Algebra RH

Essential Question: What is the closure property?

do now

Consider the set of whole numbers. Choose two whole numbers: _____ and _____

a) add the whole numbers = _____. Is the result a whole number? ____
Will the result ***always*** be a whole number for any pair of whole numbers? ____

b) subtract the whole numbers = _____. Is the result a whole number? ____
Will the result ***always*** be a whole number for any pair of whole numbers? ____

c) multiply the whole numbers = _____. Is the result a whole number? ____
Will the result ***always*** be a whole number for any pair of whole numbers? ____

d) divide the whole numbers = _____. Is the result a whole number? ____
Will the result ***always*** be a whole number for any pair of whole numbers? ____

Closure Property

A set is ***closed*** (under an operation) if and only if the operation on two elements of the set produces another element of the set. If an element outside the set is produced, then the operation is ***not closed***.

Tell whether the set is closed under the operation. If it is not closed, justify your answer using an example.

Set	Operation	Closed/Not Closed	Example
1) Rational numbers	subtraction		
2) {-1, 0, 1, 2}	addition		
3) Even integers	division		
4) Positive irrational numbers	addition		
5) Integers	multiplication		

6) Under what operation(s) is the set of rational numbers NOT closed? _____

It's Your Turn Now!

Set	Operation	Closed/Not Closed	Example
7) Negative integers	addition		
8) Negative integers	multiplication		
9) {-2, 0, 2}	subtraction		
10) $\{\frac{1}{2}, 1, 2\}$	division		
11) Rational numbers	division		

12) Under what operation(s) is the set of irrational numbers NOT closed? _____

13) Consider a set of numbers that is closed under addition and subtraction. What number must be in such a set? Explain. _____

_____

14) Consider a set of numbers that is closed under multiplication and division. What number must be in such a set? Explain. _____

_____

How do we determine if a set of numbers is closed?