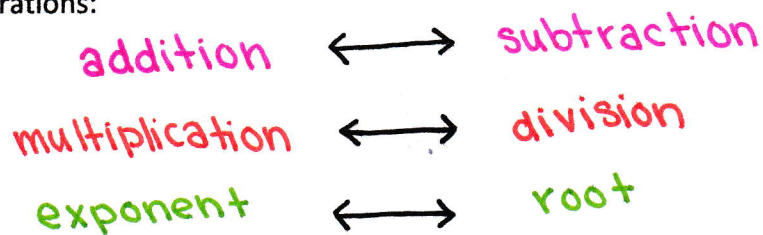


Lesson 1.5 & 1.6: Solving Equations & Modeling with Equations

Solving Equations

"Undoing" Operations:



Solving Quadratic Equations

Standard Form of a Quadratic Equation:

$$f(x) = ax^2 + bx + c \quad (a \neq 0)$$

Methods for solving quadratic equations:

1. Quadratic Formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ (always works!)
2. Completing the Square (works best when $a = 1$)
3. Factoring (does not always work)

The discriminant of the general quadratic equation $ax^2 + bx + c = 0$ ($a \neq 0$) is calculated by the equation $D = b^2 - 4ac$.

The discriminant tells us the number of solutions a quadratic equation has.

Three Cases	
$D > 0$	Two Solutions
$D = 0$	One Solution
$D < 0$	No Solutions

Modeling with Equations

Guideline for Modeling with Equations:

- 1) Identify the variable(s). Use "let" statements.
- 2) Translate from words to algebra using operation words.
- 3) Set up equation(s) based on the variables & operation words.
- 4) Solve the equation & check your answer (does it make sense in the context of problem)

Problems Involving Simple Interest

Simple Interest is an annual percentage of the total amount borrowed or deposited.

$$\begin{array}{c} \text{interest} \\ \text{accrued} \end{array} \rightarrow I = P r t \leftarrow \begin{array}{c} \text{interest} \\ \text{rate} \\ \text{time} \end{array}$$

↑
principal
(initial deposit)

Example:

\$1,000 is deposited at 5% simple interest annually. How much interest has been accrued after 3 years?

$$\begin{aligned} I &= Prt \\ I &= (1000)(0.05)(3) \\ I &= (3000)(0.05) \\ I &= 150 \end{aligned}$$

\$150 in interest will be accrued after 3 years.