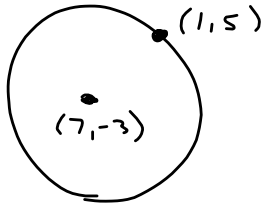DO NOW

Write the equation of the circle whose center is (7,-3) and goes through (1,5)

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

(1,5)

(7,-3)

$(1-7)^2 + (5+3)^2 = r^2$

$36 + 64 = r^2$

$100 = r^2$

$10 = r$

$(x-7)^2 + (y+3)^2 = 100$

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Using the process of completing the square (*twice!*), we can rewrite equations of circles in standard form

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

$(x-h)^2 + (y-k)^2 = r^2$
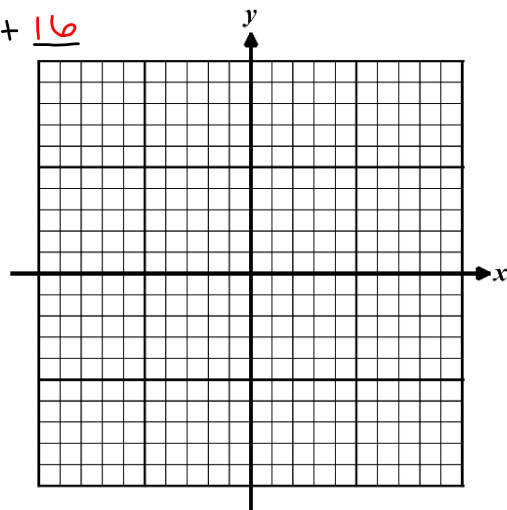
EX: What are the center and radius of the circle
$x^2 - 4x + y^2 - 8y = 5$? Graph the circle.

$x^2 - 4x + \underline{4} + y^2 - 8y + \underline{16} = 5 + \underline{4} + \underline{16}$

$\left(-\frac{4}{2}\right)^2 \quad \left(-\frac{8}{2}\right)^2$

$(x-2)^2 + (y-4)^2 = 25$

center: (2,4)

$r = 5$

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Place each circle in standard form and identify their center and radius

1) $(x^2 + 4x) + (y^2 - 2y) = 6$

$\left(\frac{4}{2}\right)^2 \qquad \left(-\frac{2}{2}\right)^2$

$x^2 + 4x + \underline{4} + y^2 - 2y + \underline{1} = 6 + \underline{4} + \underline{1}$

$(x+2)^2 + (y-1)^2 = 11$

$center = (-2, 1)$

$r = \sqrt{11}$

2) $x^2 + 14x + y^2 - 4y + 52 = 0$

$\qquad\qquad\qquad -52 \quad -52$

$x^2 + 14x + \underline{49} + y^2 - 4y + \underline{4} = -52 + \underline{49} + \underline{4}$

$(x+7)^2 + (y-2)^2 = 1$

$center = (-7, 2)$

$r = 1$

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Place each circle in standard form and identify their center and radius

3) $x^2 + y^2 - 12y = 13$

$x^2 + y^2 - 12y + \underline{36} = 13 + \underline{36}$

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

$center = (0, 6)$

$r = 7$

4) $3x^2 + 42x + 3y^2 + 12y - 33 = 0$

$\qquad\qquad\qquad\qquad +33 \quad +33$

$\dfrac{3x^2 + 42x + 3y^2 + 12y}{3} = \dfrac{33}{3}$

$x^2 + 14x + y^2 + 4y = 11$

$x^2 + 14x + \underline{49} + y^2 + 4y + \underline{4} = 11 + \underline{49} + \underline{4}$

$(x+7)^2 + (y+2)^2 = 64$

$c = (-7, -2)$

$r = 8$

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