

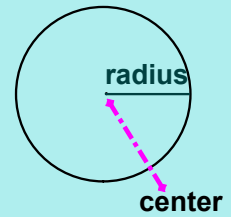
## Section 10 - 3 Circles

Students will be able

- to write and graph the equation of a circle
- to find the center and radius of a circle
- to use them to graph the circle

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A circle is the set of all points in a plane that are a distance  $r$  from a given point, the center of the circle.



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Equation for a circle with center at  $(0, 0)$  and radius  $r$  is

$$x^2 + y^2 = r^2$$

But not every circle is centered at  $(0, 0)$ . By use of the distance formula, a circle with center at  $(h, k)$  and radius  $r$ , you get the Standard Form of an Equation of a Circle:

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

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What is the equation of a circle with center at  $(5, -2)$  and a radius of 8?

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

$$(x - 5)^2 + (y + 2)^2 = 64$$

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What is the equation of a circle  $x^2 + y^2 = 9$  translated 4 units left and 3 units up?

$$(x + 4)^2 + (y - 3)^2 = 9$$

A coordinate plane showing a circle centered at  $(-4, 3)$ . The center is marked with a dot and labeled  $(-4, 3)$ . The circle has a radius of 3. Tick marks are shown on the x and y axes.

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What are the center and the radius of a circle:

$$(x + 8)^2 + (y - 3)^2 = 121$$

$$C: (-8, 3)$$

$$R: 11$$

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**What are the center and radius:**

$x^2 + y^2 - 6x + 14y = 8$

We are going to have to use completing the square.

$(x^2 - 6x + 9) + (y^2 + 14y + 49) = 8 + 9 + 49$

$(x - 3)^2 + (y + 7)^2 = 66$

C: (3, -7)  
r:  $\sqrt{66}$

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**What is the graph of  $(x - 4)^2 + (y + 2)^2 = 49$ ?**

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**pg. 635 #40. Write the equation that passes through (-2, 3) and has a center at the origin.**

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

$x^2 + y^2 = r^2$

$r = \sqrt{4 + 9}$   
 $r = \sqrt{13}$

$x^2 + y^2 = (\sqrt{13})^2$   
 $x^2 + y^2 = 13$

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**#47. Find equation of circle: center (-2, 7.5), circumference  $3\pi$**

$C = 3\pi$   
 $\frac{C}{2\pi} = \frac{3\pi}{2\pi}$   
 $r = 1.5$

$(x + 2)^2 + (y - 7.5)^2 = 2.25$

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Hwk: pg 634 - 635  
#8, 16 - 30 evens, 34, 38,  
46, 50, 56, 60, 62

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