

Unit 1 Day 2
Closure Notes



CLOSURE

A **set** has **closure** under an **operation** if the operation is performed on **elements** of the set and the result is in the original set. Say What?!?! OK, we need to define some terms.

Set: LIST of #'s

Operation: + - x ÷

Elements: parts of the Set

Let's look at an example of Closure: Integer + Integer = Integer

So we would say that integers are CLOSED under addition because we can pick ANY two integers and add them and we end up with another INTEGER.

BIG IDEA! If we want to say that a statement is false we need to provide a Counter-example

Example: Are **natural** numbers **closed** under **subtraction**?

True Example:

$$5 - 2 = 3 \quad \checkmark$$

Counter-Example:

$$2 - 5 = -3 \quad \times$$

So **natural** numbers are not closed under **subtraction**.

Your turn!

Decide with your partner if the following statements are *TRUE* or *FALSE*. If it is false, provide a counter-example.

Integers are closed under **multiplication**. *TRUE*

Rationals are closed under **multiplication**. *TRUE*

Integers are closed under **division**. *False*

$$-2 \div 3 = -\frac{2}{3}$$

Whole numbers are closed under **division**. *FALSE*

$$2 \div 3 = \frac{2}{3}$$

Create a closure statement using addition, subtraction, multiplication, and division.