

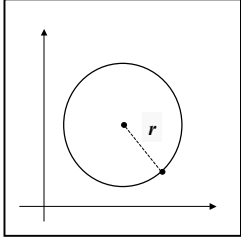
## The Equation of a Circle

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## The Equation of a Circle

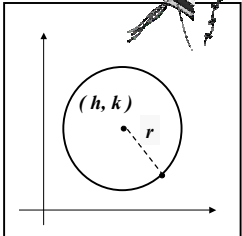
This is a circle of **radius,  $r$**



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## The Equation of a Circle

This is a circle of **radius,  $r$**  and **center** at the **point  $(h, k)$**

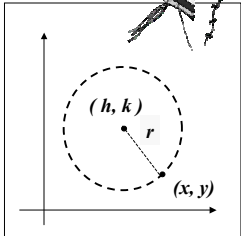


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## The Equation of a Circle

This is a circle of **radius,  $r$**  and **center** at the point  $(h, k)$ .

A **point  $(x, y)$**  is on the **circle** if its distance from the center is  $r$ .

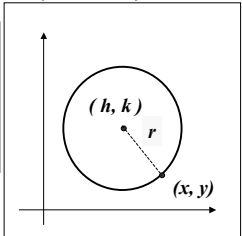


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## The Equation of a Circle

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

Knowing these relationships we can apply the **distance formula** to the two points.

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


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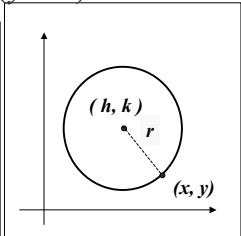
## The Equation of a Circle

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

Knowing these relationships we can apply the distance formula to the two points.

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

This leads to the **standard form of the equation of a circle** by squaring both sides.

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


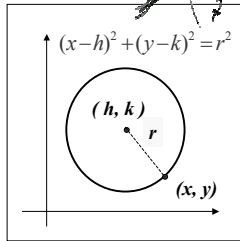
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## The Equation of a Circle

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

Standard form of an equation of a circle

- center is  $(h, k)$
- positive  $r$  is radius



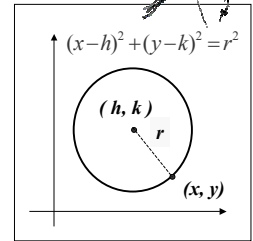
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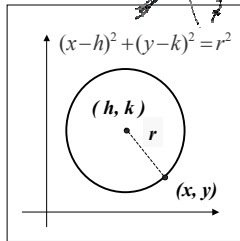
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## The Equation of a Circle

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

Standard form of an equation of a circle

- center is  $(h, k)$
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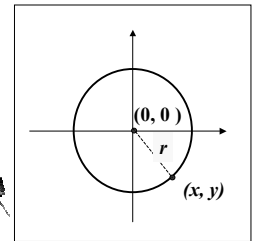
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## The Equation of a Circle

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

If the circle is centered at  $(0, 0)$ , or  $(h, k)$  is  $(0, 0)$  the equation of the circle is:

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



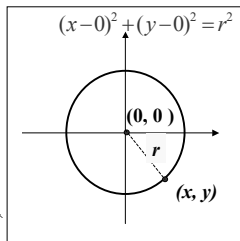
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## The Equation of a Circle

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

If the circle is centered at  $(0, 0)$ , or  $(h, k)$  is  $(0, 0)$  the equation of the circle is: or...

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



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## The Equation of a Circle

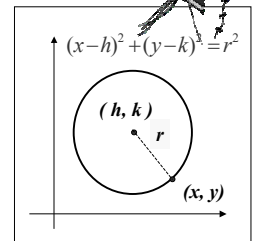
$$(x-h)^2 + (y-k)^2 = r^2$$

Standard form of an equation of a circle:

- center is  $(h, k)$
- positive  $r$  is radius

If the circle is centered at  $(0, 0)$ , or  $(h, k)$  is  $(0, 0)$  the equation of the circle is:

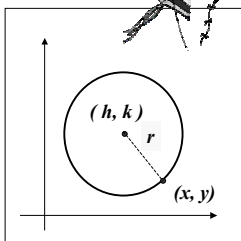
$$x^2 + y^2 = r^2$$



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## The Equation of a Circle

Standard form of an equation of a circle:  
 $(x-h)^2 + (y-k)^2 = r^2$

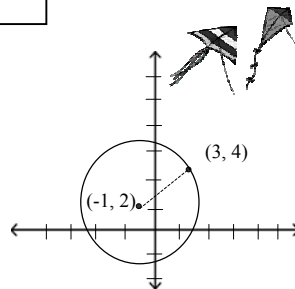


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## The Equation of a Circle

Find an Equation of a Circle

- with center at  $(-1, 2)$
- the point  $(3, 4)$  lies on the circle



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## The Equation of a Circle

**Math Alert:**  
To write the equation of a circle you must know three things:  
1) the **center**,  
2) the **radius**, and  
3) a **point** on the circle!



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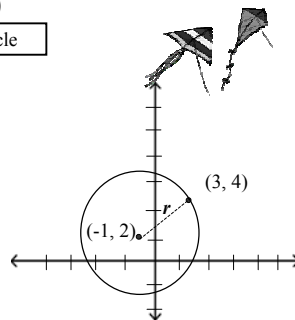
## The Equation of a Circle

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

Find an Equation of a Circle

Use the distance formula to find the **radius**...

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



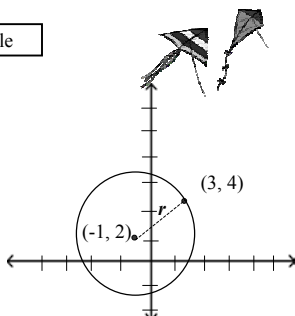
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## The Equation of a Circle

Find an Equation of a Circle

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

$$r = \sqrt{(3-(-1))^2 + (4-2)^2}$$



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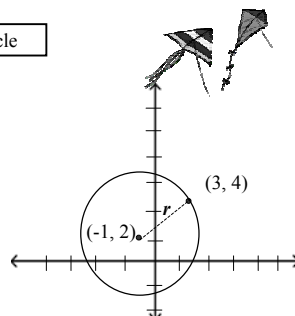
## The Equation of a Circle

Find an Equation of a Circle

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

$$r = \sqrt{(3-(-1))^2 + (4-2)^2}$$

$$r = \sqrt{4^2 + 2^2}$$



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## The Equation of a Circle

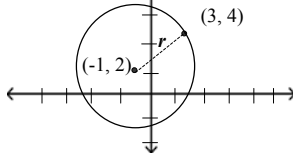
Find an Equation of a Circle

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

$$r = \sqrt{(3-(-1))^2 + (4-2)^2}$$

$$r = \sqrt{(4)^2 + (2)^2}$$

$$r = \sqrt{20}$$

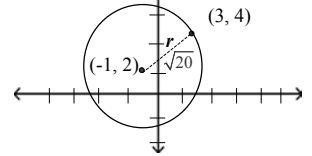


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## The Equation of a Circle

Find an Equation of a Circle

Now that we know the radius of  $\sqrt{20}$  and the center  $(h, k)$  is  $(-1, 2)$  we use the **standard form of the equation of a circle**.



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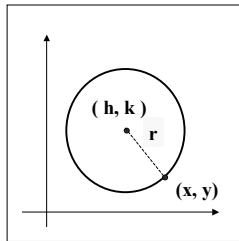
## The Equation of a Circle

**Standard form of an equation of a circle:**

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

our radius,  $r = \sqrt{20}$

and  $r^2 = 20$



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## The Equation of a Circle

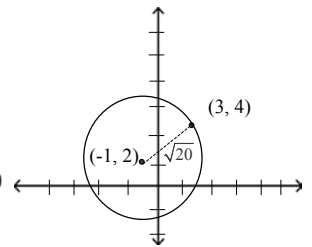
Find an Equation of a Circle

Using the **point (3,4)** the **center (-1,2)** and the found **radius**, we find the **final equation of the circle**.

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

$$(x-(-1))^2 + (y-2)^2 = 20$$

$$(x+1)^2 + (y-2)^2 = 20$$



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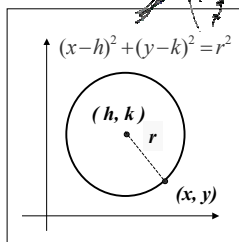
## The Equation of a Circle

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

**Standard form of an equation of a circle**

•center is  $(h, k)$

•positive  $r$  is radius



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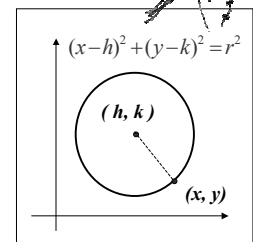
## The Equation of a Circle

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**Standard form of an equation of a circle**

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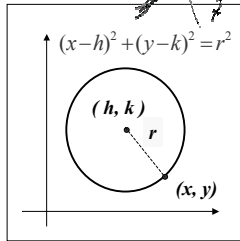
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## The Equation of a Circle

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

Standard form of an equation of a circle

- center is  $(h, k)$
- positive  $r$  is radius



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# You can do this!



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## The Equation of a Circle

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The End... push Home  

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