Section 1.4 Equations and Inequalities

Equations

An equation is formed when an equal sign is placed between two expressions creating a left side and a right side of the equation. An equation that has one or more variables is called an open sentence.

$4 - x = 2$
$2x + 4 = 10$

When the variable is replaced by a number the resulting statement is true or false. If the statement is **true**, it is called a **solution** to the equation.

Examples: Check if the given numbers are solutions to the equation.

Is 3 a solution to $2x + = 10$?

Substitute 3 for the variable:	$2(3) + 4 = 10$
Simplify	$6 + 4 = 10$
True or False?	$10 = 10$
True: 3 is a solution	

Is –2 a solution to $2x + 10 = 4$?

Substitute –2 for the variable	$2(-2) + 10 = 4$
Simplify	$-4 + 10 = 4$
True or False	$6 = 4$
False: -2 is NOT a solution	

Use mental math to solve the equation

$3x = 12$	What number times 3 is 12?
4 times 3 = 12	The answer is **4**.

Inequalities

Inequalities are open sentences where the equal sign is replaced with an inequality symbol. Inequality symbols are as follows:

$x < 10$	x is less than 10
$x > 7$	x is greater than 7
$x \leq 5$	x is less than or equal to 5
$x \geq 4$	x is greater than or equal to 4

You check solutions to inequalities the same way as equations. You substitute in for the variable and then work each side and check if the statement is true or false.

Example: Is 4 a solution to $2x + 3 > 10$?

Substitute	$2(4) + 3 > 10$
Simplify	$8 + 3 > 10$
True or False	$11 > 10$
True: 4 is a solution.	

Example: Is –5 a solution to $2x + 3 < 2$?

Substitute	$2(-5) + 3 < 2$
Simplify	$-10 + 3 < 2$
True or False	$-7 < 2$

False: -5 is NOT a solution.