Graphing Circles

Circle – the set of all points in a plane equidistant from a given point.

Radius – segment that has one endpoint at the center and the other endpoint on the circle.

Diameter – segment that contains the center of the circle and has both endpoints on the circle.

Standard Equation of the Circle $\qquad (x - h)^2 + (y - k)^2 = r^2$

where (h,k) is the center and (r) is the radius.

*** A circle with a center located at the origin has the equation $x^2 + y^2 = r^2$

For each of the following examples, determine the center and the length of the radius:

1) $(x + 1)^2 + (y - 4)^2 = 4$
2) $x^2 + (y + 3)^2 = 16$
3) $(x - 2)^2 + (y + 6)^2 = 36$
4) $(x + 7)^2 + y^2 = 64$
5) $(x + 9)^2 + (y + 7)^2 = 100$
6) $(x - 5)^2 + (y + 3)^2 = 16.25$
7) $(x - 4)^2 + (y + 1.5)^2 = 98.01$
8) $x^2 + y^2 = 11.56$
9) $(x + 8)^2 + (y + 4)^2 = 9$
10) $(x - 7)^2 + (y + 2)^2 = 169$

11) $(x + 11)^2 + y^2 = 144$
12) $(x + 15)^2 + (y - 3)^2 = 25$
13) $(x - 3)^2 + (y + 11)^2 = 121$
14) $x^2 + (y + 17)^2 = 1$
15) $(x - 3)^2 + (y - 4)^2 = 68.89$
16) $(x + 6)^2 + (y - 3)^2 = 51.85$
17) $(x - 2)^2 + (y + 6)^2 = 81$
18) $x^2 + y^2 = 2.25$
19) $(x + 8)^2 + y^2 = 27.04$
20) $(x - 4)^2 + (y + 3.5)^2 = 10.5625$

We can also write the equation of the circle when given the center and the radius.

For each example, write the equation for the circle:

1) center (4,7); r = 3
2) center (2,1); r = 8
3) center (-3,6); r = 8
4) center (-1,-1); r = 3.8
5) center (6,-3); r = 9.2
6) center (7,-4); r = 9
7) center (0,0); r = 3.14
8) center (0,-3); r = 6
9) center (1.5,3.5); r = 2
10) center (2.8,-3); r = 7.14

11) center (7,-1); r = 4
12) center (-3,8); r = 2.17
13) center (0,-6); r = 10
14) center (8,0); r = 5
15) center (-4,0); r = 4.12
16) center (4,11); r = 6.5
17) center (-11,4); r = 7
18) center (5,0); r = 2.5
19) center (-7,5); r = 1
20) center (1.2,1); r = 6.38

We should also be able to prove whether a point is located on the circle. To do this, just place the point in the equation and see if it works out!

For each of the following, prove whether or not the point is on the circle:

1) $x^2 + y^2 = 4$; (1,1)
2) $x^2 + (y - 2)^2 = 26$; (3,7)

3) $(x - 3)^2 + (y - 6)^2 = 32$; (-2,8)

4) $(x - 3)^2 + y^2 = 100$; (13,0)

5) $x^2 + (y - 2)^2 = 36$; (3,7)

6) $(x - 5)^2 + (y + 2)^2 = 49$; (4,8)

7) $(x - 4)^2 + (y - 9)^2 = 72$; (6,-17)

8) $(x + 4)^2 + (y - 3)^2 = 25$; (0,0)

9) $x^2 + y^2 = 16$; (4,0)

10) $(x + 1)^2 + (y + 7)^2 = 41$; (6,-3)