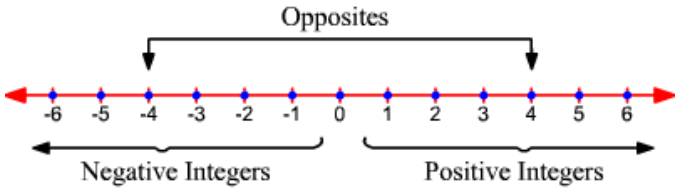
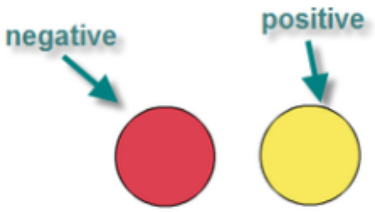
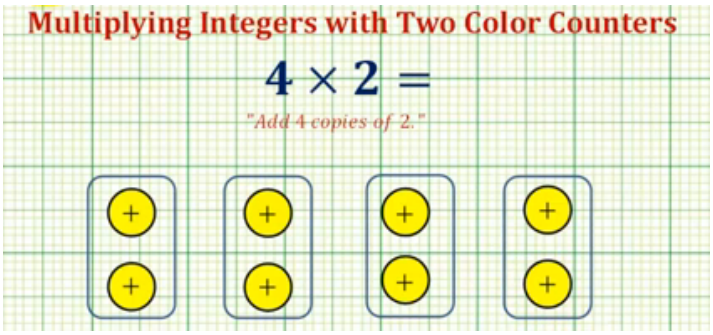


Unit 2:

Multiplication & Division of Integers





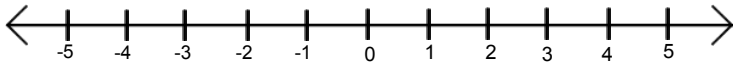
Integers

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 geater. 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

textbook uses colors

Remember that we use shaded for + and unshaded for -

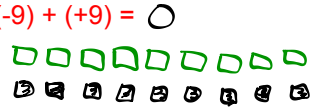
+ is yellow in the textbook

- is red in the textbook

Remember from last year Adding or Subtracting Integers

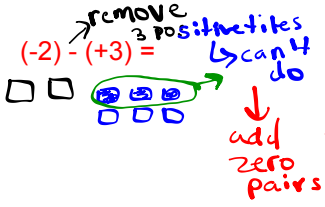
Adding (Draw in different levels both integers)

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



Subtracting (remove but may need to make zero pairs)

2) (-2) - (+3) =



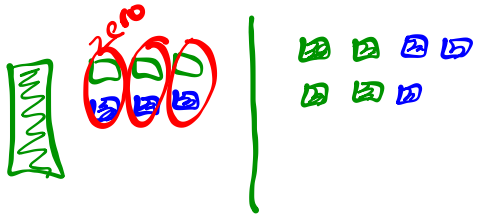
Step 1: Draw first integer

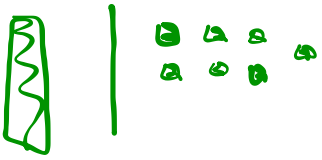
Step 2: Then subtract means to REMOVE the second integer

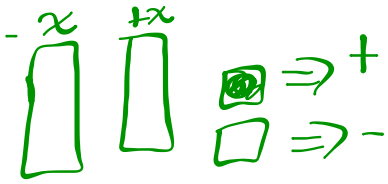
HINT: May need to use zero pairs

= -5

$x - 3 = 4$

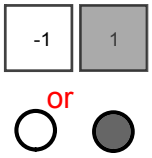






Multiplying Integers by Modeling TILES

remember



Ex1) put down

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

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

Ex2)

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

(+3) x (-3) = -9

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

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

Ex5) What about (-4) x (+3)?
3 groups of -4

You can use the Commutative rule when multiplying order **does not** matter

(-4) x (+3) = (+3)x(-4)

-12

(-4) x (+3) =

OR

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

But

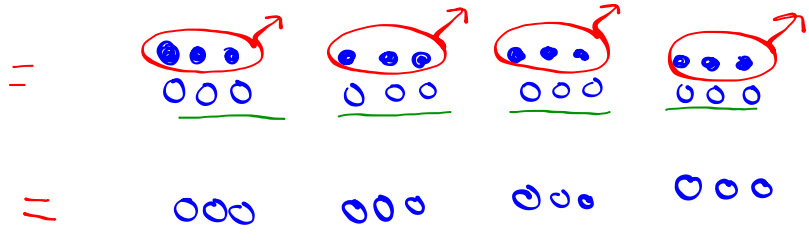
If the first integer is NEGATIVE then it means take away groups (Since starting with negative you need zero pairs)

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

-12

take away 4 groups of +3

Step 1 Model 4 groups of zero pairs



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

Study

same sign will be ⊕

(+) 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

Study

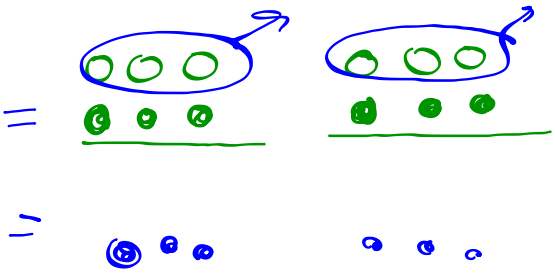
(+) x (-) = (-)

(-) x (+) = (-)

$(-2) \times (-3) = +6$

of neg -3

take away 2 groups



=

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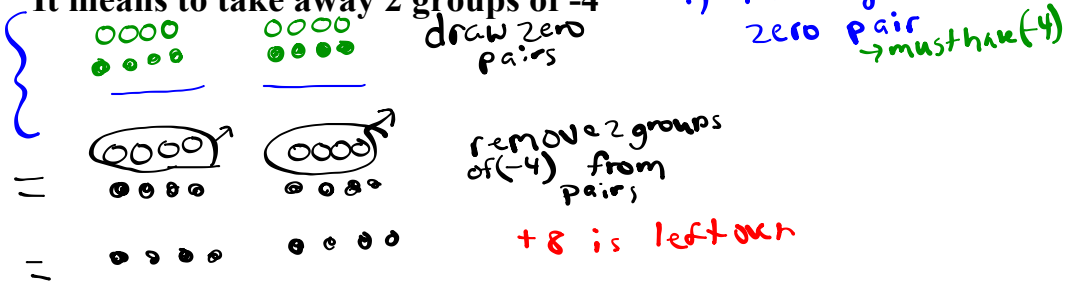
Your turn

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?

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



i) draw 2 groups of zero pair → must have (-4)

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

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

So (-3) x (-2) =

Now try (-5) x (-1)

(-5) x (-1) =

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

Final Multiplying rule (-) x (-) = +

X or ÷

Same in sign $(+)(+) \Rightarrow +$ $(-)(-)$

different $(-)(+)$ $(+)(-) \Rightarrow -$

Number line Modeling

think jumps

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

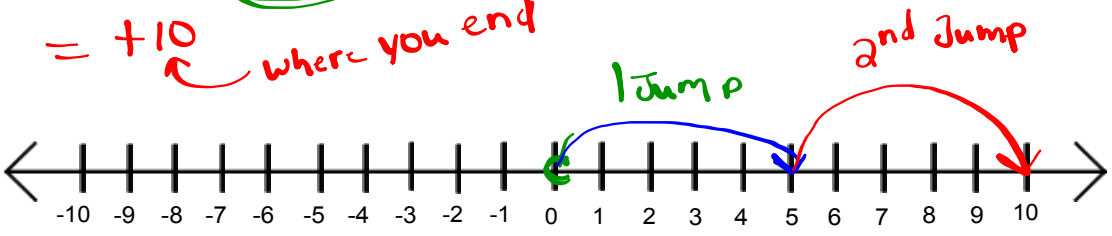
# of Jumps

Jump size (direction)

(+2) x (+5)

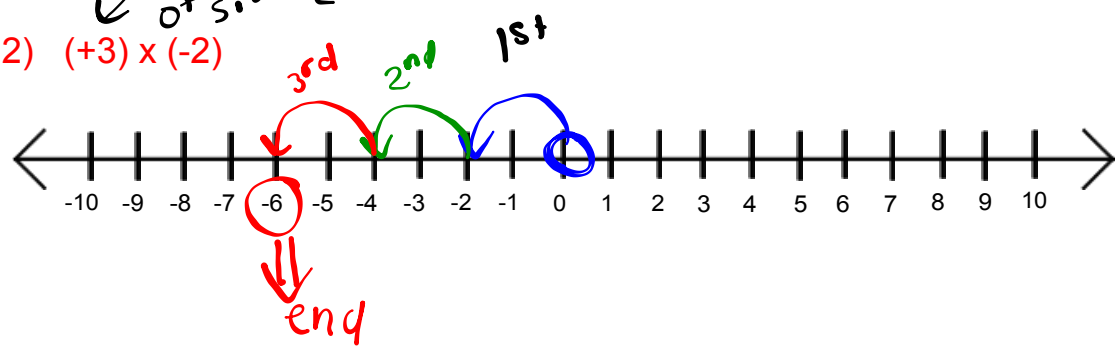
Always start at zero

= +10 where you end



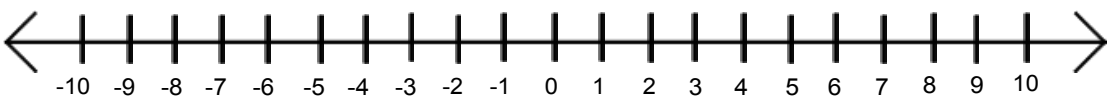
3 Jumps of size (-2)

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



= -6

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



Homework/ Class Work

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

$(^{+}4) \times (+11)$

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model w/ tiles

model # line

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

a b a c a b