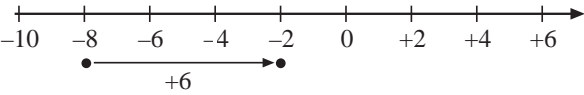


6: Adding with Negative Numbers

Question: What is the value of $-8 + 6$?

Misconception	Correct
<p>There are several possible misconceptions including</p> $-8 + 6 = 2$ <p>and</p> $-8 + 6 = -14$	<p>The correct answer is -2 as this sum results from adding positive 6 to negative 8, as can be seen from the number line below.</p>  <p><i>Starting</i> at negative 8 and adding 6 you get the answer negative 2.</p> <p>Hence $-8 + 6 = -2$</p>

Further Explanation

With mathematics, everything is logical; there is no "guessing" and no "maybe", only logical reasoning.

We associate the *minus* sign with *opposite* (as in *give* and *take*).

For example,

-8 means *taking away* 8, while $(+)6$ means *giving* 6

So $-8 + 6$ translates to

taking away 8 and *giving back* 6

which is equivalent to *taking away* only 2

But taking away 2 is what is meant by -2 . That is why $-8 + 6 = -2$.

You can argue in a similar way, or do the calculation on a number line, to show that, for example,

$$6 - 8 = -2 \quad \text{and} \quad -6 - 8 = -14$$

Note that the order of giving/taking does not matter.

Follow-up Exercises

You might find the number line below helpful when making or checking your calculations.

1. Complete the following:

(a) $-5 + 3 = \square$

(b) $-7 + 2 = \square$

(c) $-9 + 8 = \square$

(d) $-4 + 4 = \square$

(e) $-3 + 8 = \square$

(f) $-5 + 9 = \square$

2. Calculate these values:

(a) $9 - 7$

(b) $3 - 5$

(c) $-4 - 3$

(d) $5 - 8$

(e) $-5 - 8$

(f) $4 - 9$

3. Calculate the value of each of these expressions:

(i) $a + b$

(ii) $a - b$

(iii) $-a + b$

(iv) $-a - b$

when

(a) $a = 4$ and $b = 5$

and

(b) $a = -4$ and $b = 3$

Answers

1. (a) -2 (b) -5 (c) -1 (d) 0 (e) 5 (f) 4

2. (a) 2 (b) -2 (c) -7 (d) -3 (e) -13 (f) -5

3. (a) $9, -1, 1$ and -9 (b) $-1, -7, 7$ and 1