

Useful Guidelines:

- * Quadratic Equation: $f(x) = ax^2 + bx + c = 0 (a \neq 0)$, where a , b and c are real numbers.
- * Square Root Property: If x and k are complex numbers and $x^2 = k$, then $x = \sqrt{k}$ or $x = -\sqrt{k}$.
- * Completing the Square: To solve $ax^2 + bx + c = 0 (a \neq 0)$:
 - Step 1: If $a \neq 1$, divide each side by a .
 - Step 2: Write the equation with the variable terms on one side and the constant on the other.
 - Step 3: Take half the coefficient of x and square it.
 - Step 4: Add the square to both sides of the equation.
 - Step 5: Factor the perfect square of a trinomial, write it as the square of a binomial, and simplify.
 - Step 6: Use the square root property to complete the solution and write down the solution set.

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Use the square root property to solve each equation and give the solution set.

1. a) $x^2 = 49$

$x = \pm 7$

Sol Set: $\{7, -7\}$

c) $(x-4)^2 = 25$

$x-4 = \pm 5$

$x-4 = 5 \quad x-4 = -5$
 $\frac{x-4}{+4} = \frac{5}{+4} \quad \frac{x-4}{+4} = \frac{-5}{+4}$
 $x = 9 \quad x = -1$

Sol Set: $\{9, -1\}$

b) $x^2 - 8 = 0$

$x^2 = 8$

$x = \pm 2\sqrt{2}$

Sol Set: $\{2\sqrt{2}, -2\sqrt{2}\}$

d) $(2x-5)^2 = 12$

$2x-5 = \pm 2\sqrt{3}$

$\frac{2x}{2} = \frac{5 \pm 2\sqrt{3}}{2}$

Sol Set: $\{x | x = \frac{5}{2} \pm \sqrt{3}\}$

Solve each equation by completing the square and give the solution set.

2. a) $\frac{2x^2}{2} + \frac{8x}{2} + \frac{2}{2} = 0$

$x^2 + 4x + 1 = 0$
 $\quad \quad \quad -1 \quad -1$

$x^2 + 4x + 4 = -1 + 4$

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

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

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

$\frac{x+2}{-2} = \frac{\pm\sqrt{3}}{-2}$
 $x = -2 \pm \sqrt{3}$

Sol Set: $\{x | x = -2 \pm \sqrt{3}\}$

b) $z^2 - 10z + 15 = 0$

$\quad \quad \quad -15 \quad -15$

$z^2 - 10z + 25 = -15 + 25$

$z^2 - 10z + 25 = 10$

$(z-5)(z-5) = 10$

$\sqrt{(z-5)^2} = \sqrt{10}$

$z-5 = \pm\sqrt{10}$
 $\frac{z-5}{+5} = \frac{\pm\sqrt{10}}{+5}$

Sol Set: $\{x | x = z = 5 \pm \sqrt{10}\}$