Algebra 1 9.4

Complete the square to write perfect square trinomials

Solve equations by completing the square

trinomial

perfect square trinomial

quadratic term

linear term

constant term

algebra tiles

$(x+3)^2 = x+3$

$x+3$

$3x+9$

$x^2+3x$

$x^2+6x+9$

$a=1 \quad b=6 \quad c=9$

Algebra tiles

$(x+4)^2$

$x+4$

$x+4$

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$4x \quad 16$

$x^2 \quad 4x$

**GuidedPractice**

p s +

**1.** Find the value of $c$ that makes $r^2 + 8r + c$ a perfect square trinomial.

$r^2 + 8r + 16 = (p+4)^2$

**Find the value of $c$ that makes each trinomial a perfect square.**

1. $x^2 - 18x + 81 = (x-9)^2$

2. $x^2 + 22x + 121$

$(x+11)^2$

**Find the value of $c$ that makes each trinomial a perfect square.**

**10.** $x^2 + 26x + 169$ $(x+13)^2$

**11.** $x^2 - 24x + 144$ $(x-12)^2$

**12.** $x^2 - 19x + c$ $\left(x - \frac{19}{2}\right)^2$ $\frac{361}{4}$

$x^2 + 7x + \frac{49}{4}$ $\left(x + \frac{7}{2}\right)^2$

$\frac{7}{2} \cdot \frac{7}{2} = \frac{49}{4}$

$\frac{19}{2} \cdot \frac{19}{2}$

Embrace the fractions…(trust me)

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**16.** $x^2 - 22x + 121$

$(x-11)^2$

**17.** $x^2 - 15x + \frac{225}{4}$

$\left(x-\frac{15}{2}\right)^2$

**18.** $x^2 + 24x + 144$

$(x+12)^2$

**3.** $x^2 + 9x + c$

**4.** $x^2 - 7x + c$

**13.** $x^2 + 17x + c$

**14.** $x^2 + 5x + c$

**15.** $x^2 - 13x + c$

Solve a perfect square trinomial (Ch. 8):

$$\sqrt{(x+3)^2} = \sqrt{16}$$

$$x + 3 = \pm 4$$

$x = 1$ $\quad x + 3 = 4$, $\quad -3 \quad -3$

$x + 3 = -4$, $\quad -3 \quad -3$ $\quad x = -7$

**Example 2** Solve an Equation by Completing the Square

**Solve $x^2 - 6x + 12 = 19$ by completing the square.**

$-12 \quad -12$

$x^2 - 6x + 9 = 7 + 9$

$\sqrt{(x-3)^2} = \sqrt{16}$

$x - 3 = \pm 4$

$x - 3 = 4$ | $x - 3 = -4$

$+3 \quad +3$ | $+3 \quad +3$

$x = 7$ | $x = -1$

1. What is needed to build a perfect square? (start from a clean slate)
2. What has to happen (to both sides)?
3. Write in factored form
4. Now it's a PST :)
5. Solve (Ch. 8)
   Don't forget ±

**GuidedPractice**

**2.** Solve $x^2 - 12x + 3 = 8$ by completing the square.

$x = 12.4$
$x = -0.4$

$-3 \quad -3$

$x^2 - 12x + 36 = 5 + 36$

$\sqrt{(x-6)^2} = \sqrt{41}$

$x - 6 = \pm 6.40$

$x - 6 = 6.40$
$+6 \quad +6$

$x = 12.40$

$x - 6 = -6.40$
$+6 \quad +6$

$x = -0.40$

$$x^2 + 8x + 4 = 12$$
$$-4 \quad -4$$

$$x^2 + 8x + 16 = 8 + 16$$

$$\sqrt{(x+4)^2} = \sqrt{24}$$

$$x + 4 = \pm 4.90$$

$$x + 4 = 4.90$$
$$-4 \quad -4$$
$$x = 0.9$$

$$x = 0.9$$

$$x + 4 = -4.90$$
$$-4 \quad -4$$
$$x = -8.9$$

p. 576 (9.4)

1-4

11-23 odd