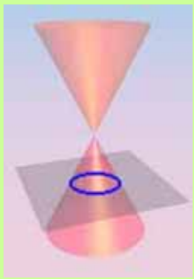
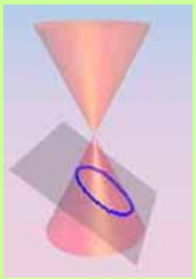
Chapter 9
conic sections

Conic Sections!!!



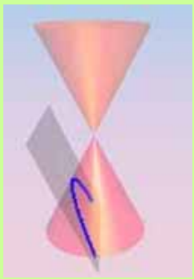
Circle

Plane intersects the cone **parallel to its base**



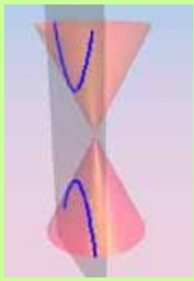
Ellipse

Plane intersects the cone **at an angle with its base**



Parabola

Plane intersects the cone **parallel to its side**



Hyperbola

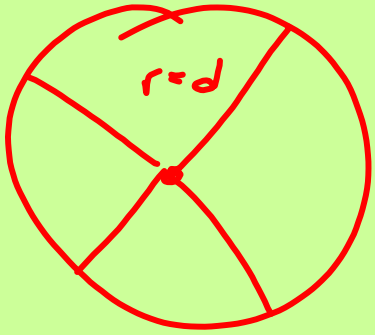
Plane intersects the cone **perpendicular to its base**

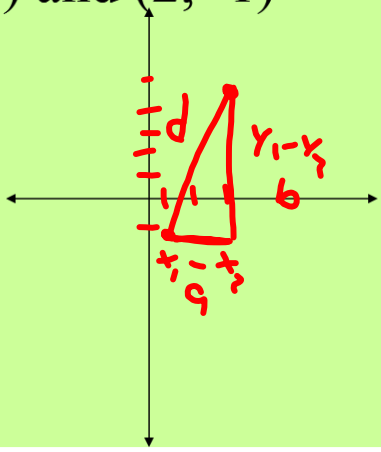
9.1 Circles

Each conic section has an equation that defines it. The circle's equation is derived from a familiar formula.....THE DISTANCE FORMULA!!

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

Find the distance between (3, 5) and (2, -1)





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

Equation of a circle :

$$r = \sqrt{(x-h)^2 + (y-k)^2}$$

with center (h, k) *and* radius $= r$

or :

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

Circles

Examples:

1. Find an equation with center at (-3, 2) having a radius of 5.

(h,k)

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

$(x+3)^2 + (y-2)^2 = 25$

2. Give the equation of the circle with radius 3 whose center is at the origin.

$(0,0)$ $r=3$

$(x-0)^2 + (y-0)^2 = (3)^2$

$x^2 + y^2 = 9$

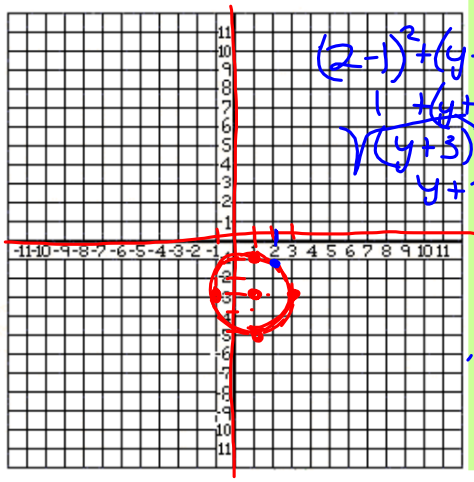
Graphing .....

Find the center and radius, and sketch the graph of the circle whose equation is:

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

$x-h$ $y-k$ $\sqrt{4}=r^2$

Center: (1, -3) Radius: 2



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

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

$\sqrt{(y+3)^2}=\sqrt{3}$

$y+3=1.732$

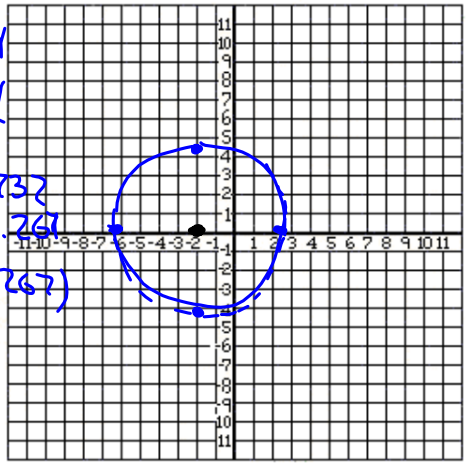
$y=-1.268$

$(2,-1.268)$

Sketch the graph of:

$(x+2)^2+y^2=19$

Center: (0, 0) Radius: 4.358



Name _____ Hour _____ Date_____

Circles Wkst.

Find the Center and Radius for each.

1. $x^2 + y^2 = 49$

   Center: (,)
   Radius: r =

2. $x^2 + y^2 = 324$

3. $(x+2)^2 + (y-3)^2 = 183$

   Center: (,)
   Radius: r =

4. $(x+7)^2 + (y+8)^2 = 64$

5. $(x-10)^2 + (y+9)^2 = 36$

6. $(x+5)^2 + (y-10)^2 = 9$

7. $x^2 + (y+2)^2 = 121$

8. $(x-14)^2 + (y-2)^2 = 4$

For the following, You will need to complete the square first, if you know how to do it, go ahead and try, if not wait until we learn it in class. Then Determine Center and radius.

9. $x^2 + y^2 + 24x + 10y + 160 = 0$

10. $364 + 28y + y^2 + x^2 = -26x$

11. $-6x = -x^2 + 32y - 264 - y^2$

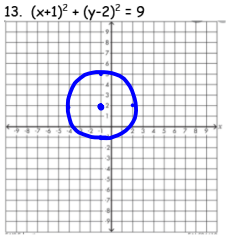
12. $-6x + x^2 = 97 + 10y - y^2$

Answers

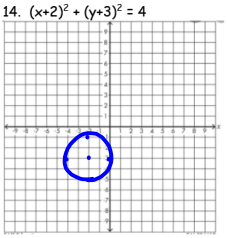
1. (0,0) r = 7
2. (0,0) r = 18
3. (-2,3) r = 13.5
4. (-7,-8) r = 8
5. (-10,-9) r = 6
6. (-3,10) r = 3
7. (0,-2) r= 11
8. (14,2) r = 2
9. (-13,-14) r = 1
10. (-12,-5) r = 3
11. (3,16) r = 1
12. (3,5) r = 11.4
13. (-1,2) r = 3
14. (-2,-3) r = 2
15. (-1,-2) r = 5
16. (-3,3) r = 2.8
17. (-3,-2) r = 3
18. (-2.5, 3.8) r = 3

Graph the following circles Using the center and the radius up, down, left and right.

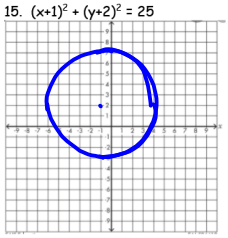
13. $(x+1)^2 + (y-2)^2 = 9$



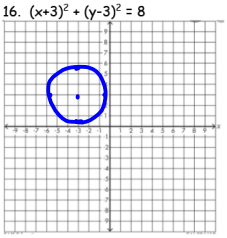
14. $(x+2)^2 + (y+3)^2 = 4$



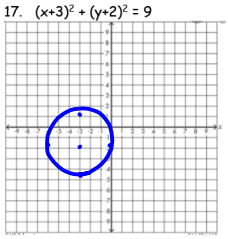
15. $(x+1)^2 + (y+2)^2 = 25$



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



17. $(x+3)^2 + (y+2)^2 = 9$



18. $(x + 2.5)^2 + (y - \sqrt{14})^2 = 9$