## Signed Numbers

The rules for combining signed numbers are described below.

## I. ADDITION

First, ask, "do the numbers being added have the same sign?"

$$
\text { If your answer is Yes, use rule } 1 . \quad \text { If your answer is No, use rule } 2 .
$$

Rule 1: When adding numbers with the same sign, add the numbers and keep the sign.
Rule 2: When adding numbers with different signs, subtract the smaller number from the larger number, and keep the sign of the larger number.
Example 1:
Example 2:
$(+3)+(+7)=+10$
$(-5)+(-9)=-14$

Example 3:
$(-4)+(+2)=-2$

Example 4:
$(+28)+(-5)=+23$

Note: The previous examples can also be written as follows:

Example 1:
$3+7=10$
Examples 1 and 2 used Rule 1.

Example 3:
Example 4:
$-4+2=-2$

28-5 = 23

Examples 3 and 4 used Rule 2.

How would you do the following problem?
Example 5: $\quad(+21)+(-14)+(-15)+(+9)$

| Using Rule 1, combine all the positives: | $(+21)+(+9)=+30$ |
| :--- | :--- |
| Then combine all the negatives: | $(-14)+(-15)=-29$ |
| Next, use Rule 2 to combine the sum of the <br> positives and the sum of the negatives | $(+30)+(-29)=+1$ |

## II. SUBTRACTION

Every subtraction problem of signed numbers is really an addition problem that follows these two rules:

Rule 1: Change the subtraction sign to an addition sign, and change the sign of the number that was being subtracted.

Rule 2: Use the addition rules to solve the problem.

| Example 1: | Example 2: | Example 3: <br> $(+75)-(+30)=$ |
| :--- | :--- | :--- |
| $(-58)-(-33)=$ |  |  |
| $(+75)+(-30)=+45$ | $(-58)+(+33)=-25$ | $(-39)+(-39)=-78$ |

Note: The previous examples can also be written as follows:
Example 1:
Example 2:
Example 3:
$75-30=45$
$-58+33=-25$
$-39-39=-78$

## II. MULTIPLICATION AND DIVISION

Both Multiplication and Division have the same sign rules. Ask, "do the numbers being multiplied or divided have the same sign?"

If your answer is $\underline{\text { Yes, use Rule } 1 . \quad \text { If your answer is No, use Rule } 2 .}$

Rule 1: When multiplying or dividing numbers with the same signs, the answer is always positive.
Rule 2: When multiplying or dividing numbers with different signs, the answer is always negative.

| Example 1: | Example 2: | Example 3: | Example 4: |
| :--- | :--- | :--- | :--- |
| $(-3) \bullet(-5)=+15$ | $\frac{-24}{+6}=-4$ | $\frac{-33}{-3}=+11$ | $-(x+1)=-x-1$ |

## Example 5:

Whenever there is a negative sign in front of the parenthesis, the signs of all the terms on the inside becomes the opposite of what they are. See example 4 and 5.

