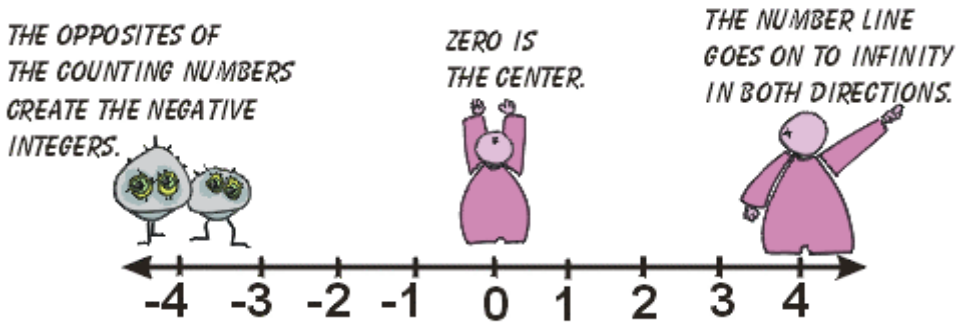
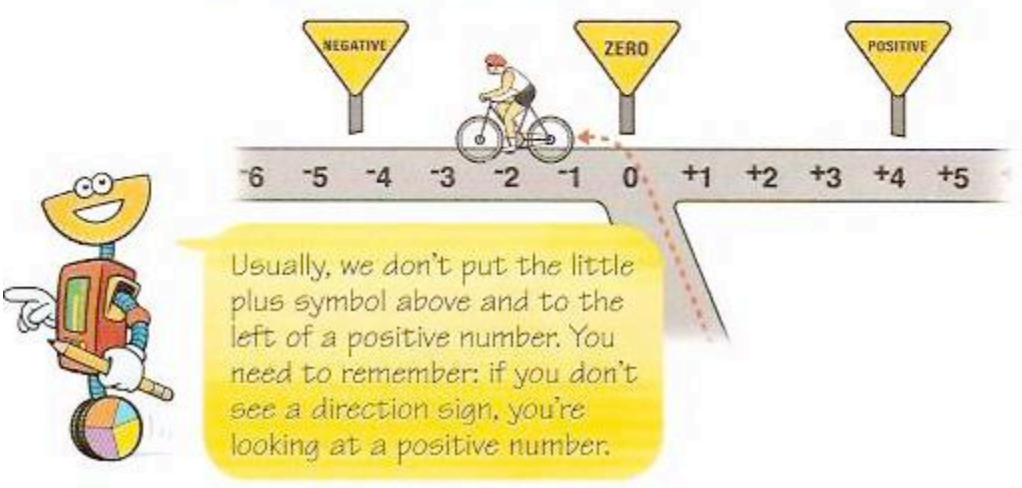
The *Other* Side of the Number Line~ Negative Integers

Integers – are the set of whole numbers and their *opposites*



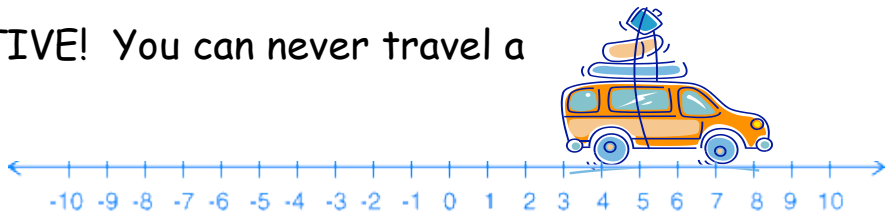
4 and **-4** are opposites

Think of the symbol (+ or –) on an integer as a direction sign. Zero is the on-ramp. LEFT from zero is negative and RIGHT from zero is positive.



Absolute Value – is the distance an integer is away from zero on a number line.

Distance is always POSITIVE! You can never travel a negative distance!



$|5|$ (Absolute value of 5) is 5 spaces away from 0 = 5

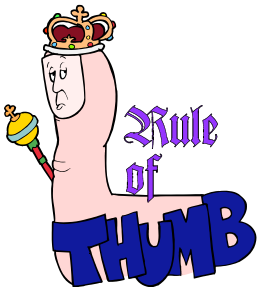
$|-5|$ (Absolute value of -5) is 5 spaces away from 0 = 5

$$|5| = |-5|$$

Using the Number Line to Add Integers

(-) is wrong so you move LEFT	(+) is RIGHT so you move that way
4 + (-5) = +4 + (-5) = pos. 4 + neg. 5 Start at the 4 and move to the LEFT 5 spaces. 4 + (-5) = -1	4 + 5 = +4 + (+5) = both integers are positive Start at the 4 and move to the RIGHT 5 spaces. 4 + 5 = 9
3 + (-6) = pos. 3 + neg. 6 Start at the 3 and move to the LEFT 6 spaces. 3 + (-6) = -3	-3 + (-6) = both integers are negative Start at the -3 and move to the LEFT 6 spaces. -3 + (-6) = -9
-6 + 4 = neg. 6 + pos. 4 Start at the -6 and move RIGHT 4 spaces -6 + 4 = -2	-5 + (-2) = Start at -5 and move LEFT 2 spaces. -5 + (-2) = -7

Using Rules to Add Integers



1. When the signs are the same, add the integers and keep the same sign
2. When the signs are difference, subtract the integers and keep the sign of the integer farther from zero (absolute value)

Following Rule 1	Following Rule 2
5 + 7 = Both integers are positive so we ADD the integers and keep the answer positive 5 + 7 = 12	5 + (-3) = Both integers have different signs, (the 5 is positive and the 3 is negative) so we SUBTRACT the integers and keep the sign of the 5 (positive) because it's further from zero than the three 5 – 3 = 2 5 + (-3) = 2
-5 + -7 = Both integers are positive so we ADD the integers and keep the answer negative -5 + -7 = -12	-5 + 3 = Both integers have different signs, (the 5 is negative and the 3 is positive) so we SUBTRACT the integers and keep the sign of the 5 (negative) because it's further from zero than the three 5 – 3 = 2 -5 + 3 = -2

Subtracting Integers:

Two Wrongs DO make a Right & One Wrong takes you LEFT

When you have two negatives *beside each other*, they merge to make a positive/plus sign (+)

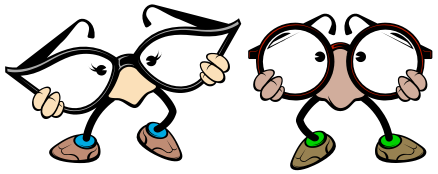
Two Wrongs into a Right	One Wrong Takes you LEFT
3 – (-4) = 3 minus a negative 4 (two negatives!) two negatives = a positive/plus sign 3 + 4 = 3 + 4 = 7 5 – (-6) = 5 minus a negative 6 Two negatives = positive/plus 5 + 6 = 5 + 6 = 11 -7 – (-4) = -7 + 4 = Start at -7 and move RIGHT 4 spaces -7 + 4 = -3	8 – 3 = one minus/negative sign Start at the 8 and move LEFT 3 spaces 8 – 3 = 5 4 – 9 = one minus/negative sign Start at the 4 and move LEFT 9 spaces 4 – 9 = -5 -5 – 3 = negative/minus sign not together Start at -5 and move LEFT 3 spaces -5 -3 = -8

Using Rules to Subtract Integers

When subtracting integers remember the phrase: "Keep it, Change it, Flip it"
and follow the same rules for Adding Integers

Follow the ONLY Rule	
4 – 5 = Keep it, Change it, Flip it 4 + (-5) = Subtract the integers and keep the sign of the number farther from zero 5 – 4 = 1 4 + (-5) = -1 -3 – (-9) = Keep it, Change it, Flip it -3 + (+9) = Subtract the integers and keep the sign of the number farther from zero 9 – 3 = 6 -3 + 9 = 6	8 – (-3) = 8 + (+3) = Add the same sign integers, keep the sign the same 8 + 3 = 11 -2 – 7 = -2 + (-7) = Add the same sign integers, keep the sign the same 2 + 7 = 9 -2 + (-7) = -9

Multiplying & Dividing Integers ~ 2 Simple Rules

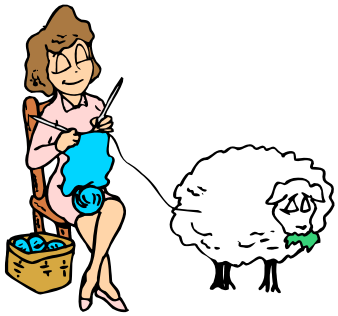


Don't you see a pattern?

3 x 2 = 6	2 x -3 = -6
3 x 1 = 3	1 x -3 = -3
3 x 0 = 0	0 x -3 = 0
3 x -1 = -3	-1 x -3 = +3
3 x -2 = -6	-2 x -3 = +6

Instead of trying to find patterns, use these 2 simple rules:

1 When the signs are the same you multiply or divide and keep the sign POSITIVE
2 When the signs are different you multiply or divide and keep the sign NEGEATIVE



Use Rule Number 1	Use Rule Number 2
4 x 5 = both positive integers, multiply and keep answer positive 4 x 5 = 20 4 x 5 = +20 -3 x -8 = both negative integers, multiply and keep answer negative 3 x 8 = 24 -3 x -8 = +24 28 ÷ 7 = both positive, divide and keep positive 28 ÷ 7 = 4 28 ÷ 7 = +4	6 x -7 = integers are different, multiply and keep sign negative 6 x 7 = 42 6 x -7 = -42 -12 ÷ 3 = integers are different, divide and keep sign negative 12 ÷ 3 = 4 -12 ÷ 3 = -4 32 ÷ -4 = integers are different, divide and keep sign negative 32 ÷ 4 = 8 32 ÷ -4 = -8