

Geometry CC – Mr. Valentino

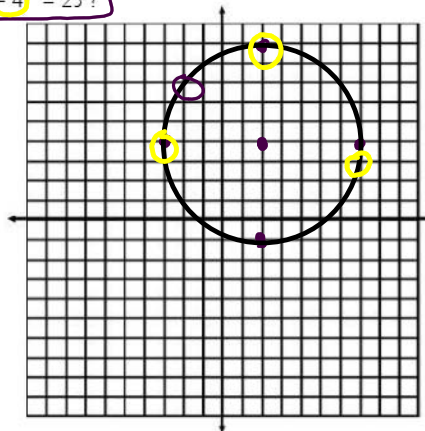
Unit 12 Day 2: Equation of a Circle (Completing the Square)!

Aim: How can we use completing the square to find the equation of a circle?

$\sqrt{25} \rightarrow 5$

Do Now: Which points lie on the circle whose equation is $(x-2)^2 + (y-4)^2 = 25$?

- Center (2, 4)
r = 5
- a) (2, 9) ✓
 - b) (-3, 4) ✓
 - c) (7, 3) ✗
 - d) (-2, 7) ✓
- $(7-2)^2 + (3-4)^2 = 25 + 1 = 26$



Explain how you know:

On the circle!

Sometimes the equation of a circle will be written in a different form (general form)

What is the center and radius of this circle?

$x^2 + 4x + y^2 - 6y = 12$



$x^2 + 4x + 4 + y^2 - 6y + 9 = 12 + 4 + 9$
 $(x+2)^2 + (y-3)^2 = 25$
 center $\rightarrow (2, 3)$
 radius $\rightarrow 5$

HALF IT
 SQUARE IT
 SHARE IT
 2X
 (once with x's)
 once with y's)

$(x+2)^2$
 $(x+2)(x+2)$
 $x^2 + 2x + 2x + 4$
 $x^2 + 4x + 4$

General Form of the Equation of a Circle
 $(x-h)^2 + (y-k)^2 = r^2$

Let's try completing the square for this equation to find the center and radius!

$x^2 - 10x + y^2 + 6y - 2 = 0$

$x^2 - 10x + y^2 + 6y = 2$
 $x^2 - 10x + 25 + y^2 + 6y + 9 = 2 + 25 + 9$
 $(x-5)^2 + (y+3)^2 = 36$
 center $(5, -3)$
 radius 6
 $\sqrt{36}$
 6

Find the center and radius of each circle by completing the square.

<p>1. $x^2 + 4x + y^2 - 6y = 36$</p> <p>Center: _____ Radius: _____</p>	<p>2. $x^2 + y^2 - 8x + 2y + 9 = 0$</p> <p>$x^2 - 8x + y^2 + 2y = -9$</p> <p>Center: _____ Radius: _____</p>
<p>3. $x^2 - 4x + y^2 + 8y = -11$</p> <p>Center: _____ Radius: _____</p>	<p>4. $x^2 + y^2 + 10y + 16 = 0$</p> <p>$x^2 + y^2 + 10y = -16$ $x^2 + 0x + 0$</p> <p>Center: <u>10,</u> Radius: _____</p>
<p>5. $x^2 + 8x + y^2 + 18y + 96 = 0$</p> <p>Center: _____ Radius: _____</p>	<p>6. $y^2 + x^2 = -12x + 2y + 27$</p> <p>Center: _____ Radius: _____</p>