§1.4 Quadratic Equations

Quadratic Equation: an equation which can be written in the form $ax^2 + bx + c = 0$ where a, b, c are real numbers and $a \neq 0$. This is also called standard form.

1) Solving by Factoring

Zero-Factor Property - If a and b are complex numbers with ab = 0, then a = 0 or b = 0 or both.

Square Root Property - If $x^2 = k$, then $x = \pm\sqrt{k}$.

example: Solve a) $6r^2 + 7r = 3$ b) $m^2 = 20$

2) Solving by Completing the Square $ax^2 + bx + c = 0$

1.) Start in standard form.
2.) Divide each side by the coefficient of x^2. (If it does not = 1)
3.) Move constant term.
4.) Square half the coefficient of x and add to both sides.
5.) Factor the perfect square.
6.) Solve using the square root property.

example: Solve(by completing the square) $z^2 - 6z + 2 = 0$

3) Solving Using the Quadratic Formula

The solutions of $ax^2 + bx + c = 0$ are $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$.

Note: The fraction bar in the quadratic formula extends under the –b term in the numerator.

example: Solve(by quadratic formula) $x^2 - 4x + 2 = 0$