

Completing the Square Worksheet

To solve $ax^2 + bx + c = 0$ by "completing the square":

- 1) Put the variable terms are on the left of the equal sign, in standard form, and the constant term is on the right. So, get it into the form $ax^2 + bx = c$.
- 2) Divide by " a ", so the coefficient of x^2 is 1.
- 3) Take one-half the coefficient of the x-term, squaring it, and adding this quantity to both sides of the equation. Basically, add $\left(\frac{b}{2}\right)^2$ to both sides.
- 4) Factor the Perfect Square Trinomial on the left side of the equation and simplify the right side. Remember, it always factors into $\left(x + \frac{b}{2}\right)^2$
- 5) Use the principle of square roots
- 6) Solve the remaining equation
- 7) Check your answer in the original equation.

Solve each equation by completing the square.

1. $x^2 - 2x - 15 = 0$

2. $x^2 + 2x = 35$

3. $2x^2 + 8x - 7 = -2$

4. $8x = 4x^2 - 1$

5. $2x^2 - 4x + 5 = 6$

6. $6x = 4x^2 - 1$

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

8. $x^2 - 7x = 18$

9. $3x^2 - 2x - 2 = 4$

10. $-7x = 3x^2 - 1$

11. $x^2 - 2x - 1 = 2$

12. $x^2 + 3x = 40$

13. $x^2 + 4x = 3$

14. $7x = 4x^2 - 1$

Answers:

1. $x = -3, x = 5$

2. $x = -7, x = 5$

3. $x = \frac{-4 + \sqrt{26}}{2}, x = \frac{-4 - \sqrt{26}}{2}$

4. $x = \frac{2 + \sqrt{5}}{2}, x = \frac{2 - \sqrt{5}}{2}$

5. $x = \frac{2 + \sqrt{6}}{2}, x = \frac{2 - \sqrt{6}}{2}$

6. $x = \frac{3 + \sqrt{13}}{4}, x = \frac{3 - \sqrt{13}}{4}$

7. $x = -4, x = 2$

8. $x = -2, x = 9$

9. $x = \frac{1 + \sqrt{19}}{3}, x = \frac{1 - \sqrt{19}}{3}$

10. $x = \frac{-7 + \sqrt{61}}{6}, x = \frac{-7 - \sqrt{61}}{6}$

11. $x = -1, x = 3$

12. $x = -8, x = 5$

13. $x = -2 + \sqrt{7}, x = -2 - \sqrt{7}$

14. $x = \frac{7 + \sqrt{65}}{8}, x = \frac{7 - \sqrt{65}}{8}$