

Solving Quadratic Equations by Completing the Square

Perfect Square Trinomials

- Examples

- $x^2 + 6x + 9$

- $x^2 - 10x + 25$

- $x^2 + 12x + 36$

Creating a Perfect Square Trinomial

- In the following perfect square trinomial, the constant term is missing.

$$x^2 + 14x + \underline{\quad}$$

- Find the constant term by squaring half the coefficient of the linear term.

- $(14/2)^2$
 $x^2 + 14x + 49$

Perfect Square Trinomials

- Create perfect square trinomials.

- $x^2 + 20x + \underline{\quad}$ 100

- $x^2 - 4x + \underline{\quad}$ 4

- $x^2 + 5x + \underline{\quad}$ 25/4

Name _____

Date _____

**Completing the Square in a Quadratic Expression –
Independent Practice Worksheet**

Find the missing value to make the polynomials a perfect-square quadratic.

1. $t^2 - 18t + \underline{\hspace{2cm}}$

2. $a^2 - 20a + \underline{\hspace{2cm}}$

3. $b^2 - 22b + \underline{\hspace{2cm}}$

4. $k^2 - 24k + \underline{\hspace{2cm}}$

5. $n^2 - 26n + \underline{\hspace{2cm}}$

6. $c^2 - 4c + \underline{\hspace{2cm}}$

7. $p^2 - 6p + \underline{\hspace{2cm}}$

8. $m^2 - 28m + \underline{\hspace{2cm}}$

9. $z^2 - 30z + \underline{\hspace{2cm}}$

10. $z^2 - 32z + \underline{\hspace{2cm}}$



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Completing the Square in a Quadratic Expression - Matching Worksheet

Match the missing value to make the polynomials a perfect-square quadratic.

_____ 1. $b^2 - 10b +$ _____ a. 400

_____ 2. $r^2 - 12r +$ _____ b. 289

_____ 3. $c^2 - 20c +$ _____ c. 196

_____ 4. $x^2 - 28x +$ _____ d. 25

_____ 5. $a^2 - 16a +$ _____ e. 324

_____ 6. $n^2 - 34n +$ _____ f. 81

_____ 7. $z^2 - 36z +$ _____ g. 100

_____ 8. $q^2 - 38q +$ _____ h. 64

_____ 9. $b^2 - 40b +$ _____ i. 36

_____ 10. $k^2 - 18k +$ _____ j. 361



Step 1 for Completing the Square:

<p>1. Be sure that the coefficient of the highest power is one. If it is not, divide each term by that value to create a leading coefficient of one.</p>	$x^2 + 8x - 4 = 0$
<p>2. Move the constant term to the right hand side.</p>	$x^2 + 8x = 4$
<p>3. Prepare to add the needed value to create the perfect square trinomial. Be sure to balance the equation. The boxes may help you remember to balance.</p>	$x^2 + 8x + \square = 4 + \square$
<p>4. To find the needed value for the perfect square trinomial, take half of the coefficient of the <i>middle term</i> (x-term), square it, and add that value to both sides of the equation.</p> <p style="text-align: center;">Take half and square</p> <div style="text-align: center;"> $x^2 + 8x + \square = 4 + \square$ </div>	$x^2 + 8x + \boxed{16} = 4 + \boxed{16}$
<p>5. Factor the perfect square trinomial.</p>	$(x + 4)^2 = 20$
<p>6. Take the square root of each side and solve. Remember to consider both plus and minus results.</p>	$x + 4 = \pm \sqrt{20}$ $x = -4 \pm \sqrt{20} = -4 \pm 2\sqrt{5}$ $x = -4 + 2\sqrt{5}$ $x = -4 - 2\sqrt{5}$

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Topic: Completing the Square - Worksheet 1

1. $x^2 + 8x - 6 = 0$

2. $x^2 + 6x + 9 = 0$

3. $x^2 + 4x - 10 = 0$

4. $x^2 + 8x + 7 = 0$

What values would be placed in the boxes to create perfect square trinomials?

5.

$$x^2 + 16x + \square$$

6.

$$x^2 - 3x + \square$$



Solving Equations by Completing the Square

Solve each equation by completing the square.

1) $a^2 + 2a - 3 = 0$

2) $a^2 - 2a - 8 = 0$

3) $p^2 + 16p - 22 = 0$

4) $k^2 + 8k + 12 = 0$

5) $r^2 + 2r - 33 = 0$

6) $a^2 - 2a - 48 = 0$

7) $m^2 - 12m + 26 = 0$

8) $x^2 + 12x + 20 = 0$

9) $k^2 - 8k - 48 = 0$

10) $p^2 + 2p - 63 = 0$

11) $m^2 + 2m - 48 = -6$

12) $p^2 - 8p + 21 = 6$

$$13) m^2 + 10m + 14 = -7$$

$$14) v^2 - 2v = 3$$

$$15) 5v^2 - 21 = 10v$$

$$16) 4v^2 + 16v = 65$$

$$17) 7b^2 - 14b - 56 = 0$$

$$18) 2n^2 + 12n + 10 = 0$$

$$19) n^2 + 13n + 22 = 7$$

$$20) 5n^2 + 19n - 68 = -2$$

$$21) r^2 - 9r - 38 = -9$$

$$22) 3x^2 + 20x + 36 = 4$$

$$23) x^2 + 7x - 45 = 7$$

$$24) n^2 + 19n + 66 = 6$$