6.6 Solving Quadratics by Factoring

Definition 6.6.1 (Quadratic Equation)
A quadratic equation is an equation of the form $ax^2 + bx + c = 0$ where $a \neq 0$.

We solve a quadratic equation by using the *zero-product principle* to find the *roots/zeroes/solutions/x-intercepts*.

Definition 6.6.2 (Zero-Product Principle)
If $ab = 0$, then $a = 0$, $b = 0$ or both a and b equal 0.

Example 6.6.1
Solve the equation and check.

$$(2x + 1)(x - 4) = 0$$

Solving a Quadratic Equation by Factoring

1. Rewrite the equation in standard form.
2. Factor using an appropriate method.
3. Apply the zero-product rule and set each factor equal to 0.
4. Solve the equations from the previous step.
5. Check your solutions.

Example 6.6.2
Solve for x: $x^2 - 6x + 5 = 0$

Example 6.6.3
Solve for x: $4x^2 = 2x$

Example 6.6.4
Solve for x: $x^2 = 10x - 25$

Example 6.6.5
Solve for x: $16x^2 = 25$

Example 6.6.6
Solve for x: $(x-5)(x-2) = 28$