

Name:

Date:

Period: 1

Algebra 1 Review: Solving Quadratic Equations by Completing the Square Equations of Circles by Completing the Square

Lesson Objective:

WBAT solve quadratic equations by completing the square; write eqns. of Cs in standard form by completing the square.

1. $x^2 - 6x - 55 = 0$

$$x^2 - 6x + \underline{9} = 55 + \underline{9}$$

$$(x-3)(x-3) = 64$$

$$\sqrt{(x-3)^2} = \sqrt{64}$$

$$x-3 = \pm 8$$

$$x = 3 \pm 8$$

$$x = 3 + 8 \quad x = 3 - 8$$

$$\boxed{x = 11 \text{ or } x = -5}$$

2. $n^2 = -14n - 37$

$$n^2 + 14n + \underline{49} = -37 + \underline{49}$$

$$(n+7)(n+7) = 12$$

$$\sqrt{(n+7)^2} = \sqrt{12} \rightarrow$$

$$n+7 = \pm \sqrt{12}$$

$$n = -7 \pm \sqrt{12}$$

$$\boxed{n = -7 \pm 2\sqrt{3}}$$

3. $x^2 + 15x + 15 = 2 + x$

$$x^2 + 14x + \underline{49} = -13 + \underline{49}$$

$$(x+7)(x+7) = 36$$

$$\sqrt{(x+7)^2} = \sqrt{36}$$

$$x+7 = \pm 6$$

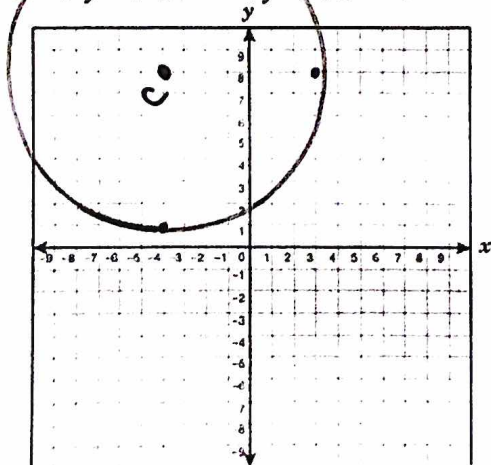
$$x = -7 \pm 6$$

$$x = -7 + 6 \quad x = -7 - 6$$

$$\boxed{x = -1 \text{ or } x = -13}$$

Equations of Circles by Completing the Square

4. $x^2 + y^2 + 8x - 16y + 31 = 0$



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

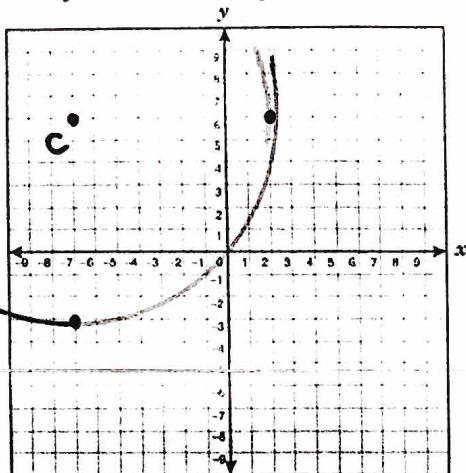
$$x^2 + 8x + \underline{16} + y^2 - 16y + \underline{64} = -31 + \underline{16} + \underline{64}$$

$$(x+4)(x+4) + (y-8)(y-8) = 49$$

$$\boxed{(x+4)^2 + (y-8)^2 = 49}$$

$$C: (-4, 8) \quad r = 7$$

5. $x^2 + y^2 + 14x - 12y + 4 = 0$



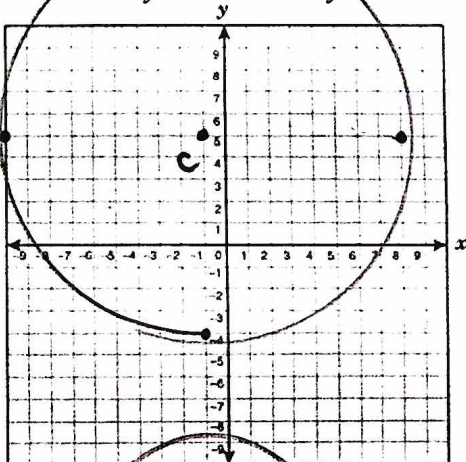
$$x^2 + 14x + \frac{49}{1} + y^2 - 12y + \frac{36}{1} = -4 + 49 + 36$$

$$(x+7)(x+7) + (y-6)(y-6) = 81$$

$$\boxed{(x+7)^2 + (y-6)^2 = 81}$$

$c: (-7, 6) \quad r=9$

6. $x^2 + 2x + y^2 = 55 + 10y$



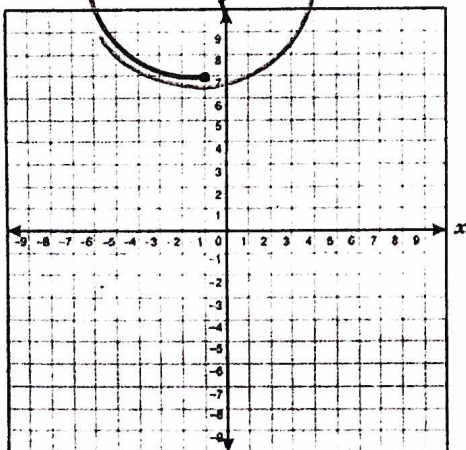
$$x^2 + 2x + \frac{1}{1} + y^2 - 10y + \frac{25}{1} = 55 + 1 + 25$$

$$(x+1)(x+1) + (y-5)(y-5) = 81$$

$$\boxed{(x+1)^2 + (y-5)^2 = 81}$$

$c: (-1, 5) \quad r=9$

7. $y^2 + 2x + x^2 = 24y - 120$



$$x^2 + 2x + \frac{1}{1} + y^2 - 24y + \frac{144}{1} = -120 + 1 + 144$$

$$(x+1)(x+1) + (y-12)(y-12) = 25$$

$$\boxed{(x+1)^2 + (y-12)^2 = 25}$$

$c: (-1, 12) \quad r=5$