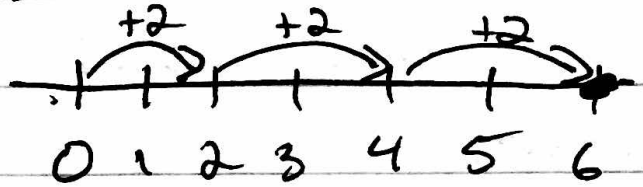
Lesson 2.3: Multiplying and Dividing Integers

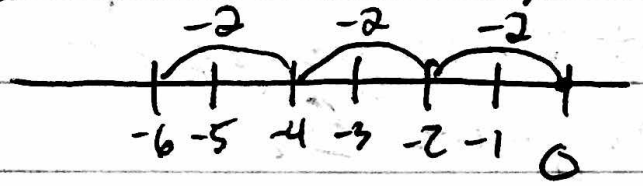
Examples

Evaluate $3 \cdot 2$



$3 \cdot 2 = 2 \cdot 3$
$= 2+2+2$
$= 6$

Evaluate $3 \cdot (-2)$



$3 \cdot (-2) = (-2) \cdot 3$

- Using a number line, we can see that $3 \cdot 2$ is repeated addition.
  → $3 \cdot 2$ means three groups of 2.

Commutative Property of Multiplication =
Two numbers can be multiplied in any order.
→ $3 \cdot (-2)$ means three groups of -2.
→ $3 \cdot (-2)$ can also be written as $3(-2)$
→ $(-2) \cdot 3$ can also be written as $-2(3)$.

$a \cdot b = ab$
where a is positive and b is positive.

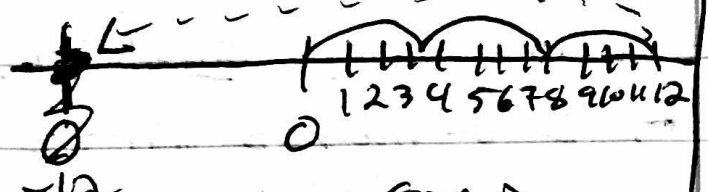
$a \cdot (-b) = -ab$

The Product of two positive integers remains positive!
The Product of a positive and negative integer become negative!

$-3 \cdot 4$

~~What about two negatives?~~

Evaluate ~~$3 \cdot (-4)$~~



$-3 \cdot 4 = -(3)(4)$

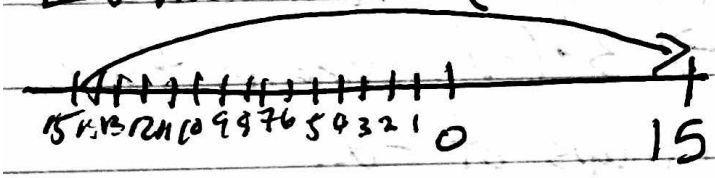
~~$= 3 \cdot 2 = (3)(2)$~~

$= -12$

$-3 \cdot 4$ is the opposite of three groups of four.

Take the product of 3 and 4 then add the negative.

Evaluate $-3 \cdot (-5)$



$-3 \cdot (-2) = -(3)(-2)$

$= -(-6)$

$= 6$

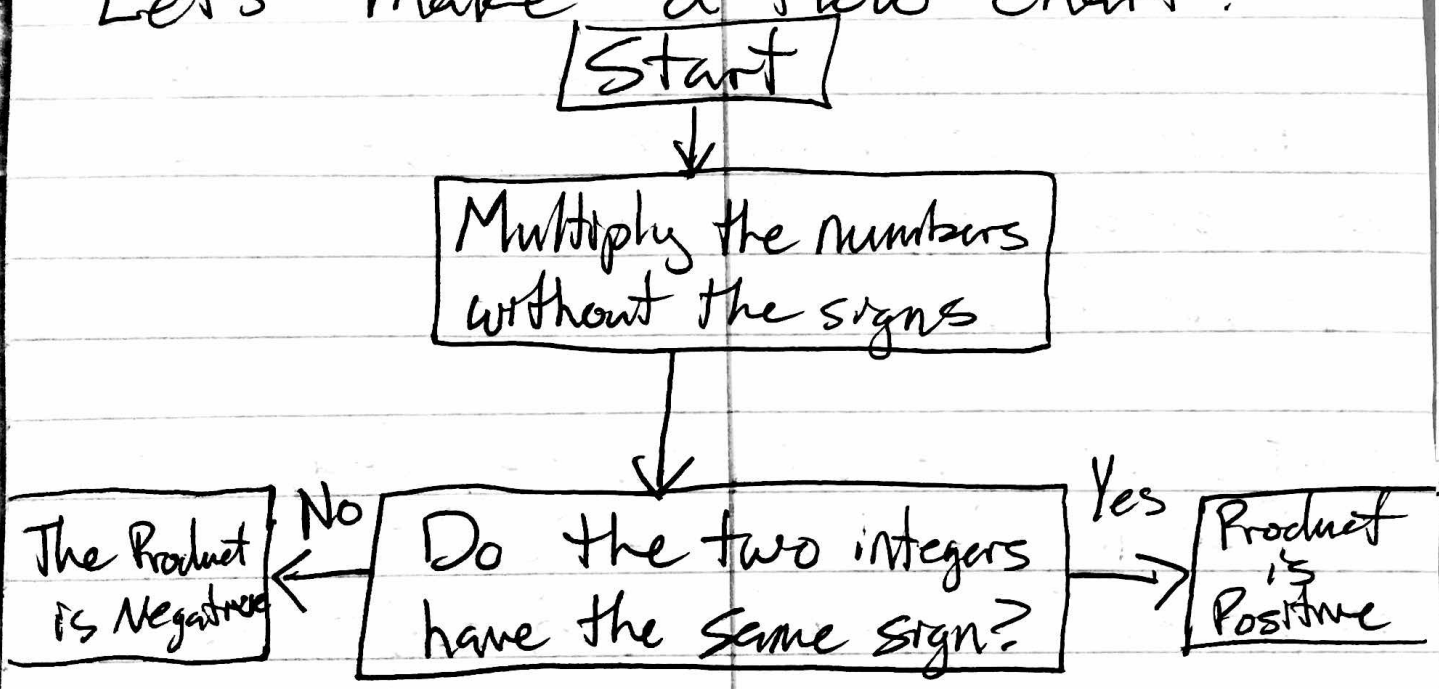
$-3 \cdot (-5)$ is the opposite of three groups of negative 5.

Two negatives make a positive

$-a \cdot (-b) = ab$

The Product of two negative integers is positive!

Let's make a flow chart!



If a, b, and c are integers, $(ab)c = a(bc)$

Associative Property of Multiplication

Examples:

$-1 \cdot 2 \cdot 3$

$= -2 \cdot 3$

$= -6$

or

$-1 \cdot 2 \cdot 3$

$= -1 \cdot 6$

$= -6$

Multiply the product of two integers with the same sign is negative.

~~Ints~~ Integers w/ same sign

Integers w/ ~~same~~ different sign

What will the product of three negative numbers be positive or negative?

$(-a)(-b)(-c)$

Negative, $(-a)(-b) = ab$,
$(ab)(-c) = -abc$

What will the product of four negative numbers be positive or negative?

$(-a)(-b)(-c)(-d)$

Positive, $(-a)(-b) = ab$
$(-c)(-d) = cd$
$(ab)(cd) = abcd$

or

$(-a)(-b)(-c)(-d)$
$= (ab)(-c)(-d)$
$= (-abc)(-d)$
$= (abcd)$

What about Dividing Integers?

$a \div (-b) = -\frac{a}{b}$
$-a \div (b) = -\frac{a}{b}$
$-a \div (-b) = \frac{a}{b}$
$a \div (b) = \frac{a}{b}$

Dividing Integers uses all the same properties as multiplication.
Negative
Negative
Positive
Positive

$$-\frac{m}{n} = \frac{-m}{n} = \frac{m}{-n}$$

The negative can be placed in either numerator or denominator for negative fractions!

Dividing Integers

Examples:

1) $15 \div 3 = ?$
$= 5$

Positive, 5

2) $-25 \div (-5) = ?$
$= 5$

Positive, 5

3) $-81 \div 3 = ?$
$= -27$

Negative, -27

Homework 8

2.3 Pg. #10-21, 22-29

Alternative Homework 8

2.3 Pg. #19-21, 30-35