***Rules for Adding Integers***

There are two rules that you must follow when adding integers.

You must look at the signs of each number that you are adding to determine which rule to use!

**Rule 1:**

If the signs are the same, add and keep the same sign.

$\left(+\right)+\left(+\right)=(+)$ **Add** the numbers.

The sum of two positive integers is always **positive.**

$\left(-\right)+\left(-\right)=(-)$ **Add** the numbers.

The sum of two negative integers is always **negative.**

**Rule 2:**

If the signs are different, subtract the numbers and use the sign of the larger number.

$\left(-\right)+\left(+\right)= $**Subtract** the numbers and take **the sign of the bigger number.**

$\left(+\right)+\left(-\right)= $**Subtract** the numbers and take **the sign of the bigger number.**

The sum of a positive integer and a negative integer is sometimes positive, sometimes negative, and sometimes zero.

The sum of a negative number and its opposite positive number of the same size equals zero.

**Sample Problem 1**: **Find the sum of each expression below using the rules for adding integers.**

|  |  |  |
| --- | --- | --- |
| **a.** | $$3+6=$$ | $3+6=9$ |
| **b.** | $$\left(-12\right)+\left(-34\right)=$$ | $$\left(-12\right)+\left(-34\right)=(-46)$$ |
| **c.** | $$\left(-23\right)+\left(-34\right)=$$ | $$\left(-23\right)+\left(-34\right)=(-57)$$ |
| **d.** | $$45+21=$$ | $$45+21=66$$ |

**Sample Problem 2**: **Find the sum of each expression below using the rules for adding integers.**

|  |  |  |
| --- | --- | --- |
| **a.** |  $\left(-13\right)+14=$ | $$\left(-13\right)+14=1$$ |
| **b.** | $$28+\left(-11\right)=$$ | $$28+\left(-11\right)=17$$ |
| **c.** | $$(-17)+11=$$ | $$\left(-17\right)+11=-6$$ |
| **d.** | $$100+\left(-100\right)=$$ | $$100+\left(-100\right)=0$$ |

***Using the Number Line to Add Integers***

We can also use the number line and direction arrows to illustrate addition of integers.

Let a positive number be represented by a right-facing arrow and a negative number be represented by
a left-facing.

To add two integers, find the point on the number line corresponding to the first addend (integer).

The sum is the number directly below the tip of the arrow.

 **Negative integers** **Positive integers**

**0**

**1**

**2**

**3**

**4**

 **-1**

 **-2**

**-3**

**-4**

**5**

**6**

 **-5**

 **-6**

**Sample Problem 3**: **Show the addition on the number line. Then write the sum.**

|  |  |  |
| --- | --- | --- |
| **a.** |  $1+4=$  | $$ 1 +4$$**0****1****2****3****4** **-1** **-2****-3****-4****5****6** **-5** **-6**$$1+4=5$$ |
| **b.** | $$\left(-2\right)+\left(-3\right)=$$ | $$ $$$$ -3 -2$$**0****1****2****3****4** **-1** **-2****-3****-4****5****6** **-5** **-6**$$\left(-2\right)+\left(-3\right)=-5$$ |
| **c.** | $$\left(-6\right)+3=$$ | $$ +3$$$ -6$ **0****1****2****3****4** **-1** **-2****-3****-4****5****6** **-5** **-6**$$\left(-6\right)+3=-3$$ |

|  |  |  |
| --- | --- | --- |
| **d.** | $$5+\left(-5\right)=$$ | $$ -5$$$$ +5$$**0****1****2****3****4** **-1** **-2****-3****-4****5****6** **-5** **-6**$$5+\left(-5\right)=0$$ |

**Sample Problem 4**: **Solve each expression below.**

|  |  |  |
| --- | --- | --- |
| **a.** |  $\left(-123\right)+\left(-140\right)+32=$ | $$ \left(-123\right)+\left(-140\right)+32=$$$$=\left(-263\right)+32=$$$$=-231$$ |
| **b.** | $$128+23+(-34)=$$ | $$ 128+23+\left(-34\right)=$$$$=151+\left(-34\right)=$$$$=117$$ |
| **c.** | $$(-70)+\left[-2+24\right]^{2}=$$ | $$ \left(-70\right)+\left[-2+24\right]^{2}=$$$$=\left(-70\right)+\left[22\right]^{2}=$$$$=\left(-70\right)+484=$$$$=414$$ |