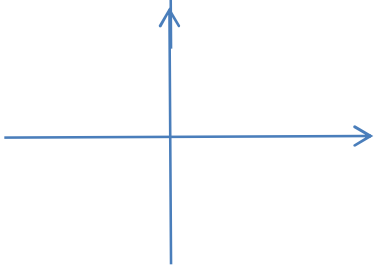
24. cos (−30°)



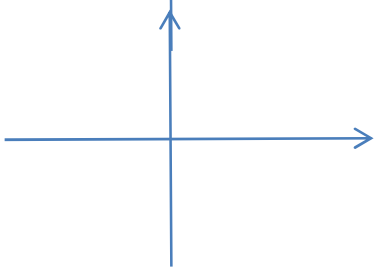
25. tan −45°



26. sin(−30°)

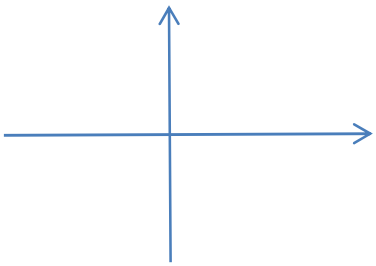


27. cos (−120°)

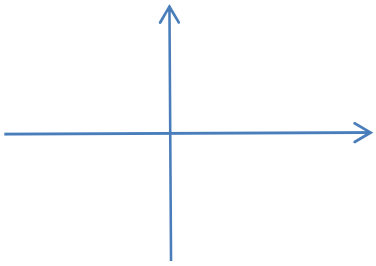


Use the Unit circle to evaluate the following Trig. Functions.

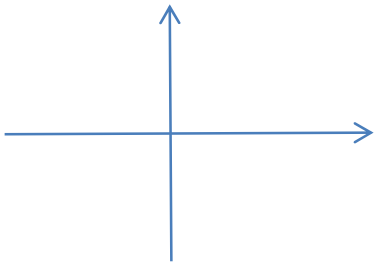
28. tan 360°



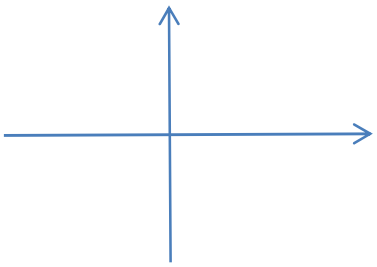
29. sin(180°)



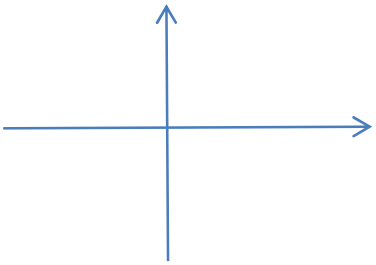
30. cos (180°)



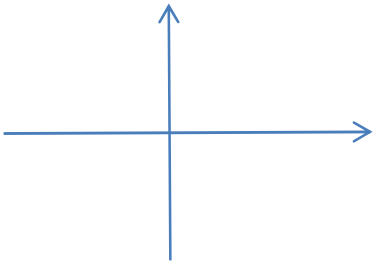
31. tan90°



32. sin(90°)

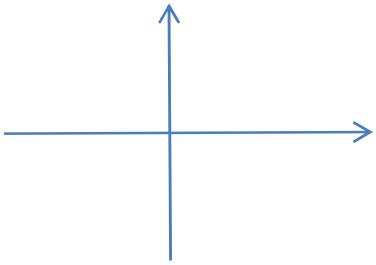


33. cos (−270°)



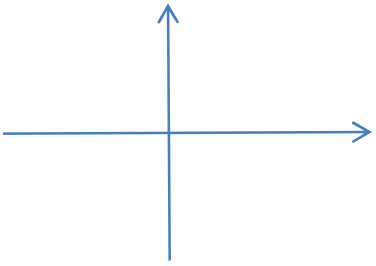
Find the values of the remaining trig functions of θ given the following information. Make sure you draw the triangle!

34. sin θ = -1/2, θ is in Quadrant 4



cos θ = **tan θ =**

35. $Tan\ \theta\ =\ -1,\ is\ in\ Quadrant\ II$



sin θ = **cos θ =**

36. Sketch a triangle that has an obtuse angle θ. If sin θ = $\frac{12}{13}$, find the values of the other five trig functions for angle θ.

sin θ = cos θ = tan θ =

csc θ = sec θ =

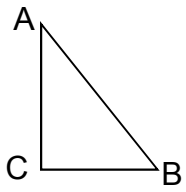
Use a calculator to find the following. Round answers to the nearest 100th. (Check your mode!)

37. sin 228°

38. sec .63

39. tan 325°

40. B = 20°, b = 5, find c



41. An airplane is at an elevation of 20,000 feet when it begins its approach to an airport. Its angle of descent is 3º.

a.) What is the distance between the airport and the point on the ground directly below the plane?

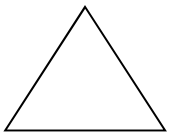
b.) What is the approximate air distance between the plane and the airport?

State the Law of Sines:

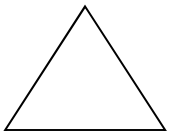
State **both** Laws of Cosines:

For the following problems, draw and label a triangle and solve for the missing parts. Round side lengths to four numbers after the decimal point and angles to the nearest hundredth.

42. m∠C = 76°, c =3, b = 4



438. m∠A = 120°, b = 14, c = 16



Directions: Identify *a*, *b*, and the length of one period. Then fill in the min/max and x-values, and sketch the graph.

49. $y = 1\cos 2x + 3$ ***a*** = _____ ***b*** = _____ **Length of period =** _____ **D=**_____

Midline=_____

Max=_____

Min=_____

The 5 values on the X-axis: (_____,_____,_____,_____,_____**)**

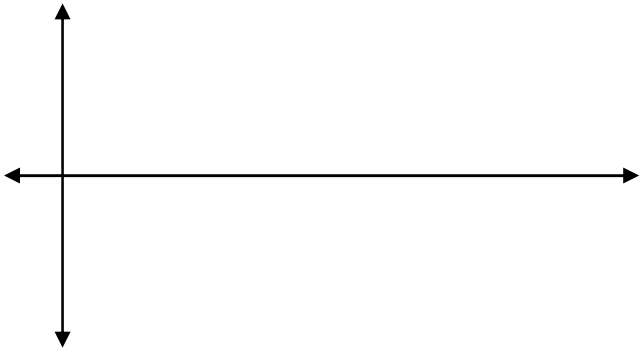
44. $y = 2\sin 4x + 1$ ***a*** = _____ ***b*** = _____ **Length of period =** _____ **D=**_____

Midline=_____

Max=_____

Min=_____

The 5 values on the X-axis: (_____,_____,_____,_____,_____**)**



Equation: _____	**Equation:** _____

Determine the vertex, the *p* value, the direction of opening, the focus, the equation for the directrix, and the equation for the axis of symmetry. Graph the vertex, the focus, the directrix, the axis of symmetry, as well as two additional points to complete the graph. Any non-integer values should be written as reduced fractions. No decimals!!

1. $y^2 = 12(x-5)$

Vertex $(\quad , \quad)$

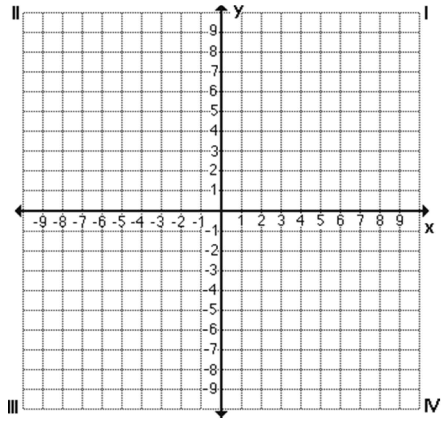
p = _____

Opens _____

Focus $(\quad , \quad)$

Directrix _____

Axis of Symmetry _____



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

Vertex $(\quad , \quad)$

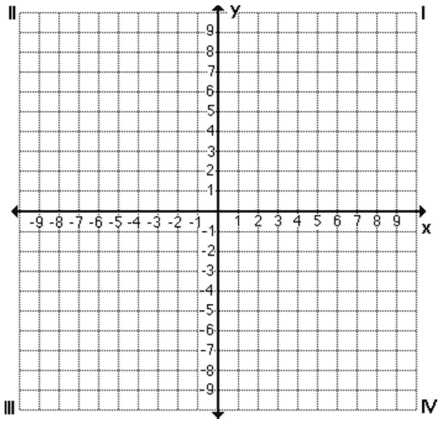
p = _____

Opens _____

Focus $(\quad , \quad)$

Directrix _____

Axis of Symmetry _____



3. $(y-1)^2 = -6(x-5)$

Vertex $(\quad , \quad)$

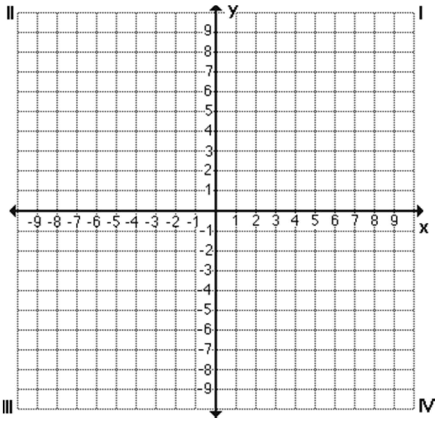
p = _____

Opens _____

Focus $(\quad , \quad)$

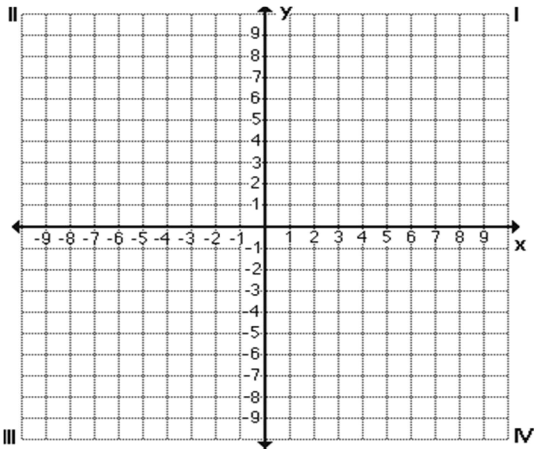
Directrix _____

Axis of Symmetry _____



Write the standard form of the equation of the parabola with the given focus and vertex.

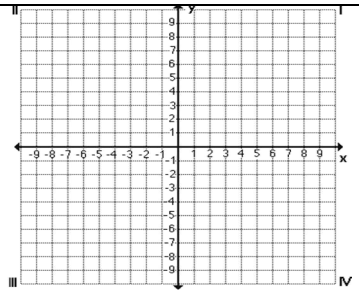
4. Vertex = $(0\ ,\ 0)$; Focus = $(6\ ,\ 0)$



Standard Form:

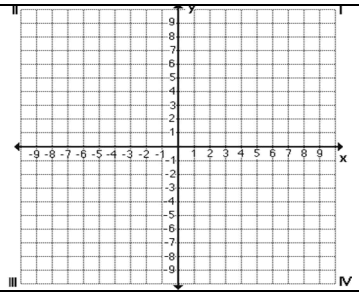
_____

5. Vertex = $(0\ ,\ 0)$; Focus = $(0,\ -4)$



Standard Form: _____

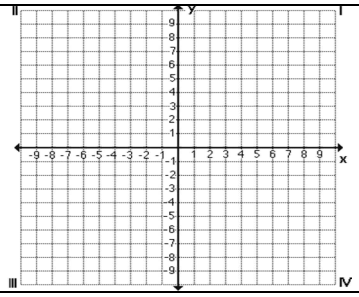
6. Vertex = $(0\ ,\ 0)$; Focus = $(2\ ,\ 0)$



Standard Form: _____

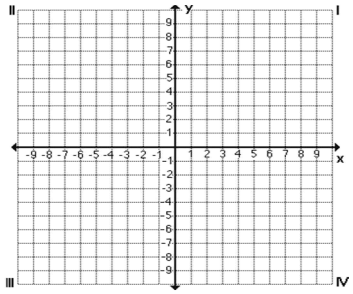
Write the standard form of the equation of the parabola with the given directrix and vertex**.**

7. Vertex = $(0\ ,\ 0)$; Directrix $x = 3$



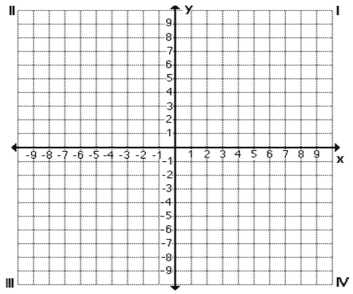
Standard Form: _____

8. Vertex = $(0\ ,\ 0)$; Directrix $y = 1$



Standard Form: _____

9. Vertex = $(0\ ,\ 0)$; Directrix $y = -4$



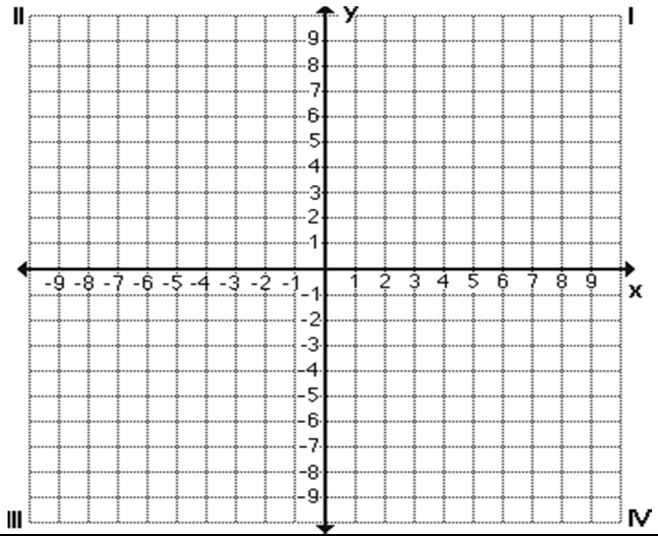
Standard Form: _____

Determine the center, the value of the radius, and four points. Graph the center and the four points to create a sketch of the circle. No decimals!!

10. $(x+1)^2+(y-5)^2=36$

Center $(\quad,\quad)$

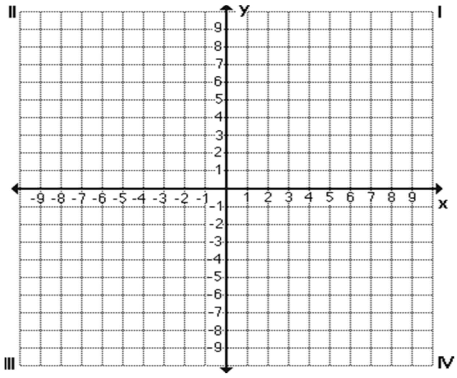
r = _____



11. $x^2+(y+3)^2=16$

Center $(\quad,\quad)$

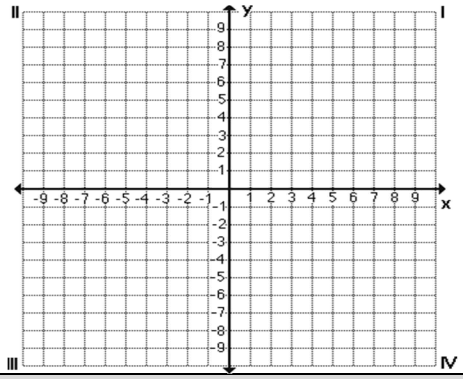
r = _____



12. $(x+3)^2+y^2=64$

Center $(\quad,\quad)$

r = _____



Write the standard form of the equation of the circle with the given radius and given center.

13. $r=3$, Center = $(0,-4)$

Equation: _____

14. $r=11$, Center = $(2,-4)$

Equation: _____

15. $r=\sqrt{5}$, Center = $(0,0)$

Equation: _____

Write the standard form of the equation of the circle that passes through the given point and the given center.

16. **Point =** $(-2, 6)$ **Center =** $(0, 0)$

Equation: _____

17. **Point =** $(0, 2)$ **Center =** $(3, -5)$

Equation: _____

Use the equation of each circle to determine the center and the radius. NO DECIMAL ANSWERS!

20. $(x-2)^2 + (y+3)^2 = 40$

Center: (,) **Radius:** _____

21. $(x+3)^2 + (y-5)^2 = 28$

Center: (,) **Radius:** _____

20. $x^2 + (y+10)^2 = 50$

Center: (,) **Radius:** _____

21. $(x-2)^2 + (y-8)^2 = 24$

Center: (,) **Radius:** _____

Put each circle equation into standard form.

27. $5x^2 + 5y^2 = 80$

Equation: _____

28. $-7x^2 - 7y^2 + 35 = 0$

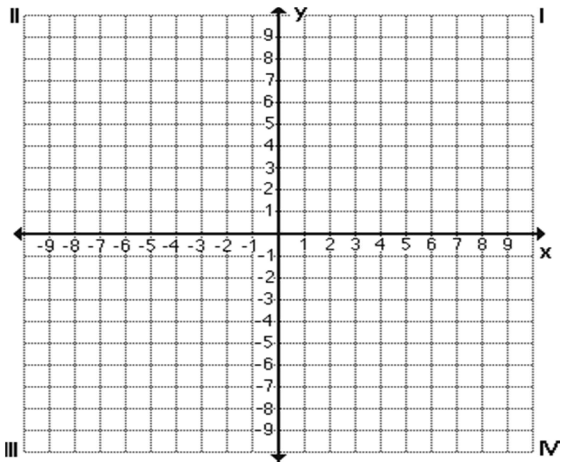
Equation: _____

For each circle, determine the center, the value of the radius, and four points. Graph the center and the four points to create a sketch of the circle. NO DECIMALS!!

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

Center (,)

r = _____



Determine the center, the vertices of the transverse axis, the conjugate axis points, the foci, and the asymptotes. Graph the center, the vertices, a line through the transverse axis, the conjugate axis, the foci, and the asymptotes. Then sketch the shape of the branches. All non-integer values should be rounded to the nearest hundredth.

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

Center (,)

a = _____

Vertices (,) (,)

b = _____

c = _____

Foci (,) (,)

Asymptotes: _____

31. $\frac{(y-4)^2}{12} - \frac{x^2}{4} = 1$

Center (,)

a = _____

Vertices (,) (,)

b = _____

c = _____

Foci (,) (,)

Asymptotes: _____

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

Center (,)

a = _____

Vertices (,) (,)

b = _____

c = _____

Foci (,) (,)

Asymptotes: _____

Identify the Conic section as a parabola, circle, ellipse, or hyperbola, then graph it. Be sure to label all important parts that apply (Center, Vertices, co-vertices, foci, directrix, and asymptotes)

33.

$$2x^2 + 2y^2 = 72$$

(Divide each term by 2!)

34. $4x^2 + 8y^2 = 8$

(Divide each term by 8!)

35. $(x+3)^2 = -2(y+2)$

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