5 Integers

08/08/2024

LOOKING BACK

DIAGNOSTIC ASSESSMENT

We have seen the different properties displayed by whole numbers under the operations of addition, subtraction, multiplication, and division.

Fill in the blanks.

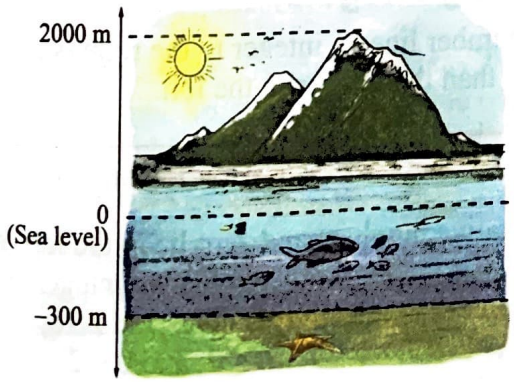
1. $298 + \_\_\_\_ = 314 + \_\_\_\_$
2. $\_\_\_\_ + 608 = \_\_\_\_ + 189$
3. $567 + \_\_\_\_ = 567$
4. $781 - \_\_\_\_ = 0$
5. $123 + (79 + \_\_\_\_) = (\_\_\_\_ + 79) + 321$
6. $1091 \times 1 = \_\_\_\_$
7. $\_\_\_\_ \times 2105 = 0$

INTRODUCTION TO INTEGERS C-1.4

In our day-to-day lives, we often come across situations involving the numbers beyond the whole numbers.

Temperature: During the winter season, the minimum temperature on a particular day in Chennai was 20°C. On the same day, the minimum temperature in Shimla was 25°C lower than that in Chennai. We understand that 20°C lesser than 20°C will be 0°C but what happens below 0. How do we represent this? This temperature can be represented with a minus sign in front of it as −5°C (read as 'minus five degree celsius') which means 5°C less than 0°C.

Height: If we say that a mountain peak is 2000 metres tall, it means that the mountain top is 2000 metres above the sea level considered to be 0. So, the depth of an ocean, say 300 metres below the sea level, can be expressed as –300 metres.

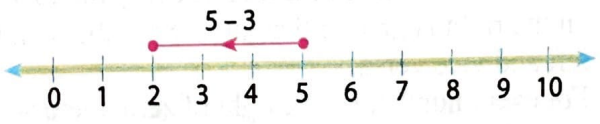


Direction: If we consider that a person is moving towards north, then 5 metres north would mean covering a distance of 5 metres towards the north direction, while −5 metres north would mean 5 metres in the opposite direction, that is to say, 5 metres towards the south.

Money: If we go to a shop with ₹10 and the cost of the item is ₹20, and the shopkeeper still chooses to give us the item. He writes the amount due to him from our side as ₹10. This due amount can be indicated using the minus sign as −₹10.

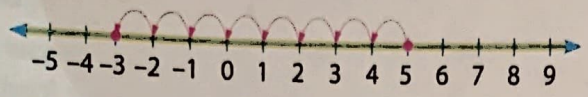
Negative Numbers

The below number line represents whole numbers. For example, to perform the operation of 5 – 3, we go three steps backwards from 5 and reach 2, so 5 – 3 = 2.

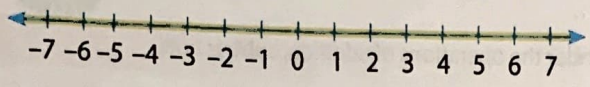


Now consider 5 − 5. We go five steps backwards from 5, and reach 0, so 5 − 5 = 0. If we have to subtract 8 from 5, we start from 5 and move eight steps backwards towards left. But what happens once we reach zero. We now need to extend the number line to the left of zero and with marks placed at equal distance from each other.

Write the numbers 1, 2, 3, ... with minus sign, starting from the first mark to the left of 0. So on moving 8 steps to the left of 5, we will come to a stop, three steps to the left of zero at −3.



We can see that starting from 0, the direction of this point −3 is opposite to that of 5, which lies to the right of 0. This opposite direction is indicated by a negative sign placed before the number.

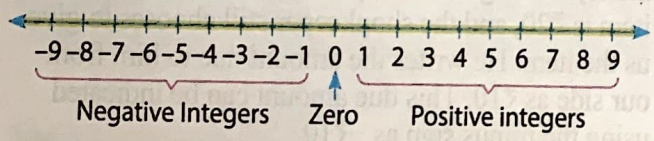


The idea of a negative sign for the opposite direction also provides us with numbers on the left side of zero on a number line. All these numbers are less than zero and are called *negative* numbers.
Thus, *the numbers less than zero represented with a minus sign in front are called* ***negative numbers.***

Integers

Whole numbers taken together with the negative numbers are called ***integers.***

The natural numbers 1, 2, 3, …, in the system of integers are called ***positive integers*** and are sometimes denoted as + 1, + 2, + 3, …. The numbers to the left of zero are called ***negative integers*** and are always denoted as −1, −2, −3, …. *The whole number 0 is neither a positive integer nor a negative integer, as the negative of zero is zero itself.*



Three important points to note about the integers number line are:

a. There are countless positive numbers to the right of zero and there are countless negative numbers to the left of zero as well.
b. On the number line of integers, every number on the right is greater than all the numbers on its left and vice versa.
c. For every number on the right of zero, there is a number on the left of zero, both at the same distance from zero. For example, for the number 8 on the right of zero, there is number (−8) on the left of zero, both having the same distance from zero. These two numbers are called the ***opposites***. Thus, every number on the right of zero has an opposite on the left of zero and vice versa.

Remember

★ The integer −6 is read as 'negative 6' or 'minus 6' while +6 is read as 'positive 6' or simply 'six'.

In our day-to-day life, we consider:

a. Temperature above 0°C as positive and below 0°C as negative.
b. In height, if the sea level is considered as the zero level, above the sea level is positive height and the depth is taken as negative height.
c. In direction, if north is considered as positive, then south is negative and vice versa.
d. In profit and loss, if profit is positive then loss is negative profit and vice versa.

Example 1: If profit is considered as positive, represent the following with proper sign:

a. Profit of ₹50 b. Loss of ₹25

Solution:

a. Profit of ₹50 is a positive value. So, profit is ₹50.
b. Loss of ₹25 is a negative value. Hence, loss of ₹25 = −₹25.

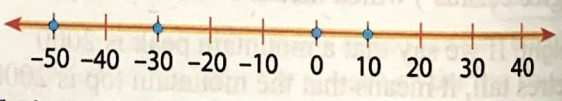
Example 2: If depth is considered as positive, express the following with proper sign:

a. 20 metres deep b. 30 metres high

Solution:

a. In this case, depth is positive. Hence, 20 metres deep is +20 metres.
b. As depth is considered positive in this case, 30 metres high is a negative length. Hence, we have to express it as −30 metres.

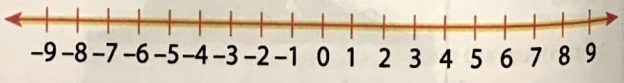
Example 3: What integers do the coloured dots on the number line represent?



Solution: The integers represented by the coloured dots are −50, −30, 0, and 10.

Ordering Integers

On a number line an integer to the right is always greater than the integer to the left.



a. Negative numbers and zero lie to the left of positive numbers, so all positive integers are greater than negative integers and zero, e.g., $-2 < 2$, $-3 < 1$, $-4 < 3$, and $0 < 2$.

b. 0 (zero) lies to the right of negative integers, so 0 is always greater than the negative integers,
e.g., $-1 < 0$, $-2 < 0$, $-3 < 0$, and $-10 < 0$.

c. For positive integers, a number with greater numerical value is greater.
e.g., $22 > 20$, and $121 > 51$.

d. For negative integers, a number with greater numerical value is smaller as it is farther on the left side of the other negative number on the number line,
e.g., $-22 < -20$, $-121 < -51$.

Example 4: Compare using > or <.

a. $8 \square -8$ b. $-10 \square -6$

Solution:

a. On the number line, -8 is on the left of zero and 8 is on the right of zero. So, 8 is greater than -8.
i.e., $8 > -8$.

b. -10 is on the left of -6 on the number line.
Hence, -10 is smaller than -6.
i.e., $-10 < -6$.

Example 5: Arrange the following integers in ascending order: $-20, -65, 25, 5, -10$.

Solution: For negative integers, a number with greater numerical value is smaller as these are farther on the left side on the number line.

Here, out of all the five integers given, -65 will lie on the extreme left of zero, then -20, and then comes -10, 5 is on the right of zero and 25 is farther ahead on the right.

Therefore, the smallest number is -65, next is -20, then -10, followed by 5 and then the largest number 25.

So, the numbers in ascending order are:

$$-65 < -20 < -10 < 5 < 25$$

Common Mistakes!

- $-6 < -8$ ✗ $\quad -6 > -8$ ✓
- $-8 > 0$ ✗ $\quad -8 < 0$ ✓

Absolute Value of an Integer

On the number line, the distance from, say, 0 to +5 is said to be 5 units. So, the absolute value of 5 is 5.

Also, the distance from 0 to -5 is 5 units. So, the absolute value of -5 is 5.

*The **absolute value** of an integer is the distance of that integer from 0 irrespective of the direction, i.e., negative or positive.*

The absolute value of 3 is written as $|3|$ which is read as 'absolute value of 3' and is equal to 3. The absolute value of -3 is written as $|-3|$ and is read as absolute value of -3 and is equal to 3.

Remember

- Absolute value of an integer is always positive.
- The absolute value of zero is zero.
- The term Modulus is also used for Absolute value.

Example 6: State the absolute values of the following.

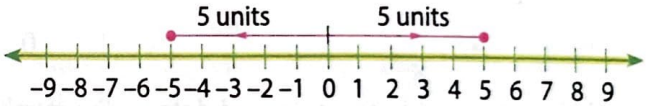
a. $|-82|$ b. $|121|$

Solution:

a. $|-82| = 82$ b. $|121| = 121$

Opposites

Look at the number line.



For every positive integer to the right of zero, there is a corresponding negative integer to the left of zero (on the negative side). Similarly, for every negative integer to the left of zero, there is a corresponding positive integer to the right of zero, at the same distance from zero but with a positive sign. These reflections are called *opposites*.

For example, the opposite of 5 is -5 and that of -7 is 7.

Example 7: State the opposites of the following.

a. 37 b. -59

Solution:

a. $37 + (-37) = 0$.
So, the opposite of 37 is -37.

b. $-59 + 59 = 0$.
So, the opposite of -59 is 59.

Remember

- The smallest positive integer is 1.
- The greatest negative integer is -1.
- For every positive integer, there exists a negative integer at the same distance from zero in the opposite direction. These two integers are called the opposites of each other.
- The absolute value of a negative or a positive integer is the positive value of the integer as it represents the distance of the integer from zero.

Exercise 5 A

08/08/2024

1. Use + or – to represent the following (consider above, profit, rise, north, right, deposit as positive; whereas below, loss, fall, south, left, withdrawal as negative).

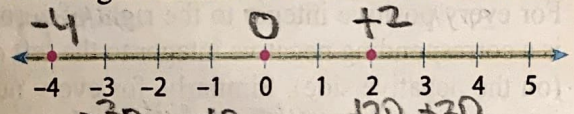
   a. Profit of ₹65 +65₹
   b. A loss of ₹65 -65₹
   c. 50 km south -50 km
   d. 50 km north +50km
   e. 40°C below 0°C -40°C
   f. 40°C above 0°C +40°C
   g. 50 cm to the right +50cm
   h. 50 cm to the left -50cm
   i. A rise of 50 points +50 points
   j. A fall of 50 points -50
   k. A withdrawal of ₹700 from a bank -700₹
   l. A deposit of ₹700 +700₹
   m. 50°C above 0°C +50°C
   n. 50°C below 0°C -50°C
   o. 20 metres below sea level -20m
   p. 20 metres above sea level +20

2. Using the number line, introduce >, =, or < in the boxes in each case.

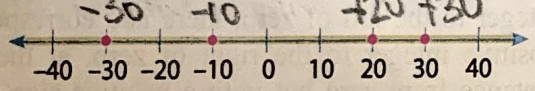
   a. 0 [>] (–3)
   b. (–4) [<] 1
   c. (–7) [<] (–5)
   d. 0 [<] 4
   e. 1 [>] 0
   f. –10 [=] –10

3. What integers do the coloured dots on the number line represent?

   a. -4, 0, +2

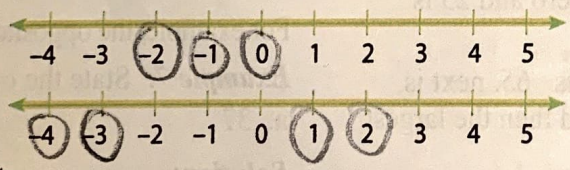
   

   b. -30, -10, +20, +30

4. Mark the given points on the number line with dots.

   a. –2, –1, 0
   b. –4, –3, 1, 2

5. Write all the integers between:

   a. –4 and 0 -3; -2; -1
   b. –6 and –3 -5; -4
   c. –3 and 3 -2; -1; 0; +1; +2
   d. 4 and 8 +5; +6; +7
   e. 0 and 6 +1; +2; +3; +4; +5
   f. –4 and 2 -3; -2; -1; 0; +1

6. Fill the boxes correctly with > or < .

   a. 0 [>] –1
   b. –8 [>] –14
   c. 8 [>] –3
   d. –17 [<] –6
   e. –6 [<] +2

7. Circle the greater integer in each pair.

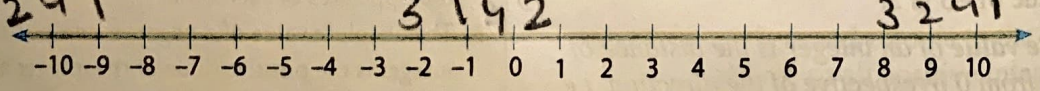
   a. (–1), –23
   b. (–7), –23
   c. –627, (0)

8. Arrange the integers in ascending order.

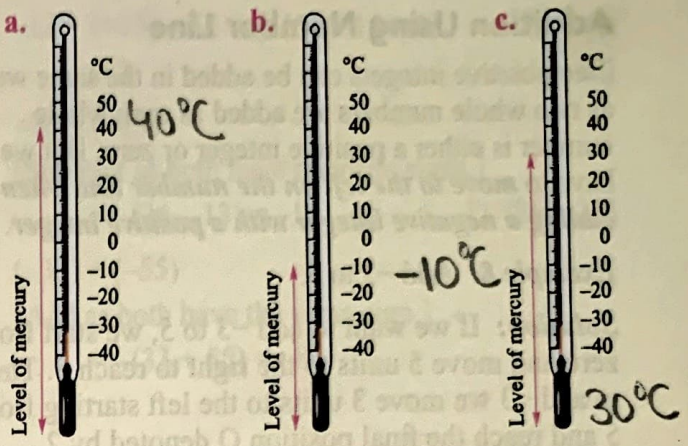
   a. –6, 0, –7, 3, –10, 4 -10, -7, -6, 0, 3, 4
   b. 3, 6, –3, 0, –8, 1 -8, -3, 0, 1, 3, 6

9. Arrange the integers from the smallest to the largest using the given number line.

   a. 7, –8, 9, –10 3 2 4 1
   b. 0, –3, 4, –2 3 1 4 2
   c. 4, –4, 5, –5 3 2 4 1

10. State the temperatures recorded by the thermometers given alongside.



11. State which temperature is lower in each case.
   a. −4°C or −10°C b. 7°C or −7°C
   c. −1°C or 1°C

12. Write the absolute values of the following integers.
   a. |−10| = 10 b. |84| = 84 c. |−73| = 73
   d. |64| = 64 e. |−1| = 1

13. Write the exact opposites of the following integers.
   a. −27 = +27 b. −301 = +301 c. +61 = −61
   d. −1 = +1 e. −8 = +8

ADDITION OF INTEGERS

C-1.3

Raju plays marbles with his friend Arnab every day. Each day he loses some marbles of his own and wins some of Arnab's marbles. The details are given in the following table. Let us calculate Raju's gain on each day.

Let gain be denoted by ○ (+1) and loss by ○ (−1).
Note that one coloured circle gets cancelled by one white circle as they are opposites and the result is zero.
○ + ○ = 0 as (+1) + (−1) = 0.

Understand the calculation shown in the filled rows and use similar calculation to fill the blank fields in the table given above.

Day	Loss of marbles	Gain of marbles	Representation of Loss and Gain of Marbles	Actual calculation	Result
Monday	5	7	○○ ○○○○○	−5 + 7	○○ = +2 (Gain)
Tuesday	8	3	○○○○○ ○○○	−8 + 3	○○○○○ = −5 (Loss)
Wednesday	10	7	○○○○○○○○○○ ○○○○○○○	−10+7	○○○ = −3 (Loss)
Thursday	7	3	○○○○○○○ ○○○	−7+5	○○○○ = −4 (Loss)
Friday	0	12 5	○○○○○○○○○○○○ ○○○○○	+12 + 5	= +17 (Gain)
Saturday	7/2	0	○○○○○○○ ○○	−7 − 2	○○○○○○○○○ = −9 (Loss)
Sunday	3/7	0			

Addition Using Number Line

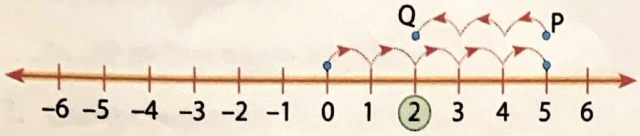
Two positive integers can be added in the same way as two whole numbers are added as each whole number is either a positive integer or zero. But we have to ***move to the left on the number line when adding a negative integer with a positive integer.***

Example 8: Add −3 to 5.

Solution: If we want to add −3 to 5, we start from zero and move 5 units to the right to reach 5. Then to add −3 we move 3 units to the left starting from 5 and reach the final position Q denoted by 2.

Thus, 5 + (−3) = 2.

Or, we can write it as: 5 + (−3) = 5 − 3 = 2.



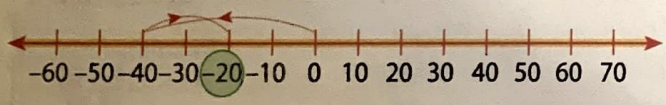
Remember

Therefore, + and − sign placed side by side without any number in between, gives a − sign, e.g., +(−6) = −6 or −(+6) = −6.

Example 9: Add 20 to −40.

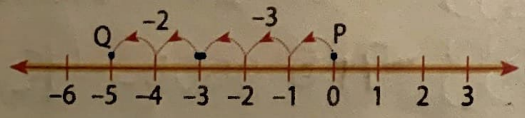
Solution: We have to find, −40 + (20).

Start from 0, move 40 steps to the left to reach −40. To add 20, move 20 steps to the right starting from −40 and you reach −20.



Example 10: Add (−2) to (−3).

Solution: To add −2 to −3, we start from zero and move three units to the left to reach −3. Next we move two units further to the left starting from −3 to add −2. Thus, we reach the position Q denoted by the integer −5.

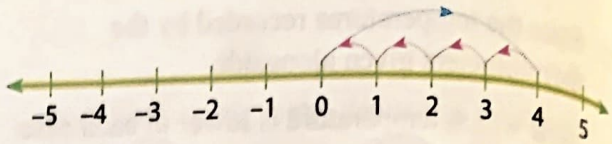


Therefore,

−2 + (−3) = −5.

Additive Inverse

Let us add 4 and (-4) on the number line. Starting from 0, move 4 steps to the right to reach 4. Then to add (-4), move 4 steps to the left from 4 to reach 0.



Thus, 4 + (−4) = 0.

Two integers are said to be the additive inverse of each other if their sum is zero. So, −4 is the ***additive inverse*** of 4.

Addition Without Using Number Line

Following are the rules for addition of integers.

- When adding integers with like signs (both positive or both negative), add their absolute values, and place the common sign before the sum.
- When adding integers with unlike signs, find the difference of their absolute values, and give the result the sign of the integer with the larger absolute value.
- When the addition and subtraction signs are placed side by side without any number in between, these two opposite signs give a negative sign.

  For example, −3 + (−7) = −3 − 7 = −10
- A number when added to its opposite gives zero as the result.

Example 11: Add the following.

a. 2 + 3 **b.** 2 + (−3) **c.** −2 + 3 **d.** −2 + (−3)

Solution:

a. 2 + 3 = (+2) + (+3) = 5

b. 2 + (−3) = −3 + 2 = −1

(Find the difference of the absolute values and since 3 is greater than 2 and it has a negative sign, the answer will be −1.)

c. −2 + 3 = + (3 − 2) = +1

(Find 3 − 2 and since 3 > 2 and it is a positive integer, the answer will be positive.)

d. (−2) + (−3) = −2 − 3 = −5

[Add the absolute values and place the common sign, which is negative (or minus sign), with the answer.]

Example 12: Add the following.

a. 11 + (+9) **b.** 21 + (−11)

c. 22 + (−121) **d.** −13 + (+15)

e. (−26) + (+13) **f.** (−33) + (−55)

Solution:

a. $11 + (+9) = 11 + 9 = 20$
[Add as both the numbers have the same sign.]

b. $21 + (-11) = 21 - 11 = 10$ [$\because 21 > 11$]

(*Note:* The symbol '$\because$' means 'because'.)

c. $22 + (-121) = -121 + 22$
[Subtract as both the numbers have different signs.]
$= -(121 - 22)$ [$\because 121 > 22$]
$= -99$

d. $-13 + (+15) = 15 + (-13) = 15 - 13$
$= 2$ [$\because 15 > 13$]

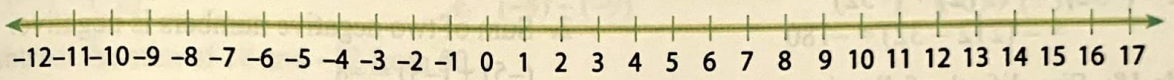
e. $-26 + (+13)$
[Subtract as both have opposite signs.]
$= -(26 - 13) = -13$ [$\because 26 > 13$]

f. $(-33) + (-55)$
[Add as both have the same sign.]
$= -(33 + 55) = -88$

Exercise 5 B

08/05/2024

1. Use the number line given here, to find the following.



a. $(-2) + (-4)$ b. $1 + (-7)$ c. $8 + (-8)$ d. $9 + (-1)$ e. $4 + (-3)$ f. $-10 + (-2)$

2. Add the following integers.

a. $-8, -6$ b. $-8, -1$ c. $-6, 6$ d. $-3, -5$ e. $-1, -2$ f. $9, -6$

3. Add the following.

a. (-20) and $(+30)$ b. $(+10)$ and (-12) c. $(+8)$ and (-20)
d. (-7) and (-3) e. (-20) and (-30)

4. Add the following.

a. 343, 356, and -343 b. -726, 789, 726, and -236 c. 293, and -293
d. $835 + (-336) + (-264)$ e. $704 + (-4) + (-10) + 10 + (-100)$

SUBTRACTION OF INTEGERS C-1.3

We know that subtraction is the reverse of addition. To understand subtraction in integers, let us look at the following examples.

Subtraction is the opposite of addition. We can change subtraction to addition by adding the additive inverse of the second number to the first number.

Example 13: Find $6 - (-7)$.

Solution: The additive inverse of -7 is 7.
So, $6 - (-7) = 6 + (+7) = 6 + 7 = 13$

Example 14: Find $-13 - (+5)$.

Solution: The additive inverse of $+5$ is -5.
So, $-13 - (+5) = (-13) + (-5)$
$= -(13 + 5) = -18$

Example 15: Find $-12 - (-16)$.

Solution: $-12 - (-16) = -12 + (+16)$
[The additive inverse of -16 is $+16$.]
$= 16 - 12 = 4$

Example 16: Find $-20-(-4)$.

Solution: $-20-(-4)=-20+(+4)$

[The additive inverse of -4 is $+4$.]

$=-20+4=-(20-4)=-16$

Example 17: Subtract the following.

a. $20-(+3)$ b. $120-(-30)$

c. $-119-(+27)$ d. $-212-(-32)$

Solution:

a. $20-(+3)=20+(-3)$
$=20-3=17$

b. $120-(-30)=120+(+30)$
$=120+30=150$

c. $-119-(+27)=-119+(-27)$
$=-(119+27)=-146$

d. $-212-(-32)=-(212)+(+32)$
$=-(212-32)=-180$

Example 18: Simplify the following.

a. $567+345-167$
$=567-167+345$
$=400+345=745$

b. $734+69+131-234$
$=734-234+69+131$
$=500+200=700$

c. $937+(-37)+100-(-200)+300$
$=900+100+200+300$
$=1500$

Common Mistakes!

$-2+7=-5$ ✗
$-2+7=5$ ✓

$-35+(-19)=16$ ✗
$-35+(-19)=-54$ ✓

Remember

Rule for subtraction: Change the sign of the integer to be subtracted to its opposite and then add the two integers.

RULES OF OPERATIONS -BRAHMAGUPTA

Brahmagupta (598 CE-668 CE) was an Indian astronomer and mathematician who laid foundations for the fields of arithmetic and algebra in Indian mathematics. His book *Brahmasphuṭasiddhānta* is believed to be the first book that provides rules for arithmetic operations involving zero and negative numbers.

We can easily understand the rules described by him through the operations of addition and subtraction of integers that we have studied in this chapter.

Rules of Addition

1. Sum of two positive numbers is positive.
$2+4=6$; $12+18=30$
2. Sum of two negative numbers is negative.
$(-5)+(-3)=-8$
3. Sum of a positive and a negative number is their difference.
$3+(-7)=-4$; $9+(-5)=4$

Operations Involving Zero

Rules of Addition

1. Sum of a negative number and zero is negative.
$-6+0=-6$
2. Sum of a positive number and zero is positive.
$9+0=9$

Note: *Note that 0 is the additive identity for whole numbers.*

3. Sum of zero and zero is zero.

Rules of Subtraction

1. Zero subtracted from a negative number is a negative number.
$-2-0=-2$
2. Zero subtracted from a positive number gives a positive number.
$6-0=6$
3. Difference of zero and zero is again zero.

Try This!

1. Find $-12-(10)$. 2. Find $-15-(-5)$. 3. Find $22-(-13)$.
4. Which is greater: $10-(-18)$ or $-28-(-10)$? 5. Which is smaller: $-20-(10)$ or $-30-(-15)$?

Exercise 5 C

1. Subtract the following.
   a. $7-(-4)$ b. $9-(-1)$ c. $8-(-10)$
   d. $16-(-7)$ e. $(-9)-(-1)$ f. $(-7)-(-9)$
2. Simplify.
   a. $(-3)+4$ b. $16-9$ c. $0-(-13)$
   d. $(-3)-(-8+9)$ e. $(-2)-(-12)$ f. $5-(-1-8)$
3. Subtract.
   a. 25 from -50 b. -70 from -70 c. -315 from 360
   d. 0 from (-70) e. -85 from 0
4. Simplify each of the following.
   a. $(-8)-(+3)$ b. $(-13)-(+14)$ c. $(-13)-(-7)$
   d. $(-5)-(-5)$ e. $(-8)-(-9)$ f. $(-6)-(+3)$
5. Subtract the sum of 28 and -12 from 50.

Mental Maths

PA

1. In a mathematics examination, Jivan got 7 marks less than Soman. Jivan got 5 marks more than Rashmi. Soman got 75 marks. How many marks did Jivan and Rashmi get?
2. Find two numbers whose sum is -12 and difference is -2.
3. Find two numbers whose sum is 15 and difference is 1.

SRINIVASA RAMANUJAN

C-9.2

Srinivasa Ramanujan, an Indian mathematician, was born in Erode, Tamil Nadu, on 22 December 1887. He is famous for his contributions in the fields of infinite series, number theory, and mathematical analysis. G.H. Hardy a renowned mathematician at the Cambridge University was so impressed by Ramanujan's brilliance, that he invited Ramanujan to work with him at Cambridge, from 1914-1919.

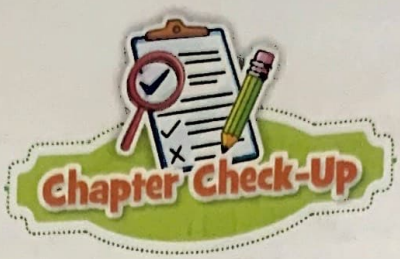
He died of ill-health at a young age of 33 years. His birth date 22nd December is celebrated as the National Mathematics Day in India.

Given here is the Ramanujan Magic Square.

Look at the first row, it is Ramanujan's date of birth, 22-12-1887.

Now find the sum of numbers in each row, in each column, and along the two diagonals. You will notice that the sum is always 139. Can you create a magic square with your date of birth?

22	12	18	87
88	17	9	25
10	24	89	16
19	86	23	11



Multiple Choice Questions

1. The integer 4 units to the right of 0 on the number line is:
   a. +14 b. –40 c. +4 d. – 4
2. Number of whole numbers lying between –7 and 7 is:
   a. 7 b. 3 c. 4 d. 5

Practice Time

3. Arrange the following integers in ascending order:
   a. 20, −20, −10, 10, 1, −1, −13 b. −21, 6, −7, 2, 0, −1, −12
4. Which temperature is lower in each case?
   a. −3°C or 2°C b. −3°C or 0°C c. −5°C or −2°C
5. Write the absolute values of: a. |100| b. |−7| c. |−21|
6. Write the opposites of: a. +7 b. −73 c. +112
7. Add/subtract the following.
   a. (+3) + (+35) b. (+12) + (−8) c. (−3) + (+9)
   d. (+8) − (+3) e. (+20) − (+30) f. (+7) − (+14)

Case-Study Based Question

8. The highest point of Mt. Everest is 29,028 feet above the sea level. The lowest point in the Dead Sea is about 1312 feet below the sea level.
   a. Use + or – to represent the following (consider above sea level, as positive; whereas below sea level as negative). i. The highest point of Mt Everest. ii. The lowest point in the Dead Sea.
   b. The level difference between these two points is:
      i. 27,716 feet ii. 30,340 feet iii. – 27,716 feet iv. – 30,340 feet

Creative Thinking

A helicopter hovering at a height of 960 m above the sea level is coming down vertically at the rate of 10 m/minute. A submarine floating in the same vertical position 150 m below the sea level ascends at 2 m/minute. What will be the height of the helicopter from the submarine exactly after half an hour?

Everyday Maths

1. The temperature of Shimla at noon on a particular day was 18°C. If the temperature dropped by 7 degrees, what is the temperature now?
2. Preeti uses an online wallet for shopping which allows her to shop for anything up to ₹500 even if she has no balance in the wallet. She wanted to buy a flask which costs ₹880. The balance in her account was – ₹72. So, she added ₹1500 to her account and bought the flask. What is the balance in her online wallet now?

Cross-Curricular Connect

C-10.1

(Science) The place where organisms live is called a **habitat**. Habitat means a dwelling place (a home), it provides food, water, air, shelter, and fulfils other needs of organisms.The plants and animals that live on land are said to live in **terrestrial habitats**. On the other hand, the habitats of plants and animals that live in water are called **aquatic habitats**.

A bird is flying at a height of 3200 m above the sea level and a fish is swimming at a depth of 500 m below the sea level. What is the height difference between the bird and the fish?

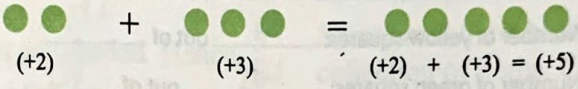
Maths Lab Activity

Aim: To understand the operations of addition and subtraction of integers.

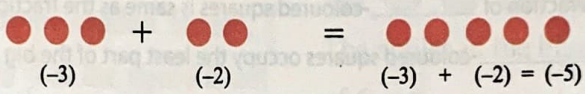
Materials Required: Two sets of counters of two different colours. One colour is considered as positive units (say green) and the other colour as negative units (say red). A negative unit and a positive unit together make a zero. Thus, a green and a red counter together make a zero. The negative of green is red and the negative of red is green as a negative sign means change of the sign.

Preparation: Students work in pairs. One student has all the red counters and the other student has all the green counters.

Addition

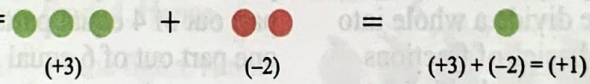
Example 1: $(+2) + (+3) =$ 

When two or more positive integers are added, the result is the sum of their absolute values with a positive sign.

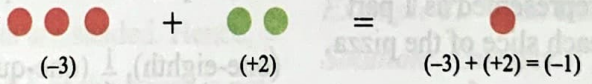
Example 2: $(-3) + (-2) =$ 

When two or more negative integers are added, the result is the sum of their absolute values with a negative sign.

Result 1: When integers with the same sign are added, the result is the sum of their absolute values and has the same sign.

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

(and cancel out each other)

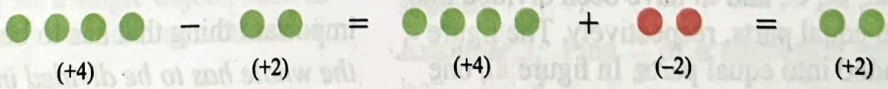
Example 4: $(-3) + (+2) =$ 

(and cancel out each other)

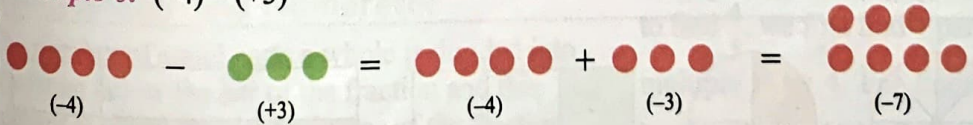
Result 2: When two integers of opposite signs are added, the result will be the difference of the absolute values of the integers with the sign of the number having the higher absolute value.

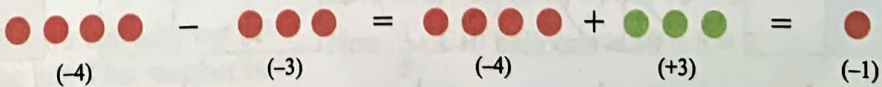
Subtraction

Subtraction of integers is nothing but the addition of the additive inverse.

Example 5: $4 - 2 =$ 

Example 6: $(-4) - (+3) =$



Example 7: $(-4) - (-3) =$ 

Example 8: $(+4) - (-3) =$