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Addition and Subtraction of Integers Negative and Positive Rules (For CBSE, ICSE, IAS, NET, NRA 2022)

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Addition and Subtraction Of Integers explained here. Mathematics is a subject that deals with numbers. Arithmetic is an elementary branch of mathematics. Arithmetical operations include addition, subtraction, multiplication and division. It helps us to find the sum (total) or difference (how more or less) of something. Not only sum or difference, it also helps one to compare and divide things equally. Arithmetic operations are applicable to all real numbers including integers.

Addition and Subtraction Integers Rules

Integers are a special group of numbers that are positive, negative and zero, which are not fractions. Rules for addition and subtraction are the same for all, whether it is natural number or an integer because natural numbers are itself integers. Extend the rule and apply it for integers as well.

Negative and Positive Rules

The integers which we add or subtract could be positive or negative. Hence, it is necessary to know the rules for positive and negative symbols.

$$(+)\times(+)=\text{Plus}\times\text{Plus}=\text{Plus}$$

$$(+)\times(-)=\text{Plus}\times\text{Minus}=\text{Minus}$$

$$(-)\times(+)=\text{Minus}\times\text{Plus}=\text{Minus}$$

$$(-)\times(-)=\text{Minus}\times\text{Minus}=\text{Plus}$$

Rules:

- When two positive integers are multiplied then the result is positive.
- When two negative integers are multiplied then also result is positive.
- But when one positive and one negative integer is multiplied, then the result is negative.
- When there is no symbol, then the integer is positive

Addition of Integers

Addition of integers means there are three possibilities. They are:

- Addition between two positive numbers,
- Addition between two negative numbers; and
- Addition between a positive number and a negative number.

Addition Rules for Integers

Type of Numbers	Operation	Result	Example
Positive + Positive	Addition	Positive (+)	$12 + 16 = 28$
Negative + Negative	Addition	Negative (-)	$(-12) + (-16) = -28$
Positive + Negative	Subtract	Positive (+)	$(-12) + 16 = 4$
Negative + Positive	Subtract	Negative (-)	$12 + (-16) = -4$

Whenever a positive number and a negative number are added, sign of the greater number will decide the operation and sign of the result. In above example $12 + (-16) = -4$ and $(-12) + 16 = 4$; here, without sign 16 is greater than 12 hence numbers will be subtracted and answer will give the sign of greater number.

Alternatively, to find the sum of a positive and a negative integer, take the absolute value (“**absolute value**” means to remove any negative sign of a number, and make the number positive) of each integer and then subtract these values. Take above example, $12 + (-16)$; absolute value of 12 is 12 and -16 is 16.

$$12 - 16 = -4$$

Thus, we can conclude the above table as follow:

- Addition of two positive integers always gives a positive-sum.
- Addition two negative integers always give a negative-sum.
- Addition of a positive and a negative integer give either a positive or negative-sum depending on the value of the given numbers.

Note: The sum of an integer and its opposite is always zero. (For example, $-5 + 5 = 0$)

Subtraction of Integers

Like addition, subtraction of integers also has three possibilities. They are:

- Subtraction between two positive numbers,
- Subtraction between two negative numbers; and
- Subtraction between a positive number and a negative number.

For the ease of calculation, we need to renovate subtraction problems into addition problems. There are two steps to this:

1. Convert the subtraction sign into an addition sign.
2. After converting the sign, take the inverse of the number which comes after the sign.

Once the transformation is done, follow the rules of addition given above.

For example, find the value of: $(-3) - (5)$

Step 1: Change the subtraction sign into an addition sign

$$(-3) - (5) = (-3) + (5)$$

Step 2: Take the inverse of the number which comes after the sign

$$-3 + (-5) \text{ (opposite of 5 is } -5)$$

$$-3 + (-5) = -8 \text{ [Add and put the sign of greater number]}$$

Adding and Subtracting Integers Examples

Example 1: Evaluate the following:

1. $(-4) + 8$
2. $(-2) - (-3)$

Solution:

$$1. (-4) + 8$$

- Here first integer is Negative and second integer is Positive.
- So, here operation is Subtraction.

$$-4 + 8 = 4$$

- But result is positive because, put the greater integer sign and greater integer sign is Positive.

$$2. (-2) - (-3)$$

- Here, first integer and second integer both are negative.
- So, operation is subtraction.
- But we make it to easy, first we change the subtraction sign into an addition sign.

$$= (-2) + (-3)$$

- Second step, Take the inverse of the number which comes after the sign,
- After the sign number is (-3) , and (-3) 's inverse number is 3.

$$= (-2) + (3)$$

- Subtract and Put the sign of greater number.

$$= 1$$

Example 2: Add -15 and -23.

Solution:

$$-15 + (-23)$$

- Here first and second integer both are negative.
- So, here operation is addition.

$$-15 + (-23)$$

- Both are negative, we add them, we get the result of addition is negative,
- Such as,

$$-15 + (-23)$$

$$= -38$$

Example 3: Subtract -15 and -23.

Solution:

$$-15 - (-23)$$

- Here both the integers are negative.
- Here operation is subtraction, we make this subtraction is easy to convert the subtraction sign into addition.
- First change the subtraction sign into addition sign.

$$= -15 + (-23)$$

- Second take the inverse of number which comes after the addition sign.
- Here after the addition sign number is (-23) . Inverse number of (-23) is 23.

$$= -15 + 23$$

$$= 8$$

Here result is positive because we put the sign of greater number, greater number's sign is positive.

Example 4: Evaluate $9 - 10 + (-5) + 6$

- Solution:
- Here given,

$$9 - 10 + (-5) + 6$$

- First open the brackets.
- So, we use the rule of positive and negative sign.
- Rule: Positive \times Negative = Negative
- So,

$$9 - 10 - 5 + 6 (\because +(-5) = -5)$$

- Add the positive and negative integers separately.
- Here positive integers are 9 & 6 and negative integers are $-10, -5$
- So, we add the 9 & 6 and -10 & -5 .

$$= 9 + 6 - 10 - 5$$

$$= 15 - 15$$

$$= 0 (\because \text{opposite is always zero})$$

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