1. Following number line shows the temperature in degree celsius (c^o) at different places on a particular day.

(a) Observe this number line and write the temperature of the places marked on it.

Solution:-

By observing the number line, we can find the temperature of the cities as follows,

Temperature at the Lahulspiti is -8°C

Temperature at the Srinagar is -2°C

Temperature at the Shimla is 5°C

Temperature at the Ooty is 14°C

Temperature at the Bengaluru is 22°C

(b) What is the temperature difference between the hottest and the coldest places among the above?

Solution:-

From the number line we observe that,

The temperature at the hottest place i.e., Bengaluru is 22°C

The temperature at the coldest place i.e., Lahulspiti is -8°C

Temperature difference between hottest and coldest place is = 22°C – (-8°C)

= 22°C + 8°C

= 30°C

Hence, the temperature difference between the hottest and the coldest place is 30°C.

(c) What is the temperature difference between Lahulspiti and Srinagar?

Solution:-

From the given number line,

The temperature at the Lahulspiti is -8°C

The temperature at the Srinagar is -2°C

∴The temperature difference between Lahulspiti and

Srinagar is = -2°C − (8°C)

= − 2°C + 8°C

= 6°C

(d) Can we say temperature of Srinagar and Shimla taken together is less than the

temperature at Shimla? Is it also less than the temperature at Srinagar?

Solution:-

From the given number line,

The temperature at Srinagar =-2°C

The temperature at Shimla = 5°C

The temperature of Srinagar and Shimla taken together is = − 2°C + 5°C

= 3°C

∴ 5°C > 3°C

So, the temperature of Srinagar and Shimla taken together is less than the temperature at Shimla.

Then,

3° > -2°

No, the temperature of Srinagar and Shimla taken together is not less than the temperature of Srinagar.

2. In a quiz, positive marks are given for correct answers and negative marks are given

for incorrect answers. If Jack's scores in five successive rounds were 25, – 5, – 10,

15 and 10, what was his total at the end?

Solution:-

From the question,

Jack's score in five successive rounds are 25, -5, -10, 15 and 10

The total score of Jack at the end will be = 25 + (-5) + (-10) + 15 + 10

= 25 – 5 – 10 + 15 + 10

= 50 – 15

= 35

∴Jack's total score at the end is 35.

3. At Srinagar temperature was – 5℃ on Monday and then it dropped by 2℃ on Tuesday. What was the temperature of Srinagar on Tuesday? On Wednesday, it rose by 4℃. What was the temperature on this day?

Solution:-

From the question,

Temperature on Monday at Srinagar = -5^oC

Temperature on Tuesday at Srinagar is dropped by 2^oC = Temperature on Monday – 2^oC

= $-5^oC – 2^oC$

= -7^oC
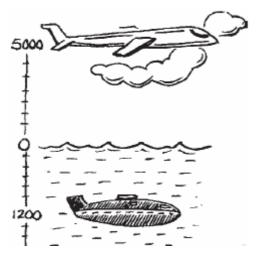
Temperature on Wednesday at Srinagar is rose by 4^oC = Temperature on Tuesday + 4^oC

= $-7^oC + 4^oC$

= -3^oC

Thus, the temperature on Tuesday and Wednesday was -7^oC and -3^oC respectively.

4. A plane is flying at the height of 5000 m above the sea level. At a particular point, it is exactly above a submarine floating 1200 m below the sea level. What is the vertical distance between them?

Solution:-

From the question,

Plane is flying at the height = 5000 m

Depth of Submarine = -1200 m

The vertical distance between plane and submarine = 5000 m – (- 1200) m

= 5000 m + 1200 m

= 6200 m

5. Mohan deposits ₹ 2,000 in his bank account and withdraws ₹ 1,642 from it, the next day. If withdrawal of amount from the account is represented by a negative integer, then how will you represent the amount deposited? Find the balance in Mohan's account after the withdrawal.

Solution:-

Withdrawal of amount from the account is represented by a negative integer.

Then, deposit of amount to the account is represented by a positive integer.

From the question,

Total amount deposited in bank account by the Mohan = 2000

Total amount withdrawn from the bank account by the Mohan = – 1642

Balance in Mohan's account after the withdrawal = amount deposited + amount withdrawn

= 2000 + (- 1642)

= 2000 – 1642

= 358

Hence, the balance in Mohan's account after the withdrawal is 358

6. Rita goes 20 km towards east from a point A to the point B. From B, she moves 30 km towards west along the same road. If the distance towards east is represented by a positive integer then, how will you represent the distance travelled towards west? By which integer will you represent her final position from A?

Solution:-

From the question, it is given that

A positive integer represents the distance towards the east.

Then, distance travelled towards the west will be represented by a negative integer.

Rita travels a distance in east direction = 20 km

Rita travels a distance in west direction = – 30 km

∴Distance travelled from A = 20 + (- 30)

= 20 – 30

= -10 km

Hence, we will represent the distance travelled by Rita from point A by a negative integer, i.e. – 10 km

7. In a magic square each row, column and diagonal have the same sum. Check which of the following is a magic square.

5	–1	– 4
–5	–2	7
0	3	–3

(i)

1	–10	0
– 4	–3	–2
– 6	4	–7

(ii)

Solution:-

First we consider the square (i)

By adding the numbers in each rows we get,

= 5 + (- 1) + (- 4) = 5 – 1 – 4 = 5 – 5 = 0

= -5 + (-2) + 7 = – 5 – 2 + 7 = -7 + 7 = 0

= 0 + 3 + (-3) = 3 – 3 = 0

By adding the numbers in each columns we get,

= 5 + (- 5) + 0 = 5 – 5 = 0

= (-1) + (-2) + 3 = -1 – 2 + 3 = -3 + 3 = 0

= -4 + 7 + (-3) = -4 + 7 – 3 = -7 + 7 = 0

By adding the numbers in diagonals we get,

= 5 + (-2) + (-3) = 5 − 2 − 3 = 5 − 5 = 0

= -4 + (-2) + 0 = − 4 − 2 = -6

Because sum of one diagonal is not equal to zero,

So, (i) is not a magic square

Now, we consider the square (ii)

By adding the numbers in each rows we get,

= 1 + (-10) + 0 = 1 − 10 + 0 = -9

= (-4) + (-3) + (-2) = -4 − 3 − 2 = -9

= (-6) + 4 + (-7) = -6 + 4 − 7 = -13 + 4 = -9

By adding the numbers in each columns we get,

= 1 + (-4) + (-6) = 1 − 4 − 6 = 1 − 10 = -9

= (-10) + (-3) + 4 = -10 − 3 + 4 = -13 + 4

= 0 + (-2) + (-7) = 0 − 2 − 7 = -9

By adding the numbers in diagonals we get,

= 1 + (-3) + (-7) = 1 − 3 − 7 = 1 − 10 = -9

= 0 + (-3) + (-6) = 0 − 3 − 6 = -9

This (ii) square is a magic square, because sum of each row, each column and diagonal is equal to -9.

8. Verify a − (− b) = a + b for the following values of a and b.

(i) a = 21, b = 18

Solution:-

From the question,

a = 21 and b = 18

To verify a − (- b) = a + b

Let us take Left Hand Side (LHS) = a − (- b)

= 21 – (- 18)

= 21 + 18

= 39

Now, Right Hand Side (RHS) = a + b

= 21 + 18

= 39

By comparing LHS and RHS

LHS = RHS

39 = 39

Hence, the value of a and b is verified.

(ii) a = 118, b = 125

Solution:-

From the question,

a = 118 and b = 125

To verify a – (- b) = a + b

Let us take Left Hand Side (LHS) = a – (- b)

= 118 – (- 125)

= 118 + 125

= 243

Now, Right Hand Side (RHS) = a + b

= 118 + 125

= 243

By comparing LHS and RHS

LHS = RHS

243 = 243

Hence, the value of a and b is verified.

(iii) a = 75, b = 84

Solution:-

From the question,

a = 75 and b = 84

To verify a − (− b) = a + b

Let us take Left Hand Side (LHS) = a − (− b)

= 75 − (− 84)

= 75 + 84

= 159

Now, Right Hand Side (RHS) = a + b

= 75 + 84

= 159

By comparing LHS and RHS

LHS = RHS

159 = 159

Hence, the value of a and b is verified.

(iv) a = 28, b = 11

Solution:-

From the question,

a = 28 and b = 11

To verify a − (− b) = a + b

Let us take Left Hand Side (LHS) = a − (− b)

= 28 − (− 11)

= 28 + 11

= 39

Now, Right Hand Side (RHS) = a + b

= 28 + 11

= 39

By comparing LHS and RHS

LHS = RHS

39 = 39

Hence, the value of a and b is verified.

9. Use the sign of >, < or = in the box to make the statements true.

(a) (-8) + (-4) [ ] (-8) − (-4)

Solution:-

Let us take Left Hand Side (LHS) = (-8) + (-4)

= -8 − 4

= -12

Now, Right Hand Side (RHS) = (-8) − (-4)

= -8 + 4

= -4

By comparing LHS and RHS

LHS < RHS

-12 < -4

∴ (-8) + (-4) [<] (-8) − (-4)

(b) (-3) + 7 − (19) [ ] 15 − 8 + (-9)

Solution:-

Let us take Left Hand Side (LHS) = (-3) + 7 − 19

= -3 + 7 – 19

= -22 + 7

= -15

Now, Right Hand Side (RHS) = 15 – 8 + (-9)

= 15 – 8 – 9

= 15 – 17

= -2

By comparing LHS and RHS

LHS < RHS

-15 < -2

∴ (-3) + 7 – (19) [<] 15 – 8 + (-9)

(c) 23 – 41 + 11 [ ] 23 – 41 – 11
Solution:-

Let us take Left Hand Side (LHS) = 23 – 41 + 11

= 34 – 41

= – 7

Now, Right Hand Side (RHS) = 23 – 41 – 11

= 23 – 52

= – 29

By comparing LHS and RHS

LHS > RHS

– 7 > -29

∴ 23 − 41 + 11 [>] 23 − 41 − 11

(d) 39 + (-24) − (15) [ ] 36 + (-52) − (- 36)
Solution:-
Let us take Left Hand Side (LHS) = 39 + (-24) − 15
= 39 − 24 − 15
= 39 − 39
= 0
Now, Right Hand Side (RHS) = 36 + (-52) − (- 36)
= 36 − 52 + 36
= 72 − 52
= 20
By comparing LHS and RHS
LHS < RHS
0 < 20

∴ 39 + (-24) − (15) [<] 36 + (-52) − (- 36)

(e) − 231 + 79 + 51 [ ] -399 + 159 + 81
Solution:-
Let us take Left Hand Side (LHS) = − 231 + 79 + 51
= − 231 + 130
= -101

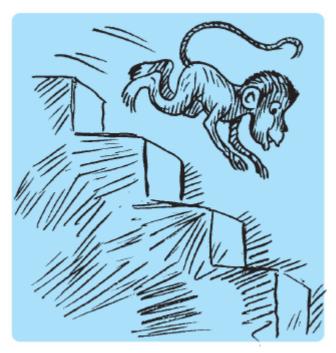Now, Right Hand Side (RHS) = − 399 + 159 + 81

= − 399 + 240

= − 159

By comparing LHS and RHS

LHS > RHS

-101 > -159

∴ − 231 + 79 + 51 [>] -399 + 159 + 81

10. A water tank has steps inside it. A monkey is sitting on the topmost step (i.e., the first step). The water level is at the ninth step.

(i) He jumps 3 steps down and then jumps back 2 steps up. In how many jumps will he reach the water level?

Solution:-

Let us consider steps moved down are represented by positive integers and then, steps moved up are represented by negative integers.

Initially monkey is sitting on the top most step i.e., first step

In 1st jump monkey will be at step = 1 + 3 = 4 steps

In 2nd jump monkey will be at step = 4 + (-2) = 4 − 2 = 2 steps

In 3rd jump monkey will be at step = 2 + 3 = 5 steps

In 4th jump monkey will be at step = 5 + (-2) = 5 − 2 = 3 steps

In 5th jump monkey will be at step = 3 + 3 = 6 steps

In 6th jump monkey will be at step = 6 + (-2) = 6 − 2 = 4 steps

In 7th jump monkey will be at step = 4 + 3 = 7 steps

In 8th jump monkey will be at step = 7 + (-2) = 7 − 2 = 5 steps

In 9th jump monkey will be at step = 5 + 3 = 8 steps

In 10th jump monkey will be at step = 8 + (-2) = 8 − 2 = 6 steps

In 11th jump monkey will be at step = 6 + 3 = 9 steps

∴Monkey took 11 jumps (i.e., 9th step) to reach the water

level

(ii) After drinking water, he wants to go back. For this, he jumps 4 steps up and then jumps back 2

steps down in every move. In how many jumps will he reach back the top step?

Solution:-

Let us consider steps moved down are represented by positive integers and then, steps moved up are represented by negative integers.

Initially monkey is sitting on the ninth step i.e., at the water level

In 1st jump monkey will be at step = 9 + (-4) = 9 − 4 = 5 steps

In 2nd jump monkey will be at step = 5 + 2 = 7 steps

In 3rd jump monkey will be at step = 7 + (-4) = 7 − 4 = 3 steps

In 4th jump monkey will be at step = 3 + 2 = 5 steps

In 5th jump monkey will be at step = 5 + (-4) = 5 − 4 = 1 step

∴Monkey took 5 jumps to reach back the top step i.e.,

first step.

(iii) If the number of steps moved down is represented by negative integers and the number of steps moved up by positive integers, represent his moves in part (i) and (ii) by completing the following; (a) − 3 + 2 − … = − 8 (b) 4 − 2 + … = 8. In (a) the sum (− 8) represents going down by eight steps. So, what will the sum 8 in (b) represent?

Solution:-

From the question, it is given that

If the number of steps moved down is represented by negative integers and the number of steps moved up by positive integers.

Monkey moves in part (i)

$= -3 + 2 - \ldots\ldots\ldots = -8$

Then LHS $= -3 + 2 - 3 + 2 - 3 + 2 - 3 + 2 - 3 + 2 - 3$

$= -18 + 10$

$= -8$

RHS $= -8$

∴Moves in part (i) represents monkey is going down 8

steps. Because negative integer.

Now,

Monkey moves in part (ii)

$= 4 - 2 + \ldots\ldots\ldots = 8$

Then LHS $= 4 - 2 + 4 - 2 + 4$

$= 12 - 4$

$= 8$

RHS $= 8$

∴Moves in part (ii) represents monkey is going up 8

steps. Because positive integer.