Opposites

Negative Integers   Positive Integers

Unit 2:

Multiplication & Division of Integers

negative   positive

Multiplying Integers with Two Color Counters
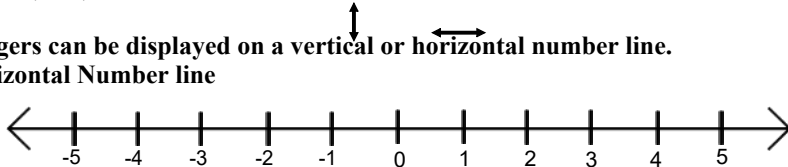
$$4 \times 2 =$$

"Add 4 copies of 2."

Integers

Integers are positive and negative whole numbers.ex. -4, +8, -25

Rational numbers are almost all negative and positive numbers, including decimals and fractions.

Opposite integers are the same number but have different signs. Ex. -9,+9 ; -16,+16; +24,-24; +7,-7

Integers can be displayed on a vertical or horizontal number line.
Horizontal Number line

When comparing integers on a number line, numbers to the left are negative and numbers to the right of zero are positive. The number to the right is always greater. Positive integers are always greater than negative integers.

The zero principle states that a positive and a negative together will always give you zero.

You can represent integers using algebra tiles. When you draw the tiles, shaded represent positive and unshaded represents negative.

Algebra Tiles

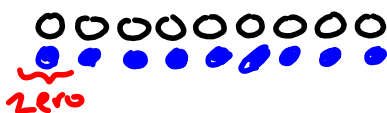yellow **1**   red **-1**

textbook uses colors

-1   1
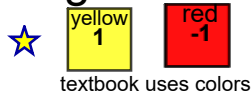
Remember that we use shaded for + and unshaded for -

+ is yellow in the textbook

- is red in the textbook
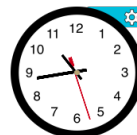
Remember from last year Adding or Subtracting Integers

Adding (Draw in different levels both integers)

1)   top   Bottom
      (-9) + (+9) = ⟵ zero

zero

(+5) + 0 = +5

Subtracting (remove but may need to make zero pairs)

2) unshaded ⟵ shaded
    (-2) - (+3) =   use zeros

Step 1: Draw first integer

Step 2: Then subtract means to REMOVE the second integer

= OOOOO

HINT: May need to use zero pairs

Multiplying Integers by Modeling TILES

remember

| -1 | 1 |

or

○ or ●

Ex1)

put down → Shaded

★ What does (+2) x (+3) mean?
2 groups of +3

★ • • •   • • •

(+2) x (+3) = + **+6**

Ex2) put down

★ What does (+4) x (+2) mean?
4 groups of +2

★ • •   • •   • •   • •

(+4) x (+2) = + **+8**

Ex3) What does (+3) x (-3) mean?
★ 3 groups of -3   ← unshaded

★ ooo   ooo   ooo

(+3) x (-3) = · **-9**

Ex4) What about (+6) x (-1)?
★ 6 groups of -1

o   o   o   o   o   o

(+6) x (-1) = - **-6**

Ex5) What about (-4) x (+3)?
★ 3 groups of -4   You can use the Commutative rule when multiplying

$(-4) \times (+3) = (+3) \times (-4)$ order **does not** matter

★ ooo ooo ooo ooo

oo oo oo

(-4) x (+3) = · **-12**

⟹ ooo ooo ooo ooo

(- 12)

OR

If the first integer is positive it means lay down.....

But

If the first intinger is NEGATIVE then it means take away groups (Since starting with negative you need zero pairs)

can also model   (-4) x (+3) as follows (Always start with zero)

What is the rule for multiplying a positive integer by a positive integer?

⭐When you multiply two positive integers, you simply multiply the numbers and your answer will always be positive.

(+7) x (+5) = **+35**   (+12) x (+10) = **+120**

(+) x (+) = (+)

What is the rule for multiplying a positive integer by a negative integer? Does the order matter?

⭐When you multiply a positive integer and a negative integer, you multiply the numbers, and your answer will always be negative.

(+6) x (-3) = **−18**   (+9) x (-4) = **−36**
(-8) x (+6) = **−48**   (-4) x (+ 7) = **−28**

(+) x (-) = (-)

(-) x (+) = (-)

Your turn   **Multiplying Two Negative Integers**
Using TILES

We just said , (+2) x (-4) means 2 sets of -4, but we always start with zero,so what are we doing with the 2 sets of -4?

oooo   oooo

If (+2) x (-4) means to put down 2 sets of -4, what does (-2) x (-4) mean? (Always start with zero)
It means to take away 2 groups of -4

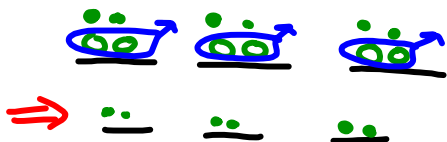Redraw whats left after removing

= •••• ••••

So (-2) x (-4) = +8

What about (-3) x (-2)?   It means take away 3 groups of -2.

zero pairs

⇒ •• •• ••

So (-3) x (-2) = +6

Now try (-5) x (-1)

(-5) x (-1) =

So when you multiply two negative integers, multiply the numbers and your answer will always be_____

Final Multiplying rule   (-) x (-) =

Rule

$(+) \times (+) = +$

$(-) \times (-) = +$

Sign same $\Rightarrow +$

$(+) \times (-)$
$(-) \times (+)$ $\Rightarrow (-)$

different sign $\Rightarrow$ neg

Number line Modeling ^{think jumps}

- we will focus on (+) x (-)   or (+) x (+)

#Jumps

Jump size

(+2) x (+5) = + 10

Always start at zero

Jump1

-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10

Ex 2) (+3) x (-2) = -6

-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10

Ex 3) (-2) x (+4)   use commutative rule

-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10
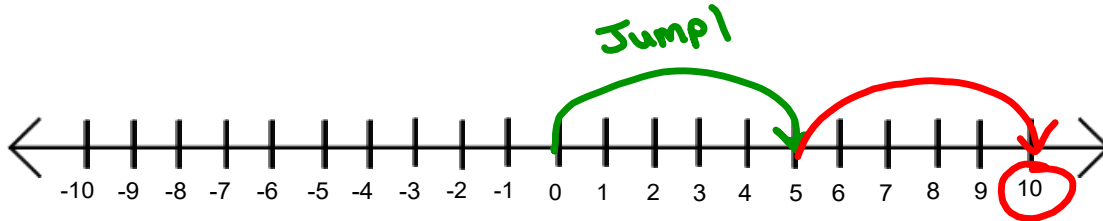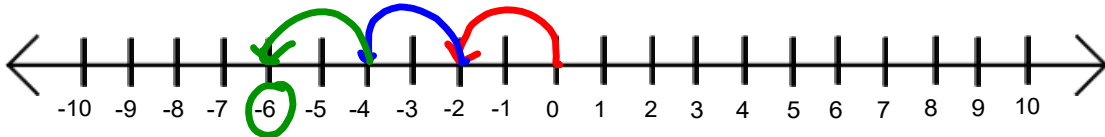
Homework/ Class Work

pg. 68

Assessment
~~Tiles~~ a,d
ab

5, 6,7, 8(a,c)

Tyson   Set 8
Pg 68→5,6,7,8x
5a)

5a) (-1) + (-1) + (-1)

3 × (-1)

5c) (+11) + (+11) + (+11) +(11)

4 × (+11)

Size 3

0 1 2 +3 4 5 +6 7 8 +9

(+3) × (+3) = +9

arrows
direction

arrow
size

stopped