

Quadratic Equations

1. **Definition of a quadratic equation in one variable:** If a, b and c are real numbers such that $a \neq 0$, then a **quadratic equation** is an equation that can be written in the form:

$$ax^2 + bx + c = 0$$

2. **The zero product property:** If $ab = 0$, then $a = 0$ or $b = 0$.
3. **Procedure for solving a quadratic equation by factoring:**
- (a) Write the equation in form $ax^2 + bx + c = 0$.
 - (b) Factor completely.
 - (c) Apply the zero product rule. That is, set each factor equal to zero and solve the resulting equations.
4. **Solve the following equations. Be sure to check your work.**

(a) $y^2 - 2y = 35$

(b) $9x^2 = 21x$

5. **The square root property:** For any real number, k , if $x^2 = k$, then $x = \sqrt{k}$ or $x = -\sqrt{k}$.
6. **Solve the following equations. Be sure to check your work.**

(a) $8x^2 + 72 = 0$

(b) $(t - 5)^2 = 18$

7. Procedure for solving a quadratic equation by completing the square and applying the square root property:

(a) Divide both sides by a to make the leading coefficient 1.

(b) Isolate the variable terms on one side of the equation.

(c) Complete the square.

- i. Add the square of one-half the linear term coefficient to both sides, $(\frac{1}{2}b)^2$.
- ii. Factor the resulting perfect square trinomial.

(d) Apply the square root property and solve for x .

8. Solve the following equations. Be sure to check your work.

(a) $z^2 - 4z + 26 = 0$

(b) $4x^2 + 12x = 5$