Integers

Three simple rules and success is yours
Integers

- **Integers** include all positive and negative numbers, for example:
  …-2.5, -2, 1.5, -1, -.5, 0, .5, 1, 1.5, 2, 2.5…. 
- **Integers** include **whole numbers** and **rational numbers**.
- **Whole numbers** are all numbers except fractions.
- **Rational numbers** are all numbers including fractions.
3 Rules for Integers

• 1. Adding Rule
• 2. Subtraction Rule
• 3. Multiply / Division Rule

The first thing you want to identify with integers is which basic operation are you going to do. Are you adding, subtracting or multiplying/dividing as this will determine which rule you will apply.
Adding Integers
The Rule Adding Integers

- Think of positive numbers as Money $$ in your Pocket.

- Think of Negative numbers as Money $$ you owe.
Let’s practice

6 + -7=
I have $6 in my pocket and I owe $7 when I put that together I still owe $1.
Since I owe money my answer is negative.
So..

6 + -7 = -1

Try  -8 + 2 =  5 + - 8 =  -12 + 18 =
Solutions

\[-8 + 2 = -6\]  I owe $8 and I have $2 in my pocket. When I put that together I still owe $6, so my answer is -6.

\[5 + -8 = -3\]  I have $5 in my pocket and I owe $8. When I put that together I still owe $3, so my answer is -3.

\[-12 + 18 = +6\]  I owe $12 and I have $18 in my pocket. When I put that together I have still have $6 in my pocket, so my answer is +6.
Subtracting Integers
The rule for subtracting integers is

Same, Change, Change.

Once you have applied Same, Change, Change, you now have an addition integer problem and apply your addition rule.

Positive Numbers = $ in my pocket
Negative Numbers = $ I owe
Rule for subtracting integers

- To subtract integers, add the opposite.
- What does this mean?
- **Same, Change, Change**
- **Same** the 1st integer stays the same
- **Change** the subtraction sign to addition.
- **Change** the sign of the second integer.
- Then follow the rules for addition.
Let’s try an example.

-5 – (-2)
-5 + 2 changes to -5 - -2
S C C

-5 stays the same, subtraction changes to addition, and the +2 is changed to a – 2.
Now apply your addition rule.
Positive Numbers = $ in my pocket
Negative Numbers = $ I owe
Let’s practice subtract integers.

1. $18 - (-5) = \underline{}$
2. $-10 - (-15) = \underline{}$
3. $6 - 10 = \underline{}$
4. $-24 - 19 = \underline{}$
5. $-18 - (-20) = \underline{}$
Let’s work it out.

18 - -5 =

S C C same, change, change

18 - -5 = changes to 18 + 5 =

Apply your addition rule

Positive Numbers = $ in my pocket

Negative Numbers = $ I owe

So 18 - -5 = 23
Work these problems out on your own referring to your rules.

-10 - (-15) =
6 - 10 =
-24 - 19 =
-18 - (-20) =
Example

-5 – 8

-5 + -8

-13

Same, Change, Change

Now follow the rules for adding integers!
-10 - (-15) = Changes to -10 + 15 = +5
6 - 10 = Changes to 6 + -10 = -4
-24 - 19 = Changes to -24 + -19 = -43
-18 - (-20) = Changes to -18 + 20 = +2
Multiplying and Dividing Integers
The Rule for Multiplying and Dividing Integers

The rule for multiplying/Dividing integers is to forget about the sign and just multiply or divide. Once you have your answer, look at your original problem and if the signs are the same your answer is $+$, if the signs are different your answer is negative.

If Sign is Same $\begin{align*} + \times + &= + \\ - \times - &= + \end{align*}$

If the Signs are Different $\begin{align*} - \times + &= - \\ + \times - &= - \end{align*}$
Let's practice referring to our rule as we go

-5 \times -2 = \quad -8 \times 4 =

6 \times 6 = \quad -6 \times -6 =

-9 \times 3 = \quad -9 \times -3 =

-12 \times -2 = \quad 4 \times -3 =
How did you do?

\begin{align*}
-5 \times -2 &= +10 & -8 \times 4 &= -32 \\
6 \times 6 &= +36 & -6 \times -6 &= +36 \\
-9 \times 3 &= -27 & -9 \times -3 &= +27 \\
-12 \times -2 &= +24 & 4 \times -3 &= -12
\end{align*}
One more time read aloud the **3 Rules**.

1. The rule for **adding integers** is to **think of positive numbers as money $$ in your pocket.**
   Think of negative numbers as money $$ you owe.

2. The rule for **subtracting integers** is **Same, Change, Change.**

3. The rule for **multiplying/Dividing** integers is to forget about the sign and just multiply or divide. Once you have your answer, look at your original problem and if the signs are the same your answer is + , if the signs are different your answer is negative.