

Algebra 1 9.4

Complete the square to write perfect square trinomials

Solve equations by completing the square

trinomial

$$x^2 + 6x + 2$$

perfect square trinomial

quadratic term

linear term

constant term

algebra tiles

Algebra tiles

$$x^2 + 4x + 4$$

$$x^2 + 6x + ? \quad 9$$

$$x^2 + 8x + ? \quad 16$$

$$x^2 + 18x + ?$$

Guided Practice

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

$$r^2 + 8r + 16 = (r + 4)^2$$
$$\begin{array}{r} r + 4 \\ r + 4 \\ \hline 4r \ 16 \\ r^2 \ 4r \\ \hline r^2 + 8r + 16 \end{array}$$

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. $x^2 - 19x + \frac{361}{4}$

$$\left(x - \frac{19}{2}\right)^2$$

$$\frac{19}{2} \cdot \frac{19}{2} = \frac{361}{4}$$

$$\begin{array}{l}
 x^2 + 7x + \frac{49}{4} \\
 \hline
 \cancel{\left(x + 3\frac{1}{2}\right)^2} \\
 \left(x + \frac{7}{2}\right)^2
 \end{array}$$

$$\frac{7}{2} \cdot \frac{7}{2}$$

Embrace the fractions...(trust me)

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

$$(x-11)^2$$

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

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

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

$$(x+12)^2$$

3. $x^2 + 9x + \frac{81}{4}$

$(x + \frac{9}{2})^2$

P.576

$\left. \begin{array}{l} 1-4 \\ 10-19 \end{array} \right\} \text{all}$

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):

Example 2 Solve an Equation by Completing the Square

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

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

Guided Practice

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