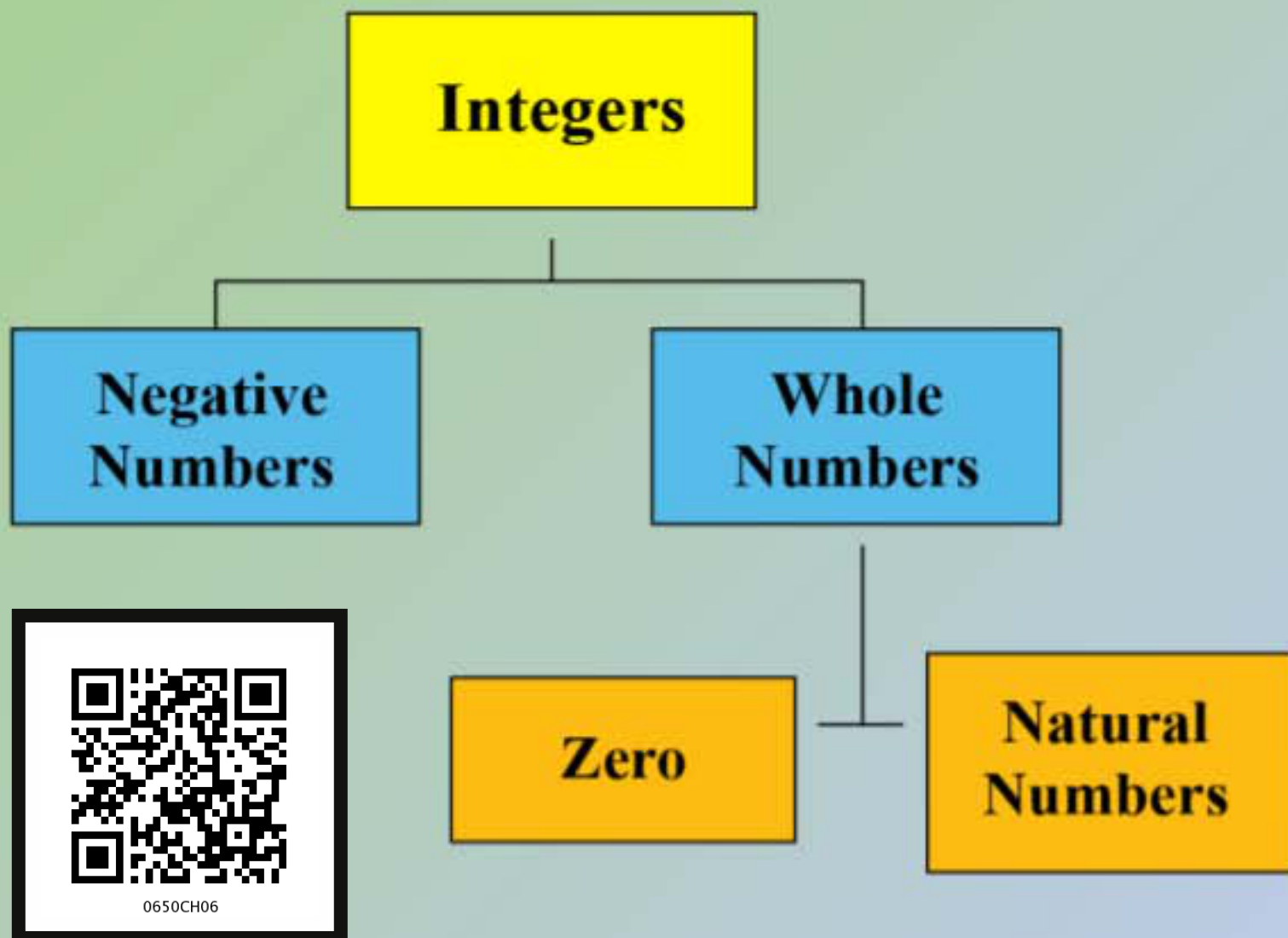


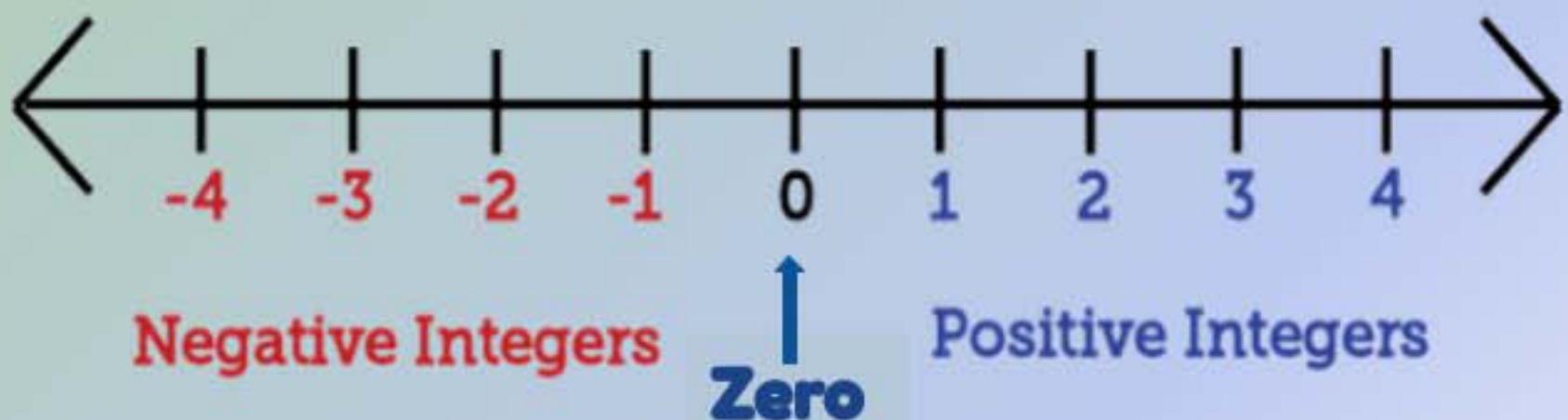
INTEGERS

“Magical land of negative numbers”

CLASS 6



Integer Number Line



FROM THE PRINCIPAL'S DESK

Dear readers,

‘Change is the only constant’, so said a wise man from the past so true indeed! With the coming of the National Education Policy 2020, the focus of education is shifting to more student centric education, and thus the need to produce the content in a way which can be easily understood by the students.

The Central Board of Secondary Examination has also brought in alterations in the way education was being imparted in the classrooms of the nation. Art Integration with the curriculum, competency based education, stress on physical fitness are all endeavours to prepare the students for the necessities of the future. One such endeavour is also changing the curriculum to graphic novels.

Conceived and directed by Mr. Sandeep Sethi, his passion rubbed on to the teachers as well. He lent support through constant guidance.

I am also grateful to Ms. Anita Karwal, Secretary, Department of School Education, Ministry of Education, whose valuable inputs and constant motivation has encouraged teachers to curate the concepts in the form of interesting graphics. I am very sure that this will change the way topics are taught in the classrooms. Using comic strip as a tool, concepts will be explained in a simple way, more relatable to the students.

Our sincere thanks to the worthy team of Ms. Anita Karwal, Secretary, Department of School Education, Ministry of Education, Mr. Manoj Ahuja, Chairman, Central Board of Secondary Education and Mr. Sandeep Sethi, the pilot of the project.

My sincere thanks are also due to the team of gifted teachers and students who in a time-bound frame produced creatively endowed content which will be a visual extravaganza for the students.

Enjoy reading!

Shefalee Gupta
Principal

CONTENTS

Preface	2
Learning outcomes	3
Storyboard	4
Know The Characters	5
Story (Part I)	6-12
Let's Recap I	13-15
Learning Check 1	16
Story (Part II)	17-21
Let's Recap II	22-23
Learning Check 2	24
Story (Part III)	25-32
Let's Recap III	33-34
Learning Check III	35
Let's Understand	35
Final Check	36-37
Puzzle Time	38
Fun Activity	38
Snakes & Ladders Fun Game	39-40
Answer Keys	41-42
Glossary & Bibliography	43
Copyrights & Disclaimer	44

PREFACE

This graphic novel has been prepared to enhance the understanding of Number Systems among students. It stresses on teaching the concepts with fun and examples. The entire storyline has shown practical applications of the use of numbers. This is a determined attempt to encourage improvement of numerical problem-solving skills and, more importantly, it focuses on the use of negative numbers and positive numbers in daily life.

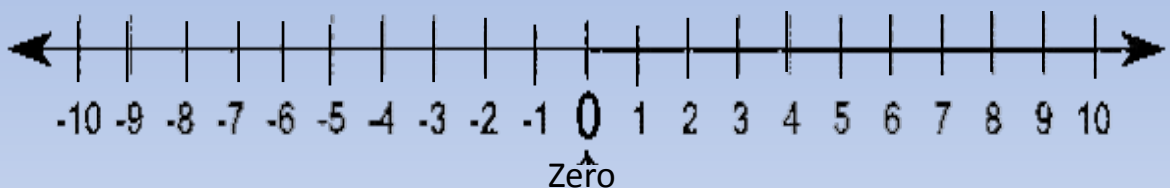
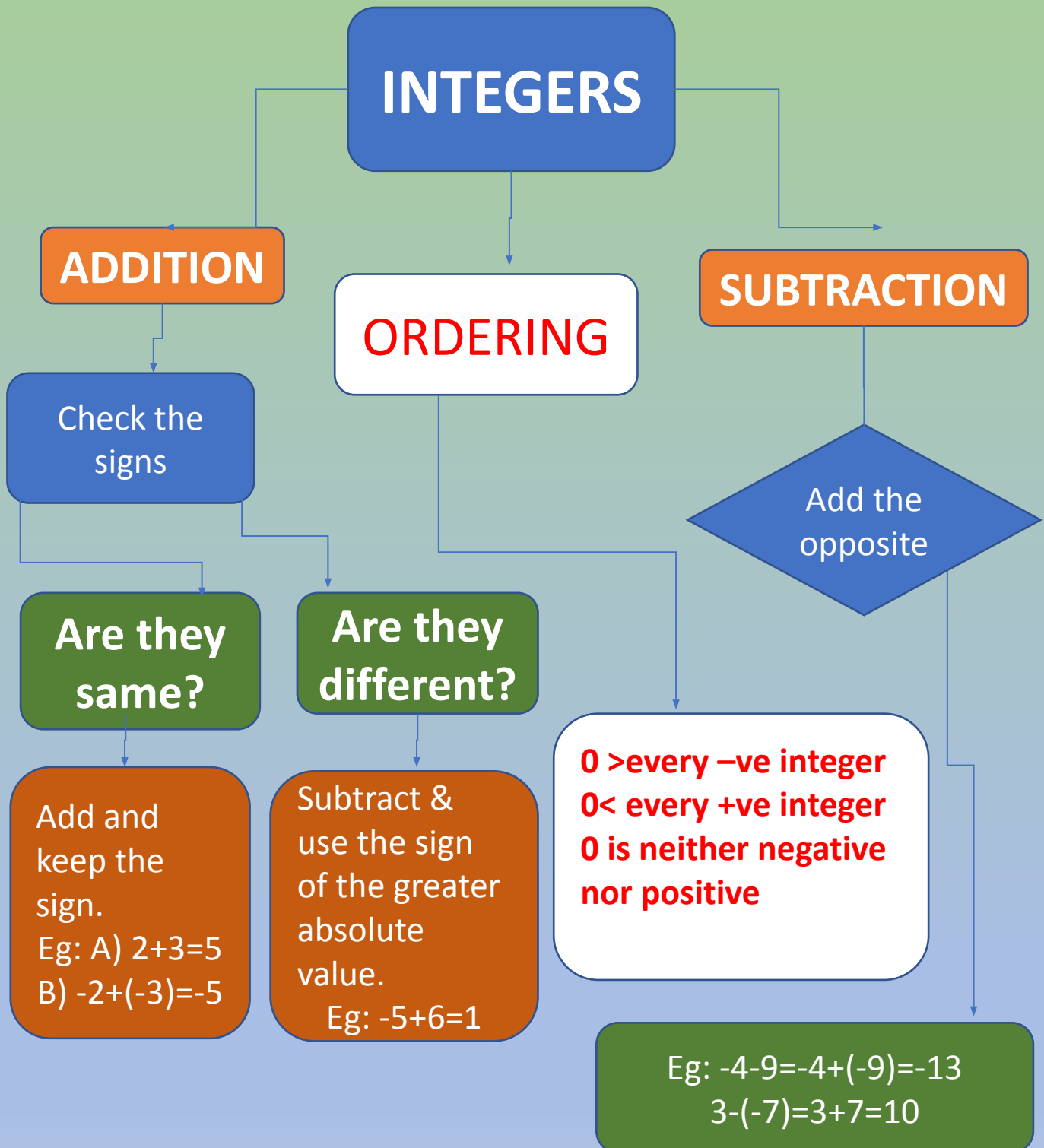
Besides the coverage of all the topics in this chapter, the novel shows how a child interacts with her family to clear her doubts and tries to develop the interactive skills of the readers and generate their curiosity in the characters of the novel. Hope this novel will succeed in educating students in a new and interesting way.

LEARNING OUTCOMES

The learners will be able to –

- ❖ Define and list the set of integers, positive numbers , negative numbers .
- ❖ Arrange integers in an order.
- ❖ List real-life situations involving opposites .
- ❖ Identify integer to represent a given real-life situations .
- ❖ Identify the opposite of an integer.
- ❖ Use the number line to illustrate integers arithmetically .
- ❖ Differentiate between a positive and a negative integer.
- ❖ Add and Subtract integers using number line .
- ❖ Apply the rules of addition and subtraction on integers.
- ❖ Apply integers in their day to day life .

STORYBOARD



KNOW THE CHARACTERS

AMIRA

An eleven year old curious and inquisitive girl who is eager to learn new things.



Mr. ZERO

A character in Amira's dream who explains the concepts of integers to her in the beginning of the story.

Mr. AMIT

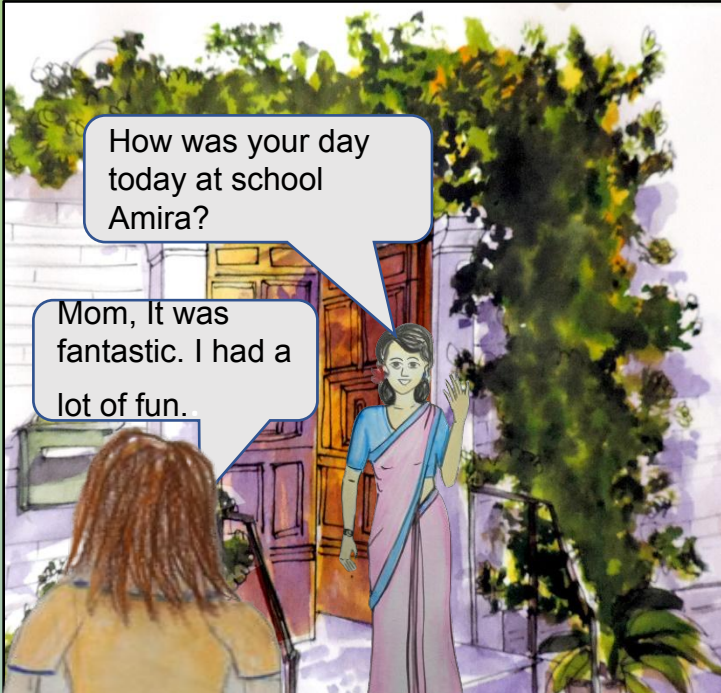
Amira's father who is 40 years old.
A smart and intelligent software engineer.



Mrs. ANITA

A 35 years old homemaker
Amira's mother.

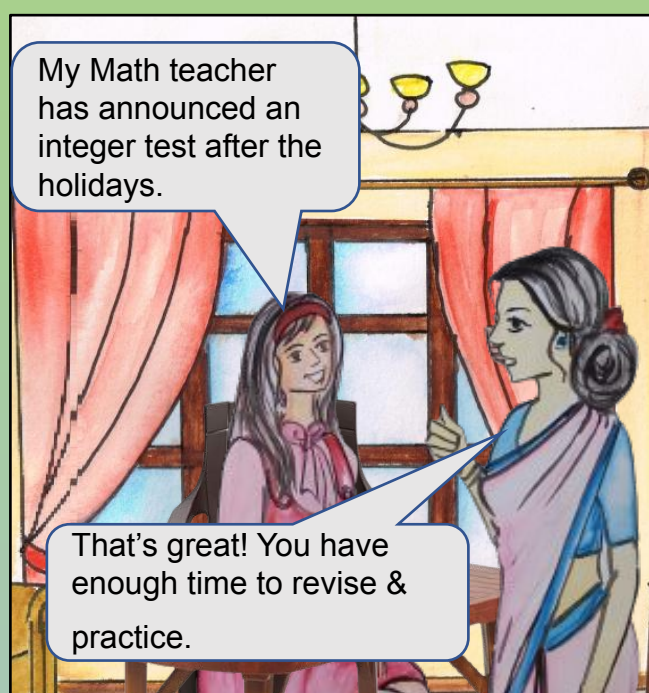




How was your day today at school Amira?

Mom, It was fantastic. I had a lot of fun.

Anita opens the gate as Amira is back from school. She is excited as winter vacation has started.



My Math teacher has announced an integer test after the holidays.

That's great! You have enough time to revise & practice.

Amira changes her school uniform and sits for lunch .



Yes Mom, I need to revisit all the concepts once again.

Yes my dear, we will help you .

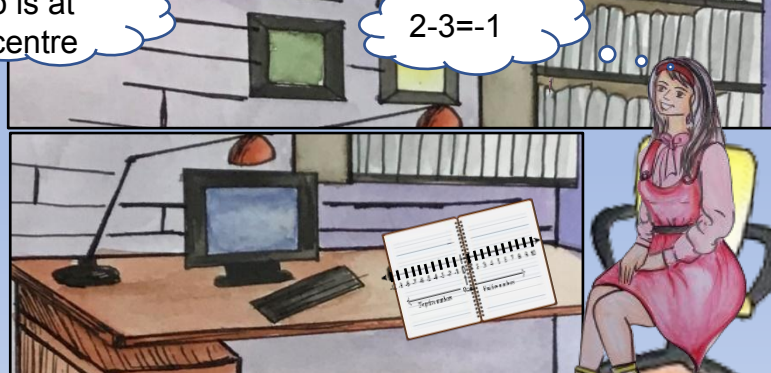


Amira, you will be happy to know that tomorrow morning we are going to Shimla!

Hooray!! That's a wonderful surprise mom!



0 is at centre



$2-3=-1$

Amira is sitting in her study room trying to recall what her teacher taught her that day in the class about number line.

Amira was so engrossed that she started daydreaming and saw herself on the number line.

Oh! Where am I ?

You are on a number line!

Excuse me Sir! May I know who are you?

Don't you recognize me? I am Zero, You must have seen me many times .

Of course I know , my teacher told me Zero is a special number

It has a special property: when we add it to a number we get that number back.

Good Amira ! This property is called Additive Identity .

Of course dear! You can see that there are numbers on both my sides i.e. right hand side and left hand side.

Yes

Mr. Zero, could you please help me to know more about number lines?

Which number are you on now ?

I am on number 5 .

The comic includes two number lines. The first number line is labeled from -10 to 10, with 'Negative numbers' on the left and 'Positive numbers' on the right, and 'Zero' at the center. The second number line is also labeled from -10 to 10, with the number 5 circled in red.

Okay Amira , now you jump one step towards right from 5 .



-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10

Where have you reached ?

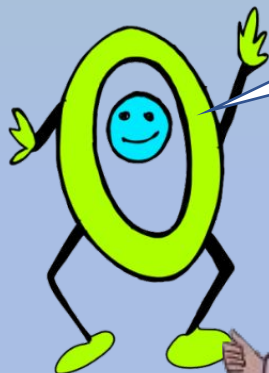


I have reached number 6.



-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10

Okay Amira, when you jump towards the right side, you will notice that the value of the numbers is increasing .



Yes, the numbers are increasing .
like 5 to 6 , 6 to 7 and 7 to 8.

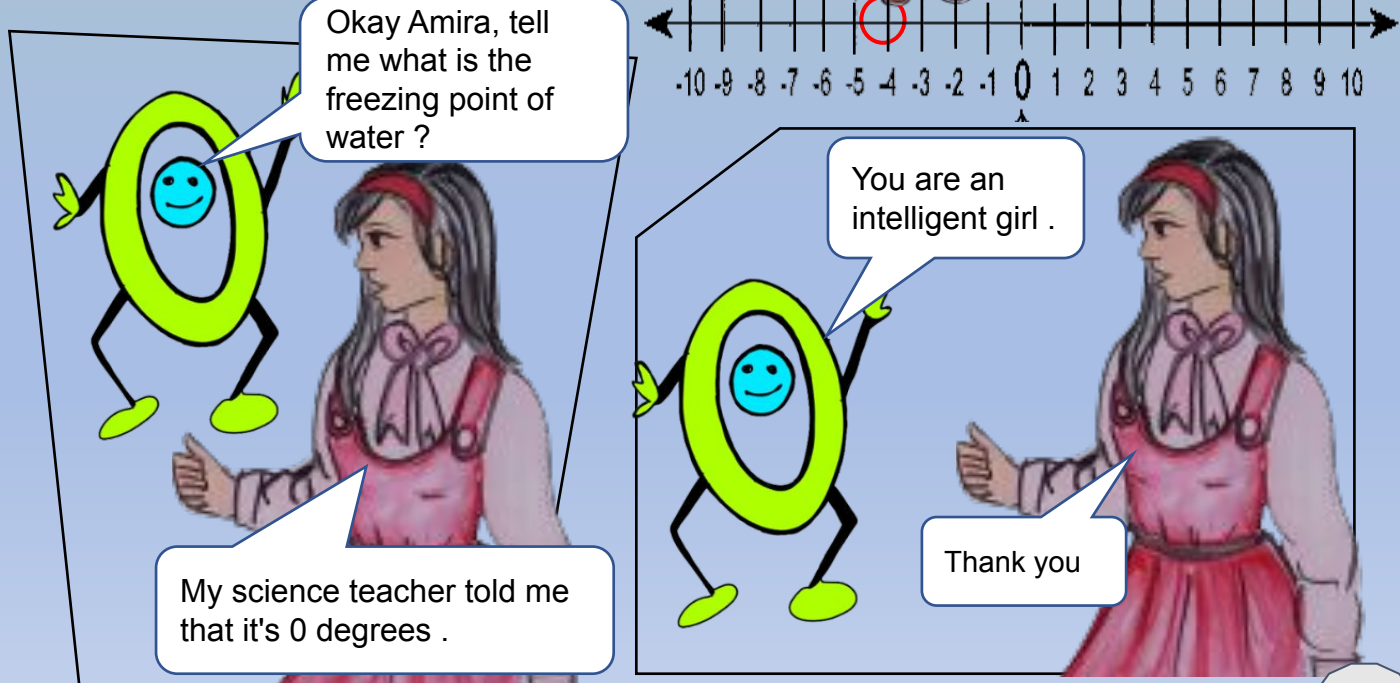
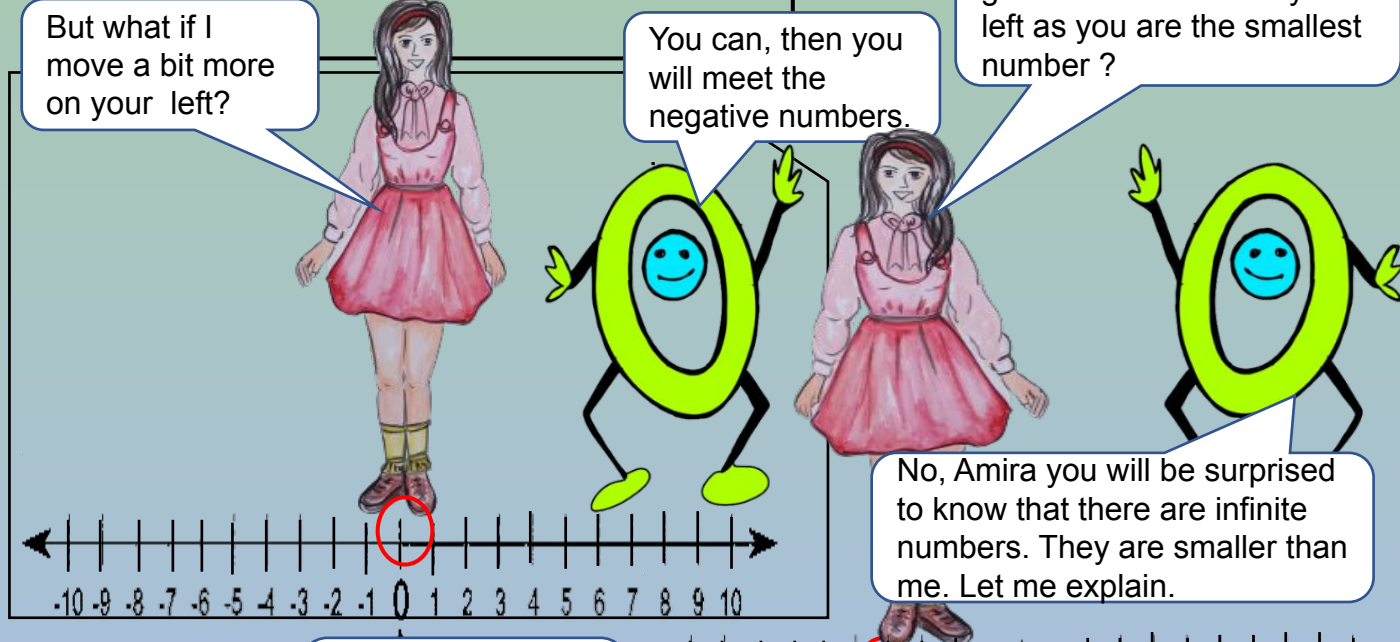
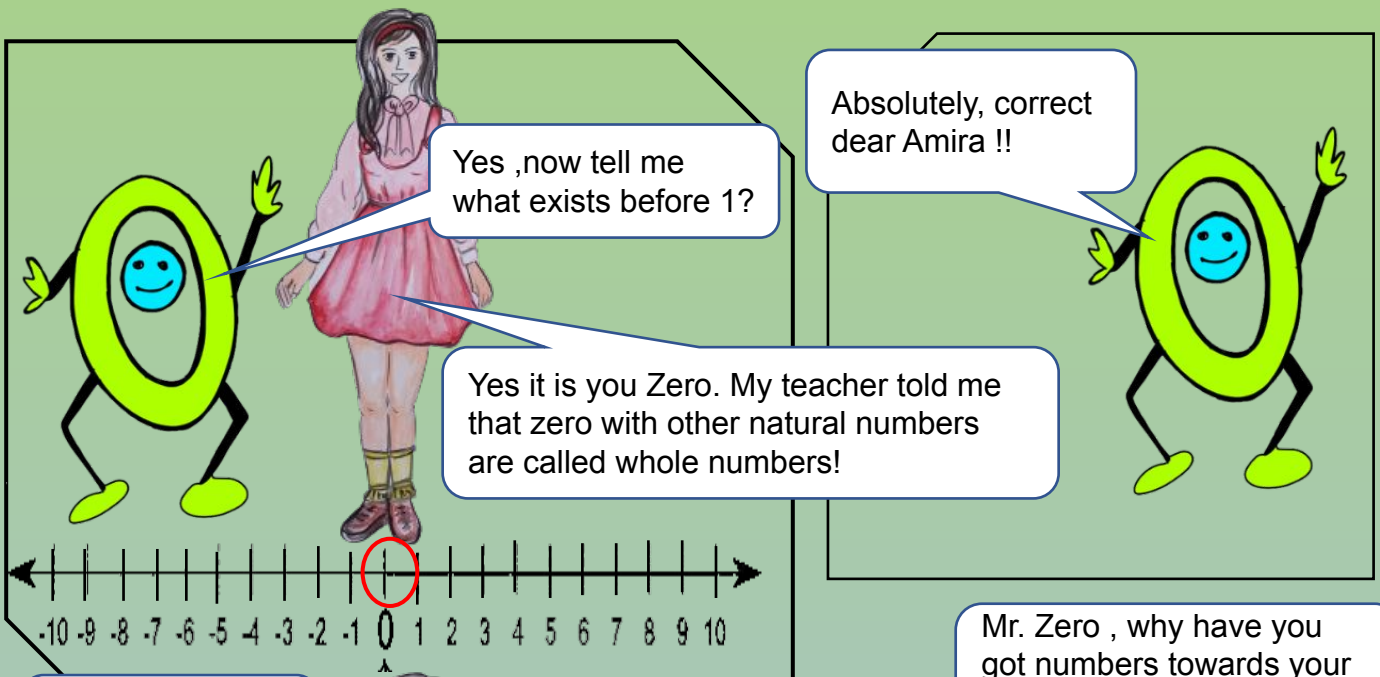
Amira, jump towards the left side .



Now the numbers are decreasing.



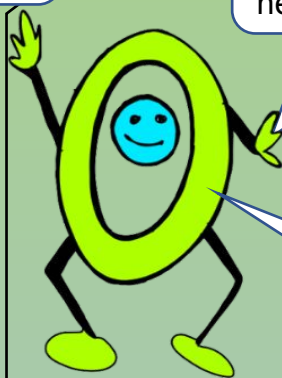
-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10



But how will we denote the temperature if it goes below zero ?

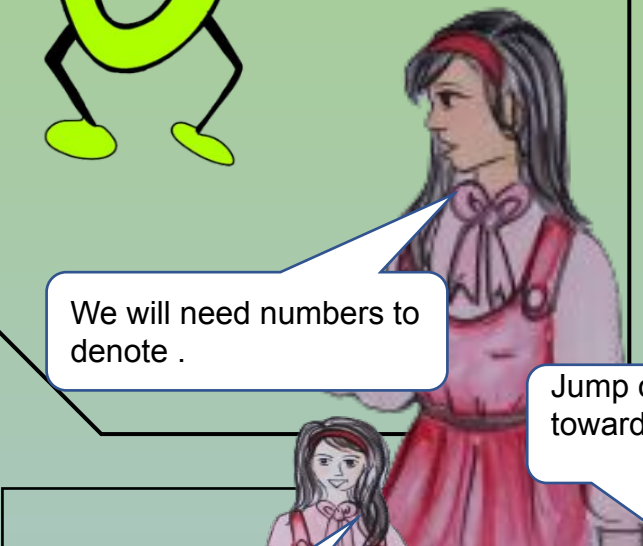


Yes , these numbers are called negative numbers or negative Integers.



Jump one step towards your left

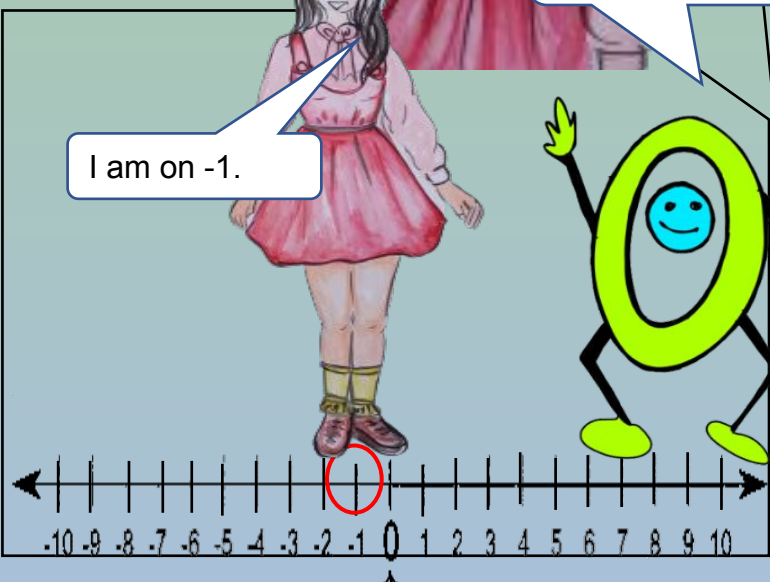
We will need numbers to denote .



Jump one more step towards the left.

Now I got it! As we move more on the left , the value of the number decreases . I have reached at -2

I am on -1.



Excellent !

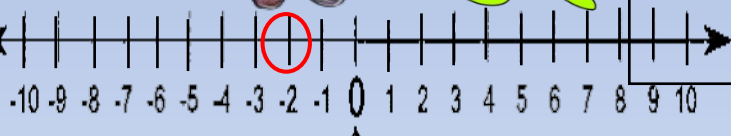


Mr. Zero , I have noticed that even being on -2, my actual distance from Zero is still 2 steps away.



So that means - 5 absolute value is 5 because it is 5 steps far from zero ?

Yes, that actual distance is called Absolute value .



Yes correct ,
you are a fast
learner.

Thank you Mr. Zero.
So, negative numbers
seems to be very
interesting.

Yes

If you deposit money in
a bank account, it
represents positive
numbers

Could you please tell me
more about the use of
negative numbers ?

If money is overdrawn
(withdrawn) from the
account, it represents
negative numbers.

Yes

Calories when eaten, it represents
positive numbers.
Calories, when burned, represent
negative numbers.

Okay

Wow !! I got it with the help of these
negative numbers ,we can easily
differentiate and compare two
opposite situations in Math.

Hmm.. Very good !!

Mr. Zero you are my hero !!

Hahaha



Mr. Zero and Amira laugh and have fun together.

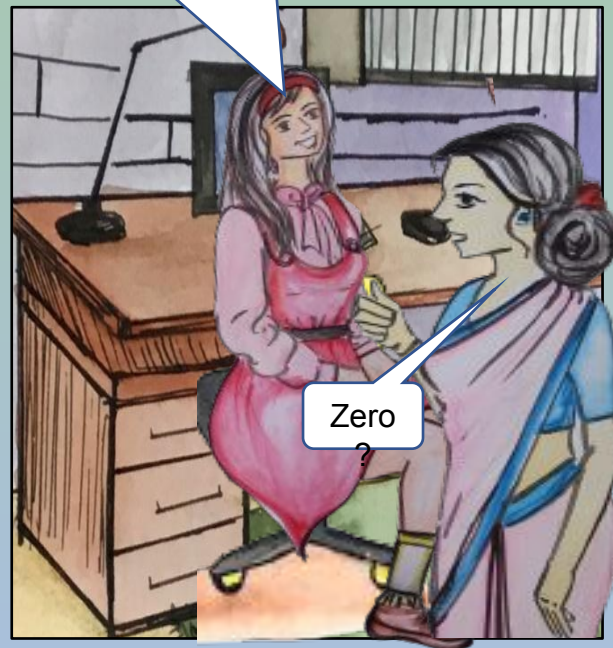
Oh it's morning. Mom, I was in a deep sleep with Mr. zero!

Wake up Amira, we are getting late.



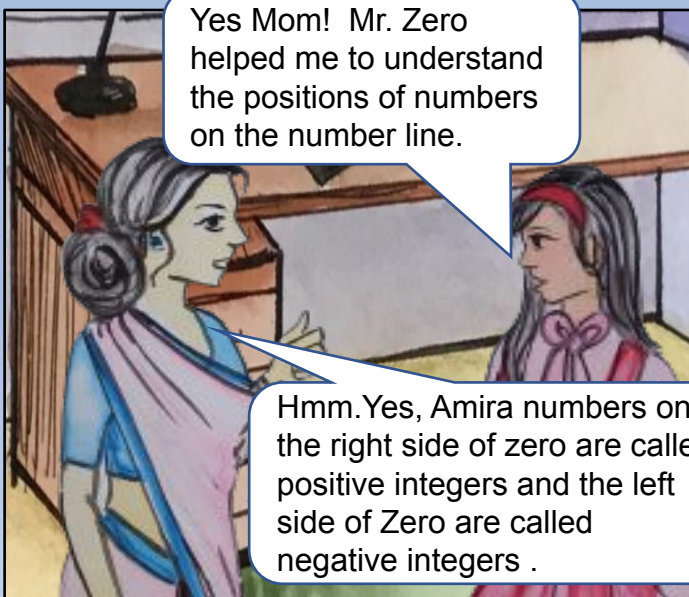
Amira's mother enters the room and sees Amira sleeping over her study desk.

Zero?



Yes Mom! Mr. Zero helped me to understand the positions of numbers on the number line.

Hmm. Yes, Amira numbers on the right side of zero are called positive integers and the left side of Zero are called negative integers .



Yes mom

Okay Amira. Now get ready fast.



Let's Recap 1

NATURAL NUMBERS

All the positive counting numbers starting from one are called **Natural Numbers**.

The first 10 natural numbers



1, 2, 3, 4, 5, 6, 7, 8, 9, 10

WHOLE NUMBERS

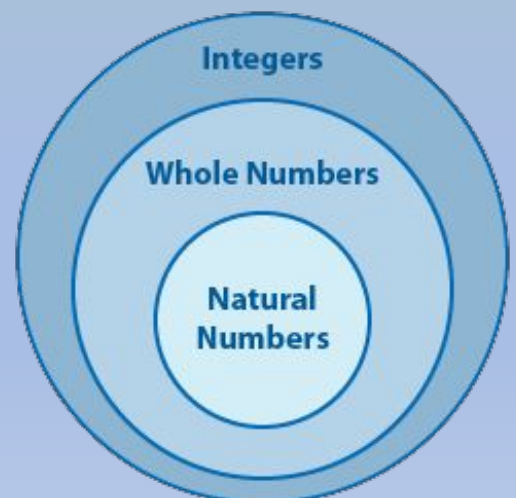
The **whole numbers** are the natural numbers together with zero.

0



What is an Integer ?

The whole numbers and the negative numbers together, the new collection of numbers will look like-4, -3, -2, -1, 0, 1, 2, 3, 4 and so on. This collection of numbers is known as Integers.



Types Of Integers

- ❑ **Positive Integers:** An integer is positive if it is greater than zero. Example: 1, 2, 3 . . .
- ❑ **Negative Integers:** An integer is negative if it is less than zero. Example: -1, -2, -3 . . .
- ❑ **Zero** is defined as neither negative nor positive integer.
- ❑ $Z = \{ \dots -7, -6, -5, -4, -3, -2, -1, 0, 1, 2, 3, \dots \}$

NEGATIVE

Temperature below 0°C

Below sea level

Owing money

Having debt

Basement parking areas

Negative charged electricity

Loss

Loss or decrease

Withdrawal

Down

POSITIVE

Temperature above 0°C

Above sea level

Earning money

Having money in the bank

Floors above ground floor

Positive charged electricity

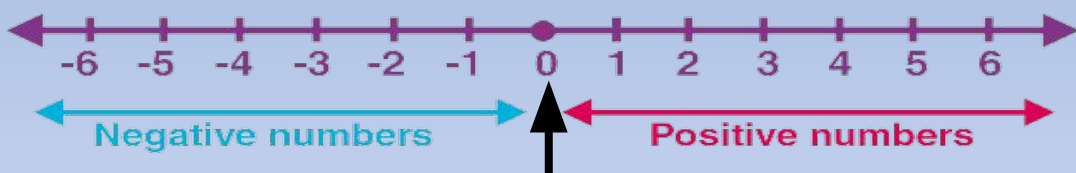
Win

Gain or increase

Deposit

Up

NUMBER LINE



0 is neither positive nor negative

ADDITIVE IDENTITY

- ❖ **Additive identity** is a number, which when added to any number, gives the sum as the number itself. It means that additive identity is "0" as adding 0 to any number, gives the sum as the number itself.
Example: $2 + 0 = 2$

Additive Identity

$$\begin{aligned}a + (0) &= a \\ 0 + (a) &= a\end{aligned}$$

Remember: Zero (0) preserves the Identity of every number during addition.

ABSOLUTE VALUE

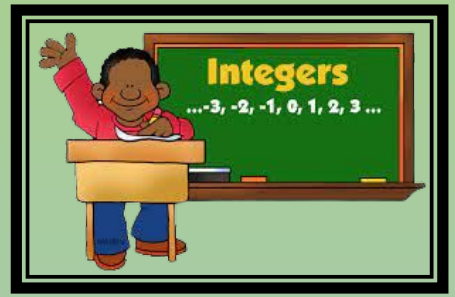
The absolute value of x , denoted " $|x|$ " (which is read as "the absolute value of x "), is the distance of x from zero.



∴ Absolute value of 4 = 4

Absolute value of - 4 = 4

Learning Check 1

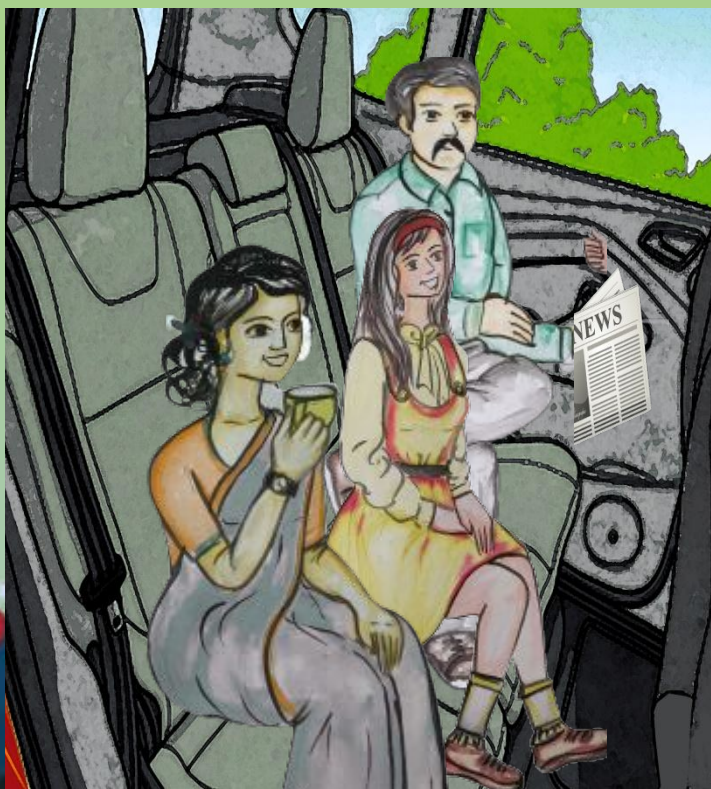


Fill in the Blanks:

1. Predecessor of $|-1|$ is _____ .
2. $(-100) + \underline{\hspace{2cm}} = 0$
3. The opposite of 'earning money' is _____ money.
4. Zero is _____ than all negative integers.
5. Number zero is neither _____ nor _____ .
6. A loss of Rs.300 is represented as _____ .
7. The integer (-2) lies on the _____ side of -5 on a number line.
8. The positive integer is always _____ than its opposite.
9. The _____ value of an integer is never negative.



Hurry up everyone!



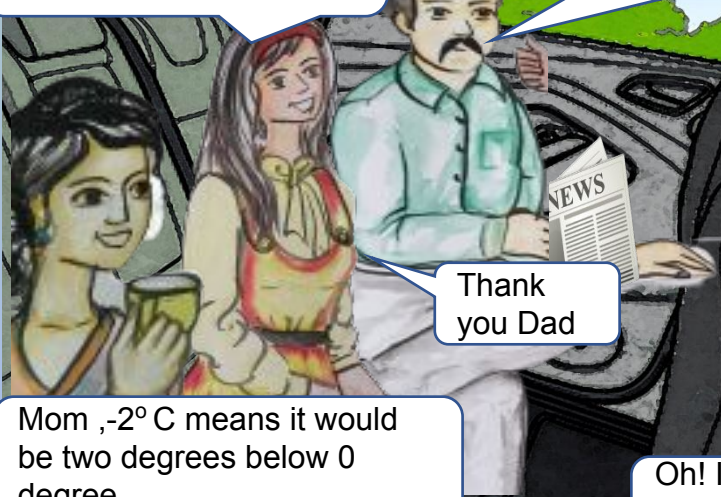
The driver starts off the car while the family sits behind. Amira's father is reading a newspaper and her mother is sipping tea.

The family is ready to depart for Shimla. Everybody is happy and keeping their luggage in the car.

Dad, It's such a pleasant weather. How far is Shimla from Delhi?

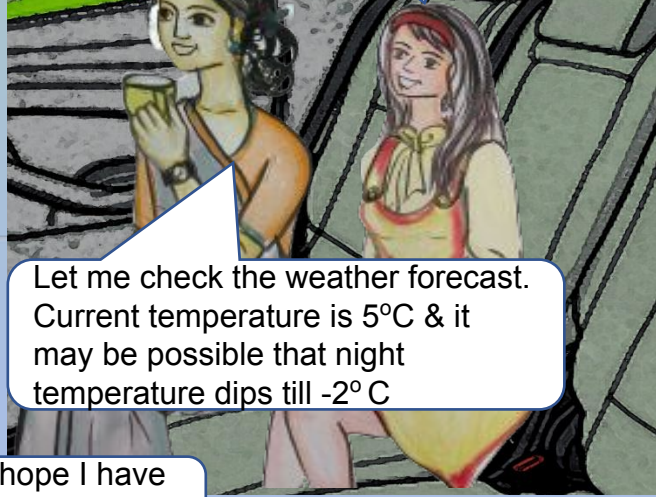
Shimla is approximately 355 Kms. From Delhi. It will take us around 6 to 7 hours to reach.

Mom, how cold would it be in Shimla?



Thank you Dad

Mom, -2°C means it would be two degrees below 0 degree.

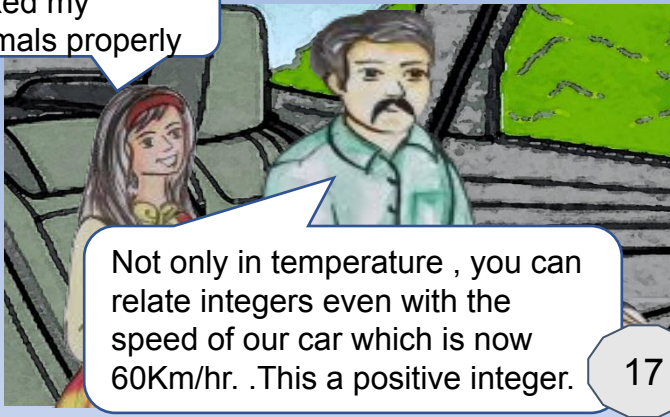


Let me check the weather forecast. Current temperature is 5°C & it may be possible that night temperature dips till -2°C

Oh! I hope I have packed my thermals properly



Yes there will be snowfall at night, it will be very cold.



Not only in temperature, you can relate integers even with the speed of our car which is now 60Km/hr. This a positive integer.



Our car is slowing down at a stop sign, it's accelerating at a negative rate.

I understood dad it represented a negative value because its speed is decreasing.

Yes now the car has stopped.

Good question Vijay. In this case the shopkeeper will write ₹ 3 in the boy's credit account, which means the boy has to pay him ₹ 3 more.

Sir, yesterday at a shop, a boy purchased a pen worth ₹ 15 but he fell short of ₹ 3 and paid only ₹ 12. The shopkeeper wrote the due amount in his account, but how does he know whether he has to take or give ₹ 3 to that boy?

After listening to all the conversation, Vijay asked a question to Amit on the real life application of integers.

Yes dad, one more way to use negative numbers.



Finally , we have reached!

Let's move to our room

Amira, which floor are we on?



We are on the ground floor.



Now imagine a vertical number line and ground floor is the floor zero. Our room is on the second floor. So which button should we press and why?

We should press +2 as our room is two floors above ground level.



Very good my little girl.

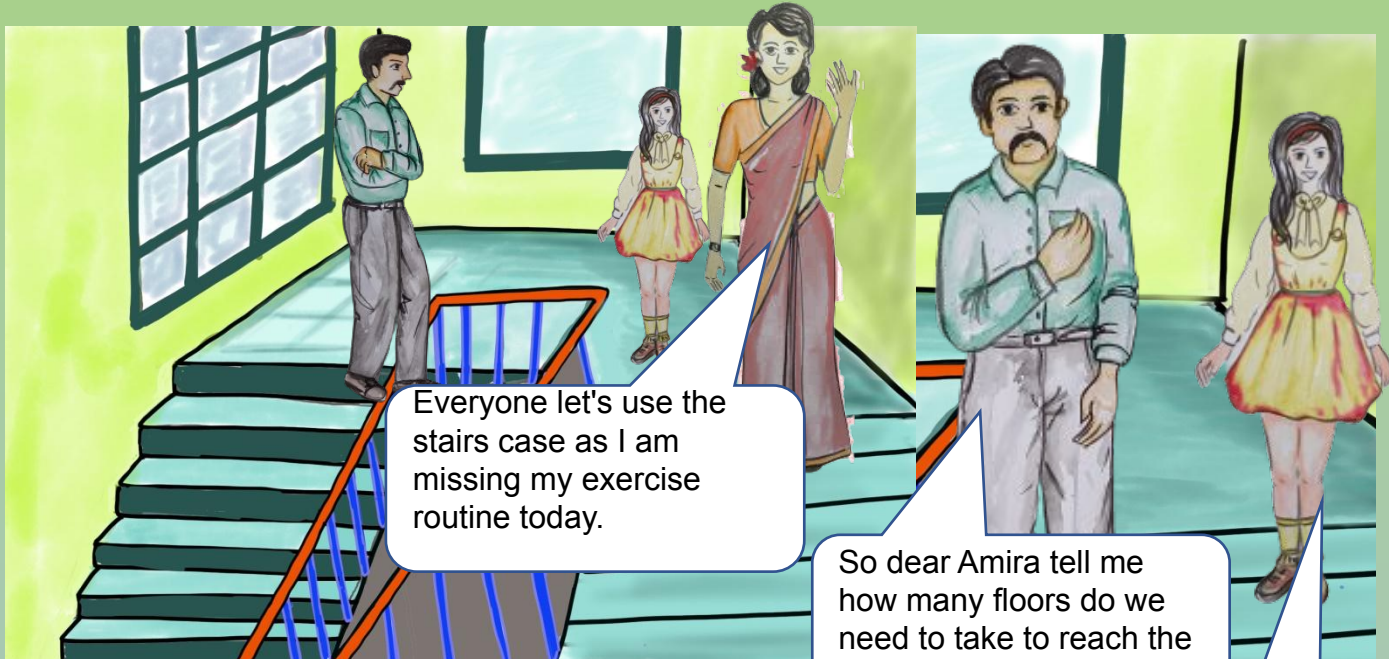
Dad, where is the dining area?

Oh! That means one floor below zero. So it will be -1



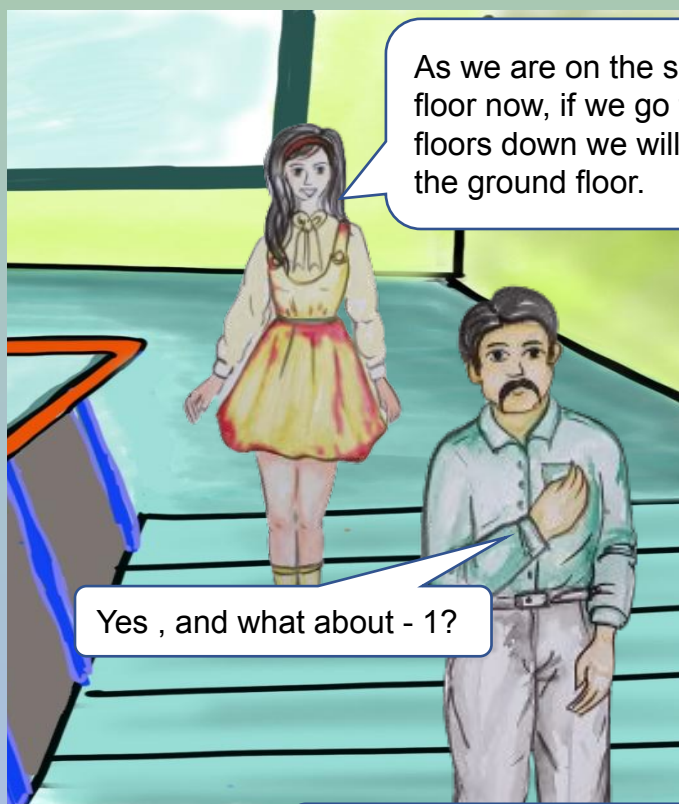
Dining area is in basement 1

Correct answer! Let's go for dinner now.



Everyone let's use the stairs case as I am missing my exercise routine today.

So dear Amira tell me how many floors do we need to take to reach the basement 1?

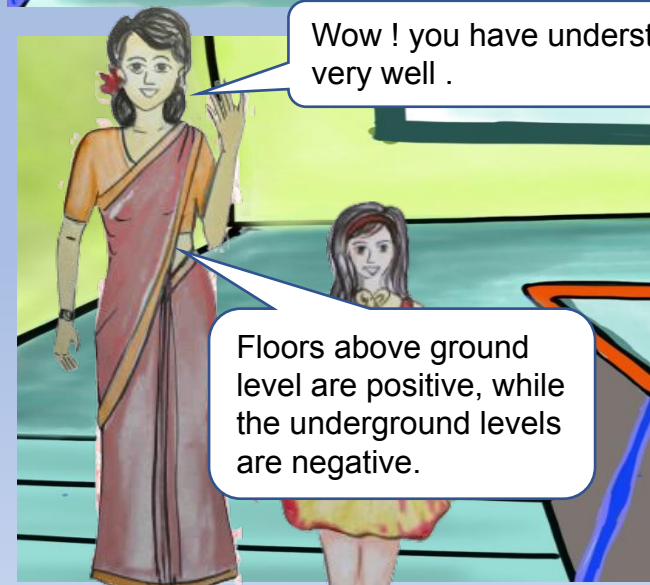


As we are on the second floor now, if we go two floors down we will reach the ground floor.

Okay, let me imagine a number line to answer this.

Yes , and what about - 1?

If we go one floor below zero floor or ground floor, then we are in the basement, that is, - 1 floor.

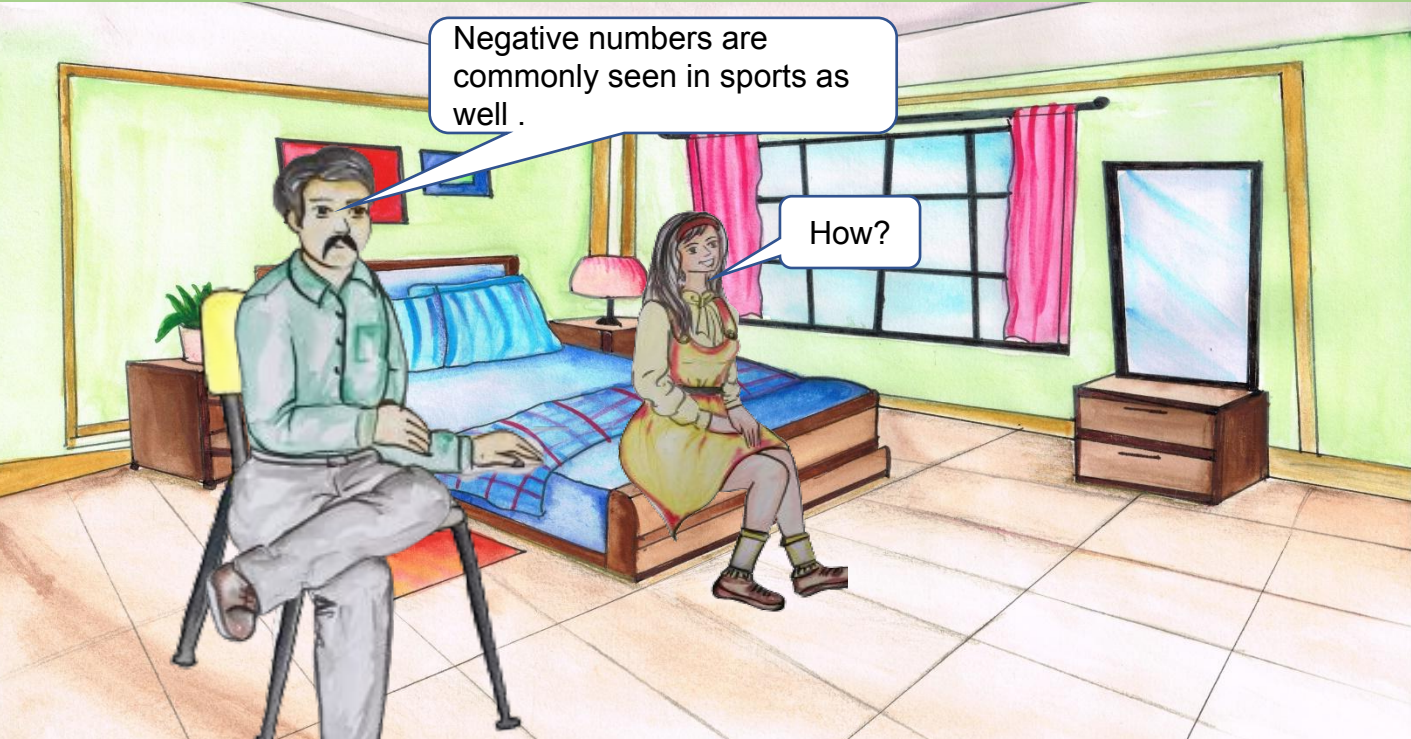


Wow ! you have understood it very well .

Floors above ground level are positive, while the underground levels are negative.

FUN FACTS

- Burj Khalifa is the tallest building in the world with 163 floors.
- Mt Everest is 8.8 km above sea level (Positive) and the Mariana Trench is 10.9 km below (Negative).



Negative numbers are commonly seen in sports as well .

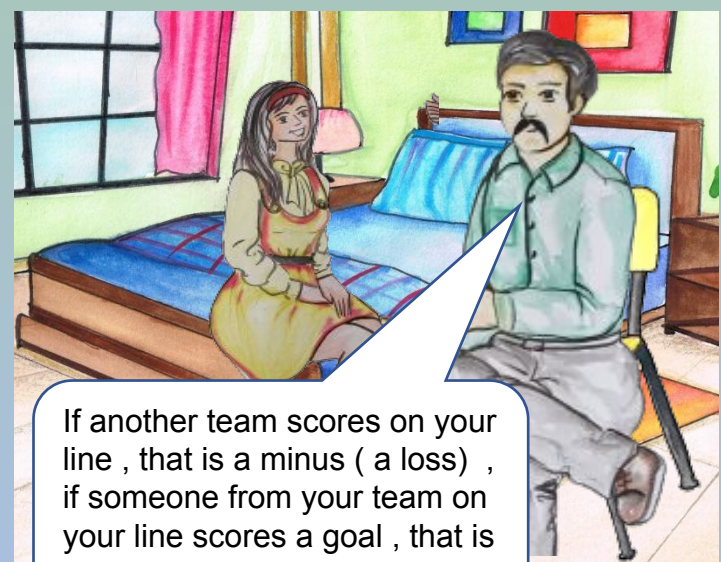
How?

Father and Amira's are discussing the scoreboard while watching a hockey match in their hotel room.

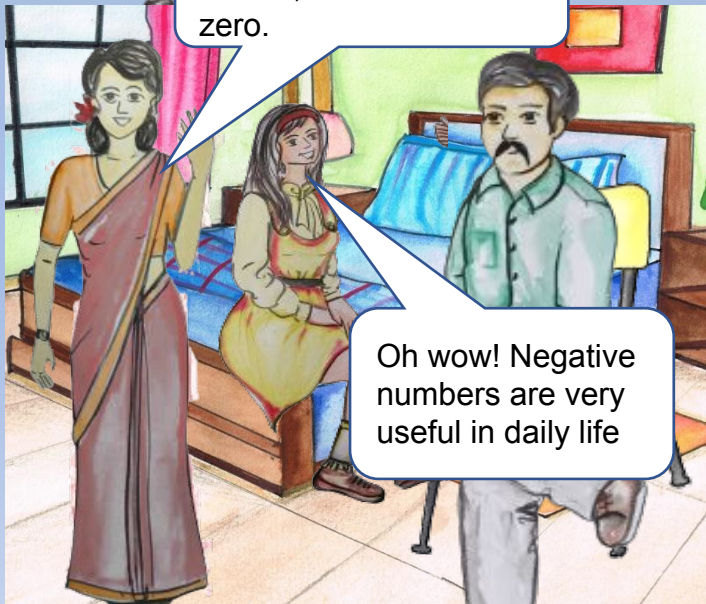


Let's consider Hockey game , where each line of player records a + /

Yes if neither team scores, the result is zero.



If another team scores on your line , that is a minus (a loss) , if someone from your team on your line scores a goal , that is a plus (a gain) .



Oh wow! Negative numbers are very useful in daily life

Next morning , Amira prepares to go for swimming. She is a swimming champion and wants to do underwater diving.

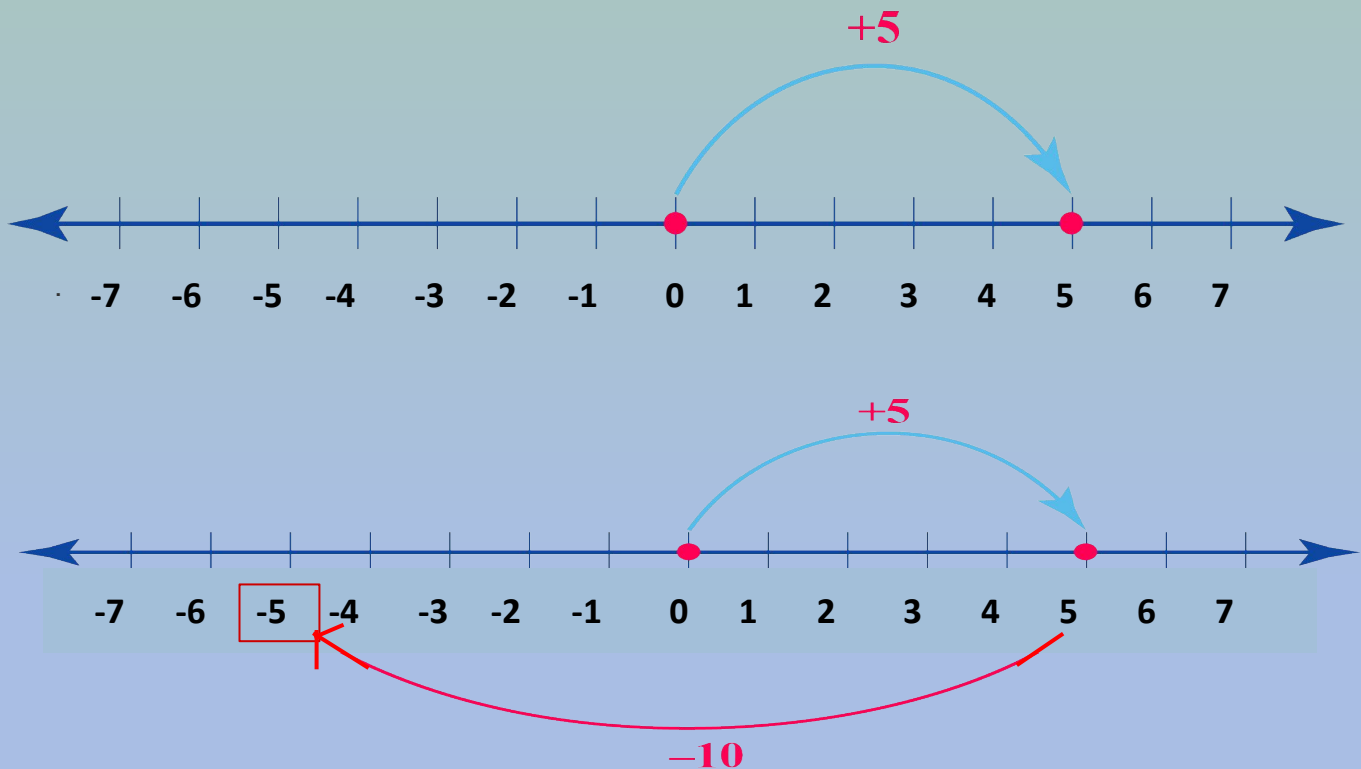
Let's Recap 2

Addition of integers using Number Line

- ✓ The rules for the addition of integers on the number line are:
- ✓ Always start from "0".
- ✓ Move to the right side, if the number is positive.
- ✓ Move to the left side, if the number is negative.

Q1) Find the value of $5 + (-10)$ using a number line.

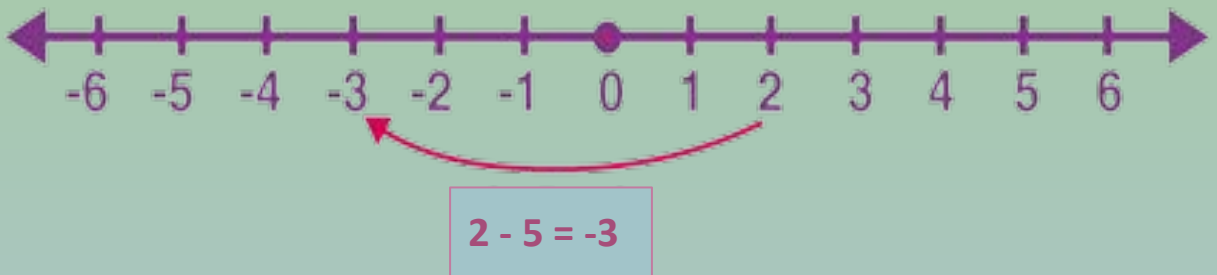
Solution : In the given problem, the first number is 5 which is positive. So, we start from 0 and move 5 units to the right side. The next number in the given problem is -10, which is negative. We move 10 units to the left side. The number we have moved to finally is -5



Subtraction Of Integers using Number Line

Q2) Find the value of $2 - 5$ using a number line.

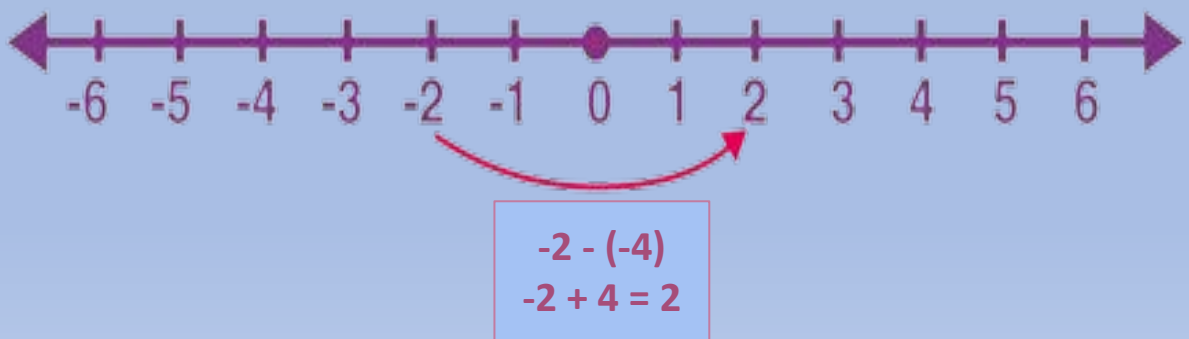
Solution : First, locate 2 on a number line. Then move 5 places to the left will give -3.



let us consider one more example

Q3) Subtract - 4 from -2

Solution : First, locate -2 on a number line. Then move 4 places to the right will give 2. (When we subtract two negative numbers, move to the right as far as the value of the second number.)

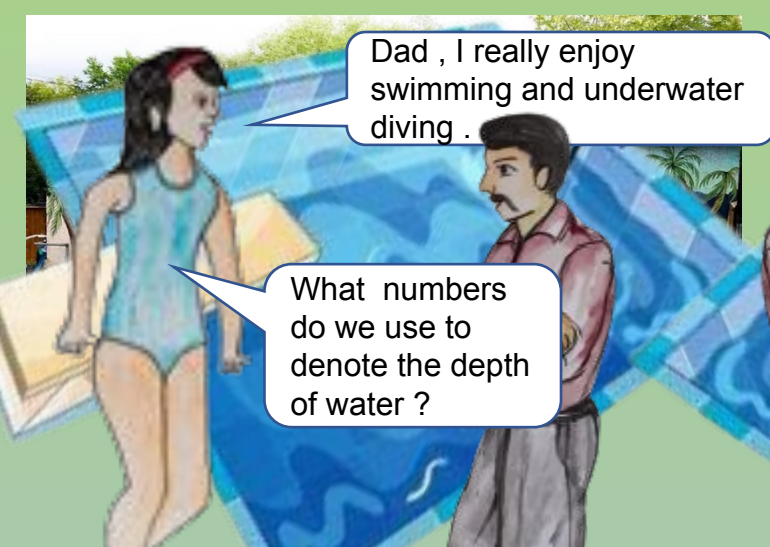


Learning Check 2

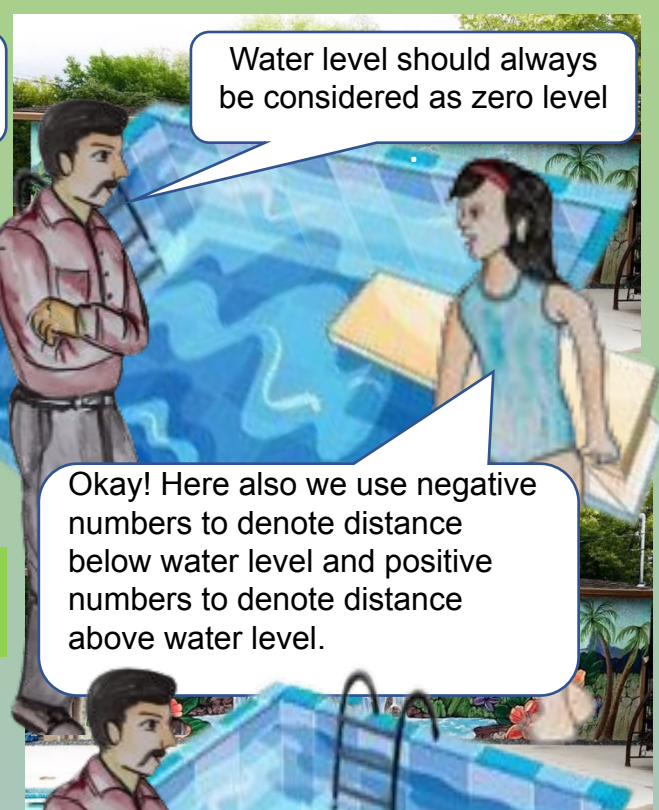


State True OR False:

1. The predecessor of 1 is a natural number.
2. The sum of two negative integers is a positive integer.
3. The sum of three different integers can never be zero.
4. $|8 - 5| = |8| - |-5|$
5. The expressions $-5 + 15$ and $-15 + 5$ have the same value.
6. The absolute value of an integer is always greater than the integer.
7. The integer (-12) is on the right of -20 on a number line.
8. The opposite of zero is zero.
9. The integers $-9, -14, -25, -30$ have been written in a decreasing order.



Amira goes for swimming and her father joins her there.



Amira enjoys swimming for another hour while Amit, her father keeps a watch over her .



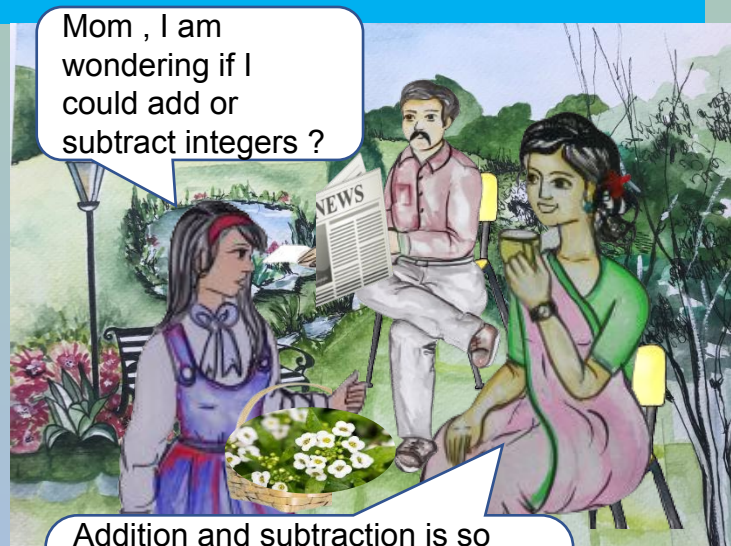
In the evening , family is enjoying the weather in the lawns . Father is reading newspaper and mother is enjoying coffee . Amira is looking around in the garden admiring its beauty.



Mom see I have collected so many beautiful flowers of white and purple colours.

Hmm.. You know these flowers are called Alyssum flowers .

Amira collects few fallen flowers in a basket.



Mom , I am wondering if I could add or subtract integers ?

Addition and subtraction is so simple , I can help you to learn addition and subtraction of integers with the help of these flowers.



How many white and purple flowers do you have ?

I have 8 white flowers and 5 purple flowers



Mom how can we add and subtract integers ?



Consider white flowers as positive integers and purple flowers as negative integers.



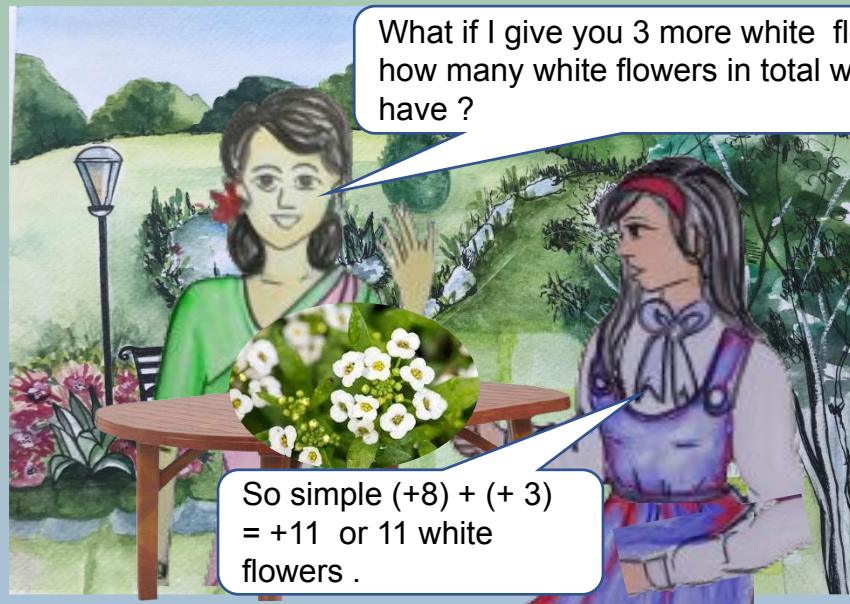
How many white flowers do you have?



I have 8 white flowers Or can I say $+8$?

Yes correct ! Remember, the same sign is added.

Mother gets a table from the room to teach integers to Amira.



What if I give you 3 more white flowers , how many white flowers in total will you have ?



So simple $(+8) + (+3)$
 $= +11$ or 11 white flowers .



Now let's tag your purple flowers as negative integers .

That means I have - 5 flowers



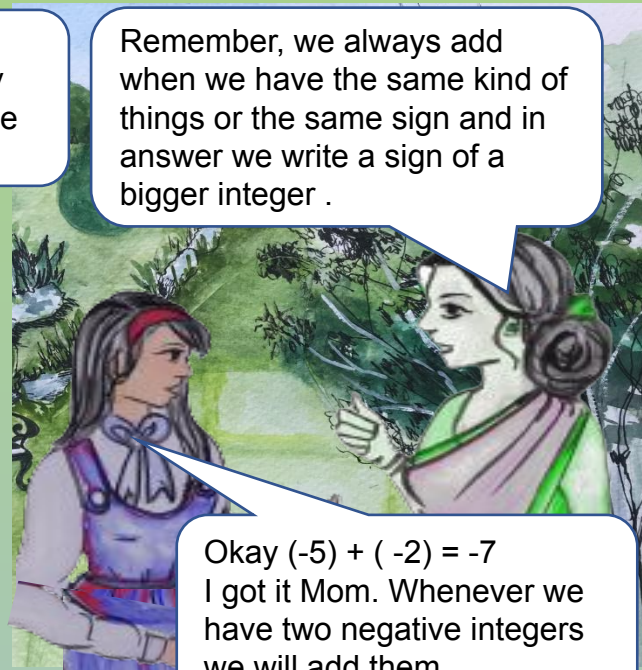
Let us try one more example.
How many purple flowers do you have?



I have 5 purple flowers.



What if I give you 2 more purple flowers ? How many purple flowers will you have in total?



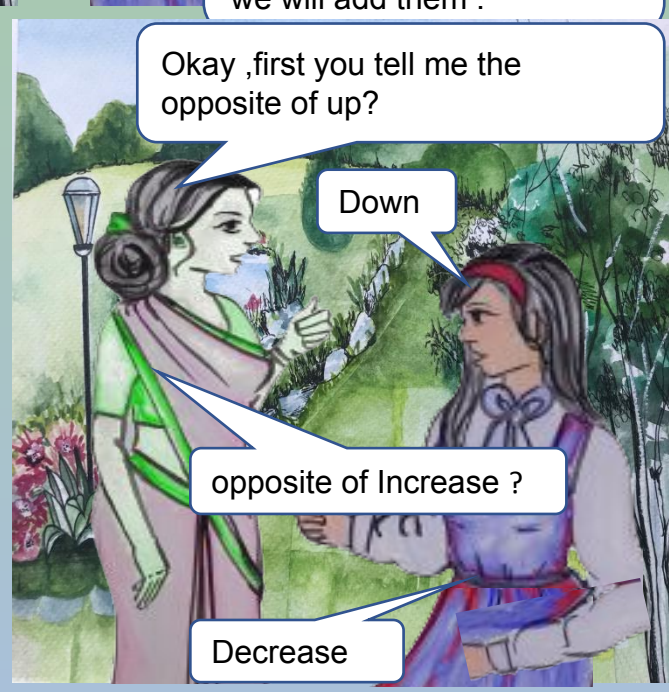
Remember, we always add when we have the same kind of things or the same sign and in answer we write a sign of a bigger integer .

Okay $(-5) + (-2) = -7$
I got it Mom. Whenever we have two negative integers we will add them .



I am impressed with my little girl.

Mom how can we subtract integers?

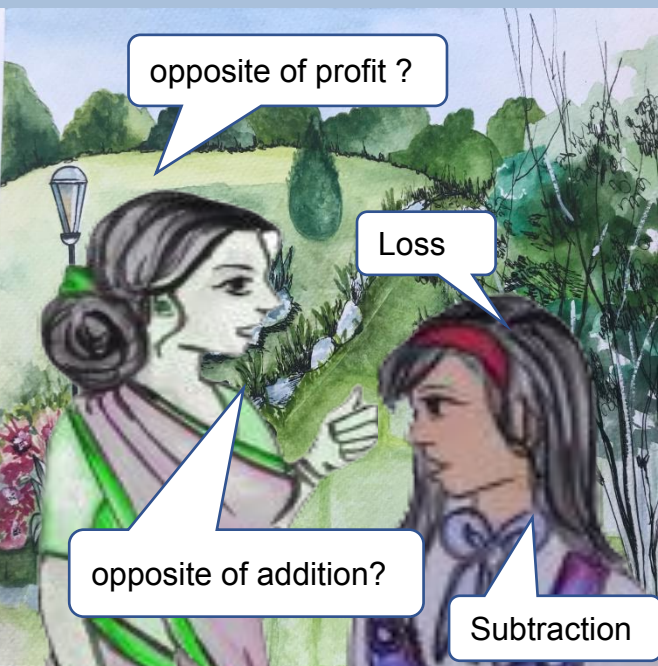


Okay ,first you tell me the opposite of up?

Down

opposite of Increase ?

Decrease



opposite of profit ?

Loss

opposite of addition?

Subtraction



Opposite of + sign?

Hmm I got it - sign

You are a smart girl .

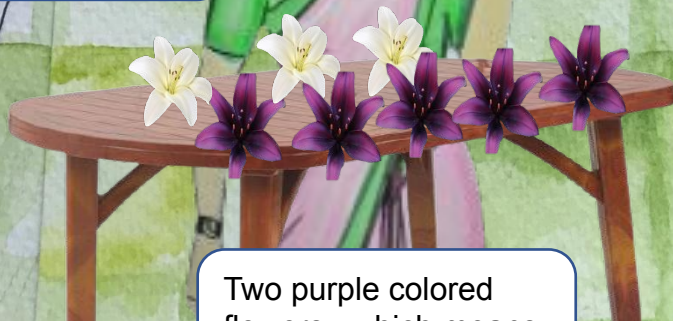
Remember, when you have one positive and one negative integer, you must subtract, but the answer will take the sign of the bigger integer.

Okay Mom !



Mom is explaining subtraction with the help of flowers .
On the table, mom has kept 5 purple flowers in a row and below the row she has kept 3 white flowers . Two opposite colours cancel each other

White here represents +ve integer and 5 purple represents - ve integer.



Two purple colored flowers , which means -2. Wow! It's so easy .

Opposite signs will cancel each other.

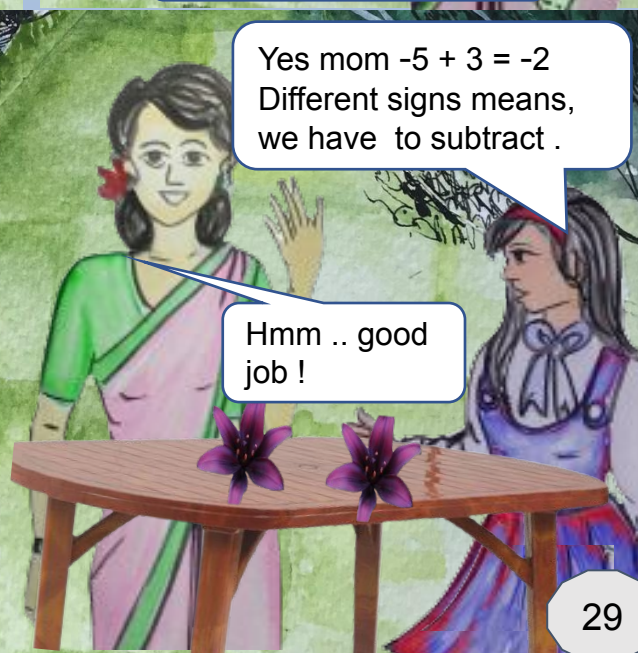


Well done , what have you left with at the end ?

Yes mom $-5 + 3 = -2$
Different signs means, we have to subtract .

Hmm .. good job !

Also remember when we have the opposite sign, we subtract and in final answer, we write the sign of a higher number.

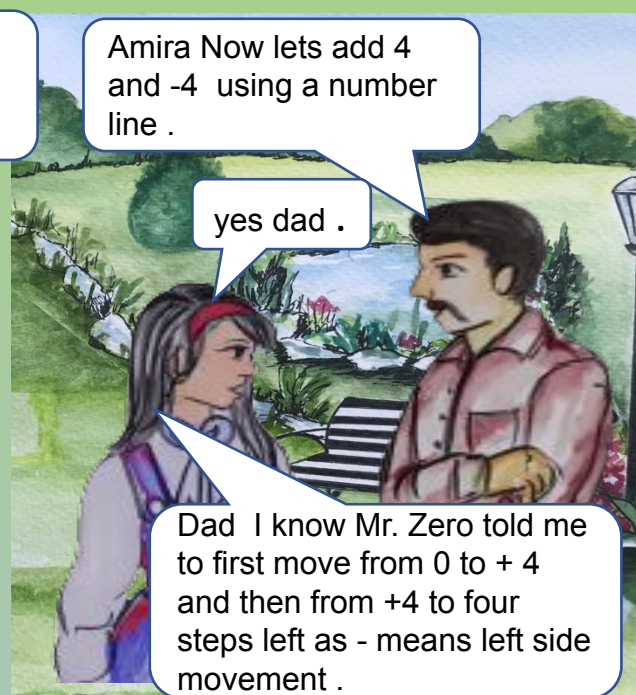




Dad , see such beautiful flowers and now I know how to add and subtract integers.

Very good, you are a sincere learner.

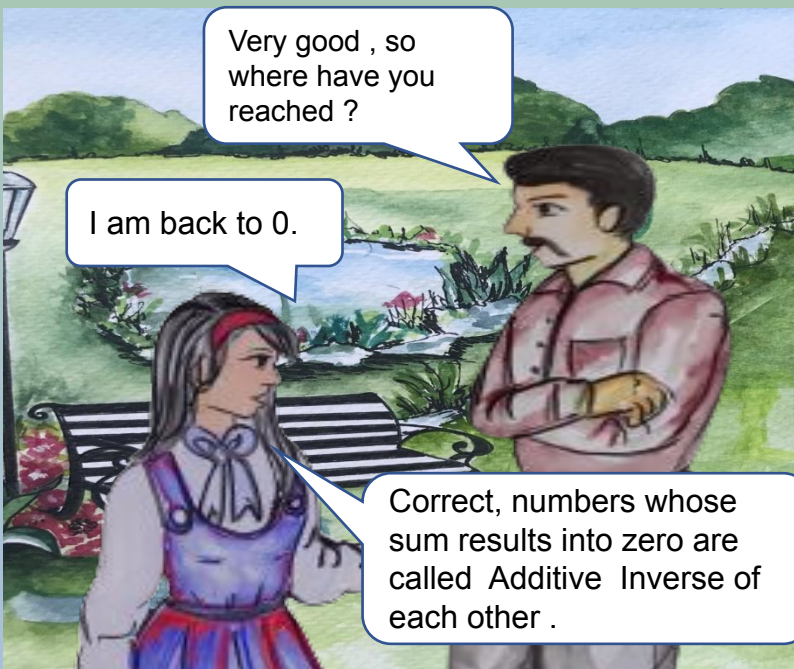
Amit, Amira's father joins them in the garden.



Amira Now lets add 4 and -4 using a number line .

yes dad .

Dad I know Mr. Zero told me to first move from 0 to + 4 and then from +4 to four steps left as - means left side movement .



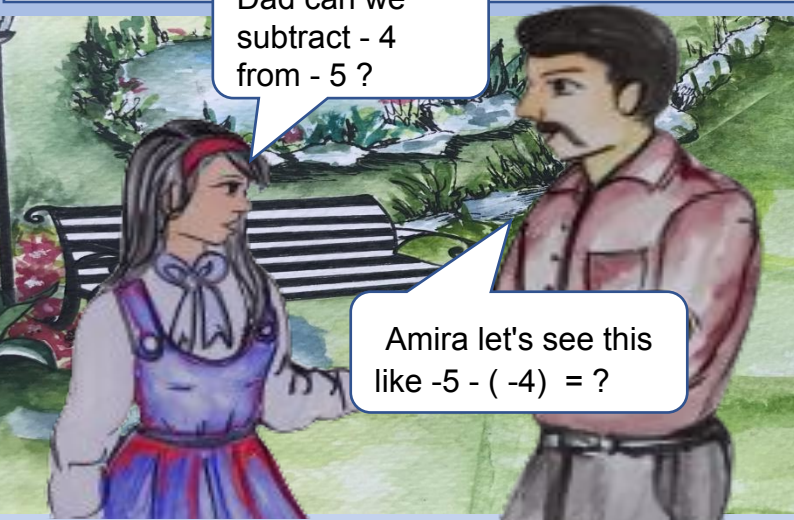
Very good , so where have you reached ?

I am back to 0.

Correct, numbers whose sum results into zero are called Additive Inverse of each other .

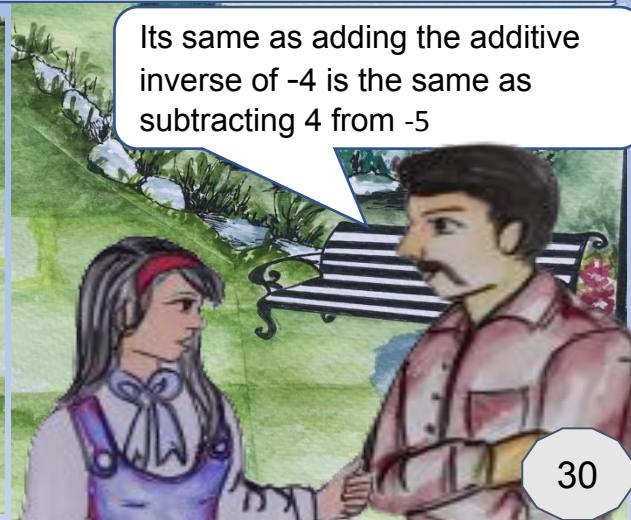


Okay , it means the Additive Inverse of + 3 would be -3. It's so simple .



Dad can we subtract - 4 from - 5 ?

Amira let's see this like $-5 - (-4) = ?$



Its same as adding the additive inverse of -4 is the same as subtracting 4 from -5



What is the additive inverse of - 4 ?

It will be + 4

Now $- 5 + 4 = -1$

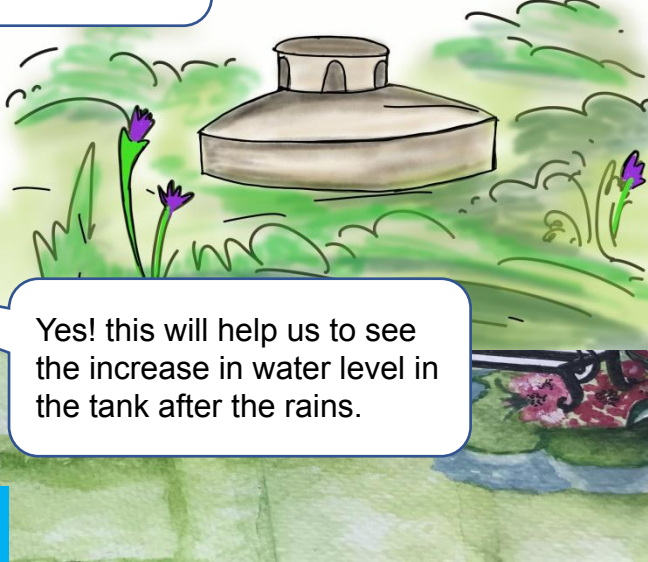
Yes dad, I jump from 0 on -5 and then four steps towards right, will take us to - 1 on the number line .

Excellent!

Today's weather forecast is that it's going to rain in the night .

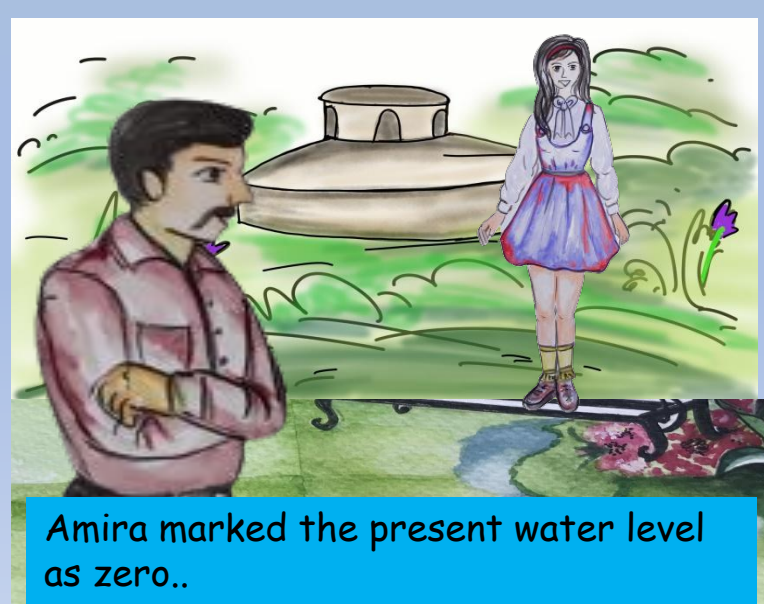


There is a rain -water harvesting tank in hotel to store rain -water. Let's go and check the water level.



Yes! this will help us to see the increase in water level in the tank after the rains.

Amit has spotted a water harvesting tank in the garden and Amira walks towards it.



Next morning Amira got up early as she was very excited to see a change in water level.

Amira marked the present water level as zero..



Wow Dad! The water level has increased by 3 inches.



Yes this is how we add integers on the number line

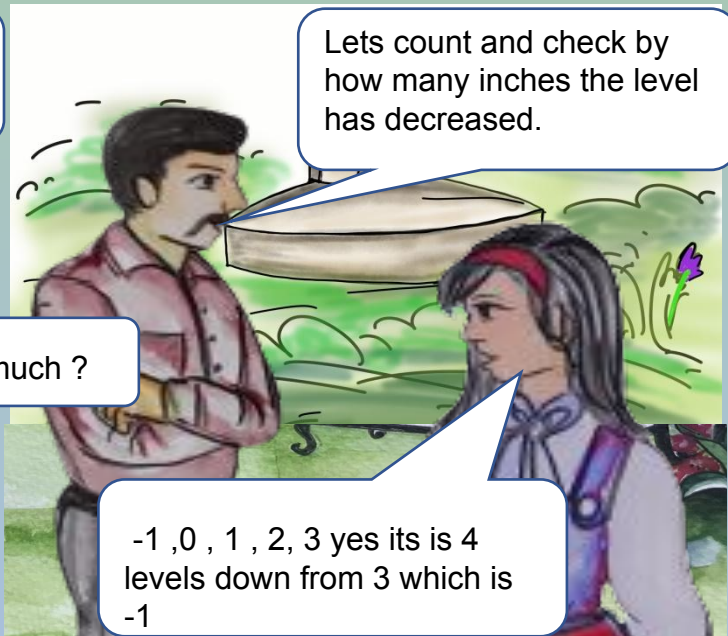
After 2 days, Amira along with her father goes to the water tank again.



Dad , I have seen that due to heat, the water level has gone down.

By how much ?

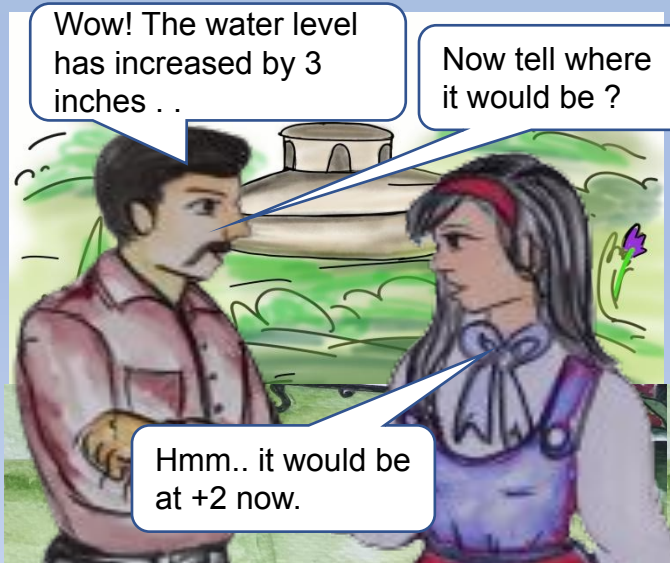
Now it's -1



Lets count and check by how many inches the level has decreased.

-1 , 0 , 1 , 2, 3 yes its is 4 levels down from 3 which is -1

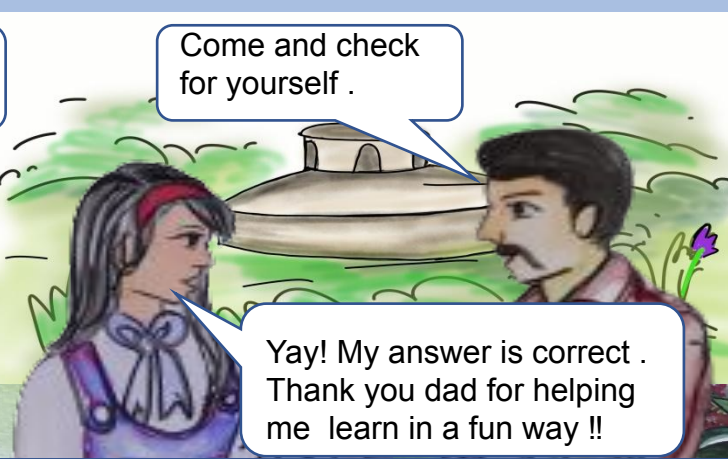
Next day , it again rained heavily. Amira goes to the water tank to check the water level..



Wow! The water level has increased by 3 inches . .

Now tell where it would be ?

Hmm.. it would be at +2 now.



Come and check for yourself .

Yay! My answer is correct . Thank you dad for helping me learn in a fun way !!

They both go inside to join Amira's mother for breakfast.

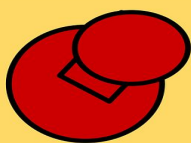
Let's Recap 3



Integers follow the following rules for addition and subtraction.

Integer's Sign	Operation	Sign	Example
$\oplus - \oplus$	Subtract	+	$7 - 3 = 4$
$\oplus - \ominus$	Add	+	$7 - (-3) = 10$
$\oplus - \ominus$	Add	+	$3 - (-7) = 10$
$\oplus - \oplus$	Subtract	-	$3 - 7 = -4$
$\ominus - \ominus$	Subtract	-	$-7 - (-3) = -4$
$\ominus - \ominus$	Subtract	+	$-3 - (-7) = 4$
$\ominus - \oplus$	Add	-	$-3 - 7 = -10$
$\ominus - \oplus$	Add	-	$-7 - 3 = -10$

Note: We can always put the sign of the higher number in the answer.



Remember!

“Same sign add,
Different sign subtract,
Keep the sign of the higher number,
then you will be exact.”



Properties of Integers

Name	Addition	Substraction
Closure	$a+b \in \mathbb{Z}$	$a-b \in \mathbb{Z}$
Commutative	$a+b = b+a$	$a-b \neq b-a$
Associative	$(a+b) + c = a+(b+c)$	$(a-b) - c \neq a-(b-c)$
Distributive	$a \times (b+c) = ab + ac$	$a \times (b-c) = ab - ac$

Learning Check 3

Q) Fill in the blanks:

- a) When we subtract -10 from 18 we get _____.
- b) _____ is an integer which is neither positive nor negative.
- c) $272 - 198 - \underline{\hspace{2cm}} = 0$.
- d) $15 + \underline{\hspace{2cm}} = 0$

Q) State whether the following statements are TRUE or FALSE:

- a) If a and b are any two integers such that $a > b$, then $-a > -b$.
- b) If the sum of an integer and its opposite is zero, then they are called additive inverses of each other.
- c) The negative of 0 is -0.
- d) The sum of positive and negative integers is always negative.

Let's Understand

Q) The temperature on a certain morning is -11°C at 5 a. m. If the temperature drops 3 degree at 6 a.m. and rises 5 degree at 8 a.m. and again drops 3 degree at 9 a.m. What is the temperature at 9am ?

Sol. Temperature at 5 a.m. = -11°C

Temperature decreased at 6 a.m. = $3^{\circ}\text{C} = -3$

Temperature raised at 8 a.m. = $5^{\circ}\text{C} = +5$

Temperature decreased at 9 a.m. = $3^{\circ}\text{C} = -3$

Final temperature at 9am =

$$(-11) + (-3) + (+5) + (-3)$$

$$= -11 - 3 + 5 - 3$$

$$= -17 + 5$$

$$= -12^{\circ}\text{C}.$$

Final Check

Q) Use a number line to evaluate each of the following:

(i) $(+7) + (+5)$

(ii) $0 + (+9)$

(iii) $(+6) + (+3)$

(iv) $(+1) + 0$

(v) $(+5) + (+8)$

(vi) $(-5) + (+3)$

(vii) $(-8) + (+1)$

(viii) $(-4) + (+9)$

(ix) $+2 + 7$

(x) $+4 - 8$



Try These !!

Q) Add the following integers :

- a) -899 and 900
- b) 276 and -200
- c) -1000 and -100
- d) -8 and -5

Q) Subtract the following integers :

- a) 76 from 81
- b) -372 from -182
- c) -41 from -26
- d) -31 from 57

Q) Arrange the following collection of integers in ascending order :

- a) $-16, -9, 11, -21, -17, 16, -20$
- b) $28, -31, -5, 14, -63, 20, 11, -21$

Q) Arrange the following in descending order :

- a) $-15, -32, -24, -15, 13, -12, 21, 9$
- b) $39, 10, -39, -12, 89, -11, -23, 21, -1$

Q) Find the absolute value of the following :

- a) -27
- b) 12
- c) -12
- d) 743

Q) Find the additive inverse of the following :

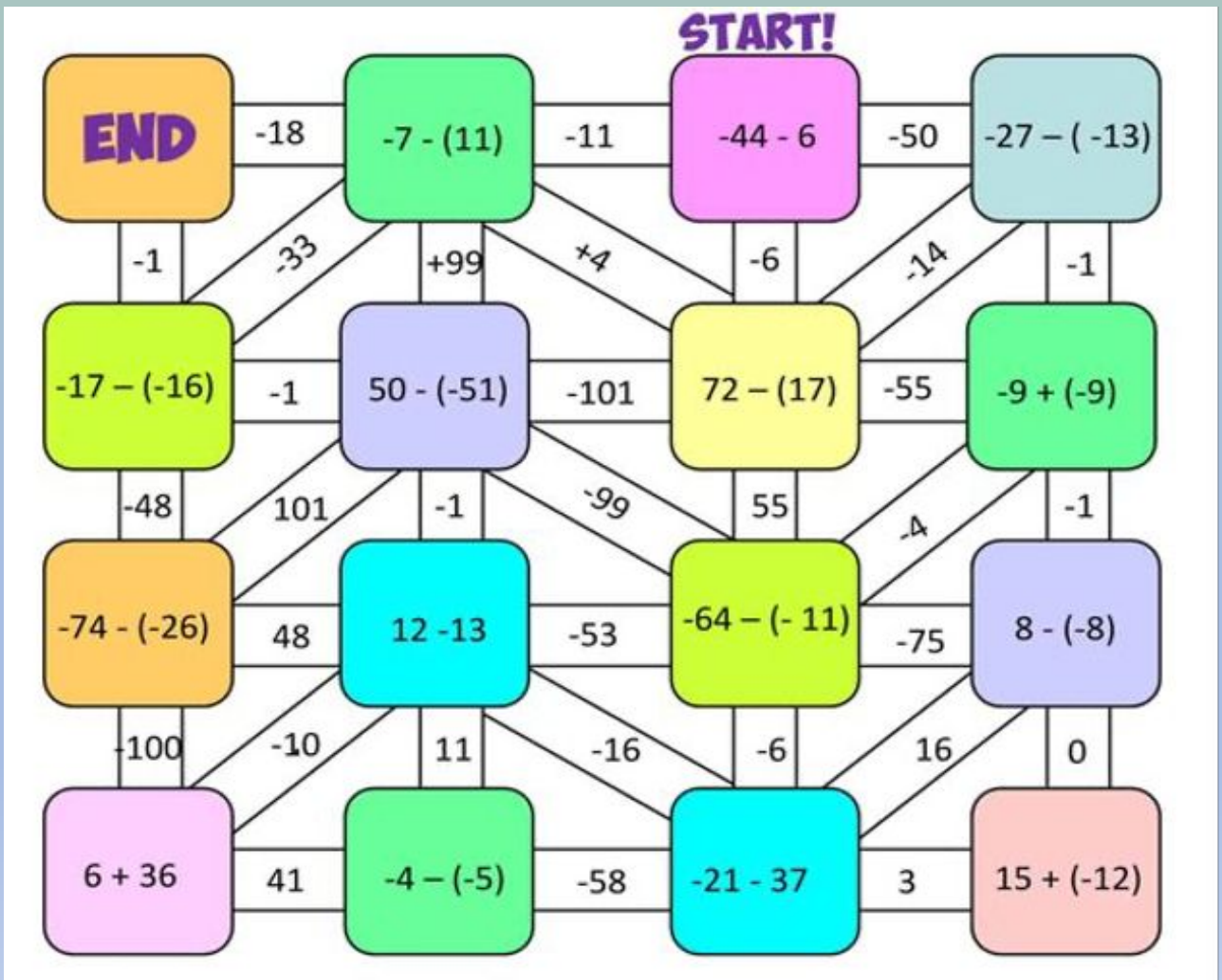
- a) 4567
- b) -543
- c) 10000
- d) -1

Puzzle Time

Let today be 0 , and let the days in the past be negative and days in future be positive.

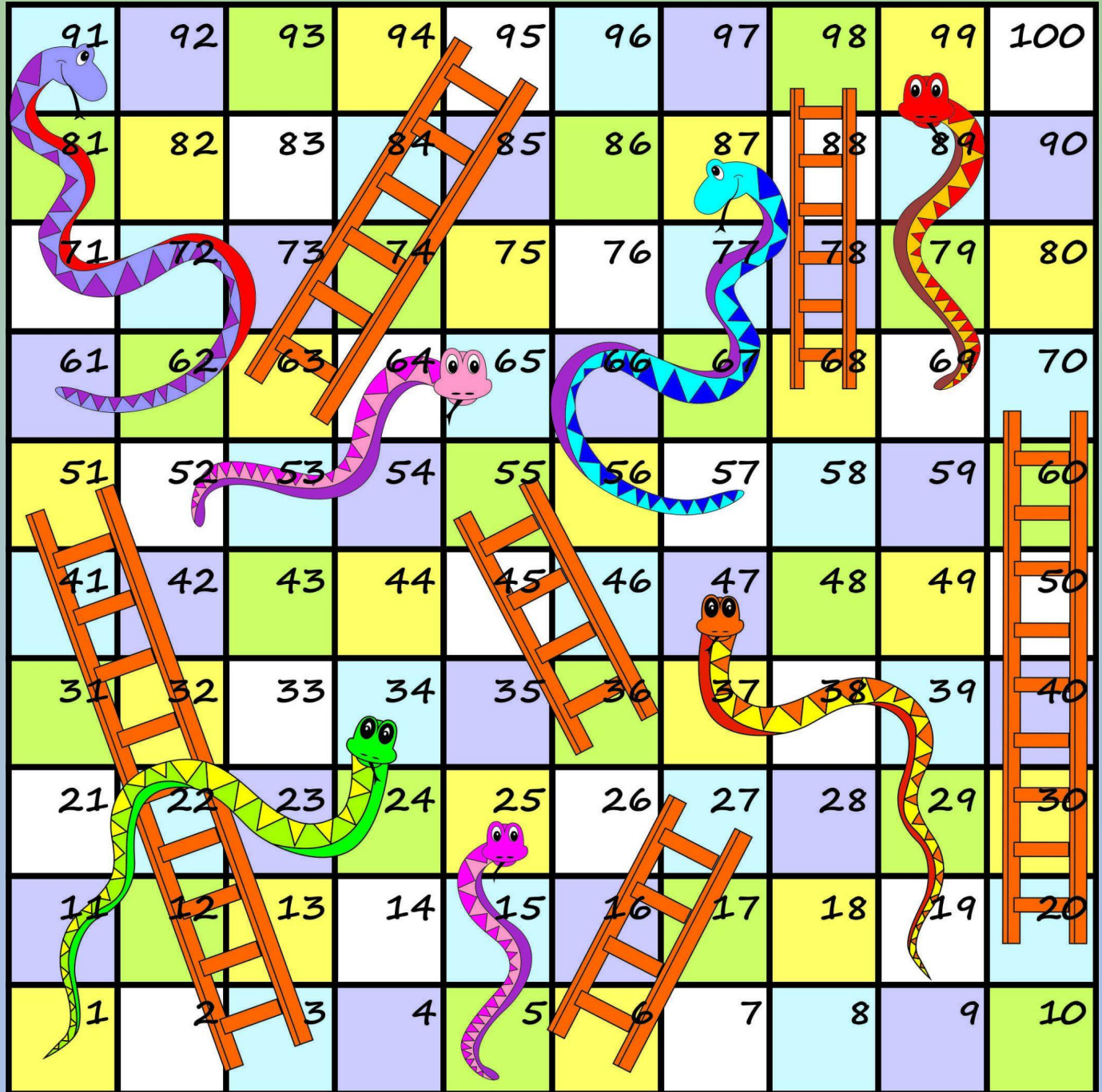
1. If today is Tuesday , what integer stands for last Sunday ?
2. If today is Wednesday , what integer stands for Saturday ?
3. If today is Friday , what integer stands for last Saturday ?
4. If today is Monday , what integer stands for next Monday ?

Fun Activity



Snakes & Ladders

Fun Game



Instructions on the next page ➡

INSTRUCTIONS TO PLAYERS

- You will need 2 dice, a Snakes and Ladders board, and paper on which to write
- One dice will represent positive numbers and the other will represent negative numbers . Make this decision before the game begins.
- You throw both dice. You will get a positive number and a negative number.
- You can either add or subtract these numbers, in any order. For example, if you throw 5 on the positive dice and 2 on the negative die your answer could be -7 , 3 or 7 . If the final result of the calculation is positive you move forwards
- If the final result is negative you move backwards the appropriate number of places.
- To start, each player throws both dice. The person with the lowest answer starts.
- The winner is the first person to reach the end of the board.
- You cannot go further back than the Start block.

One can use a regular Snakes and Ladders board for this game. Alternatively, make use of the given board which can readily be duplicated.

Answer Key

Learning Check 1

Fill in the Blanks

1. Predecessor of $|-1|$ is 0
2. $(-100) + 100 = 0$
3. The opposite of 'earning money' is losing money.
4. Zero is greater than all negative integers.
5. Number zero is neither positive nor negative.
6. A loss of Rs.300 is represented as Rs -300
7. The integer (-2) lies on the right side of -5 on a number line.
8. The positive integer is always greater than its opposite.
9. The absolute value of an integer is never negative.

LEARNING CHECK 2

TRUE OR FALSE

- 1- False
- 2- False
- 3-False
- 4-True
- 5-False
- 6-False
- 7-True
- 8-True
- 9-True

Learning Check 3

Q) Fill in the blanks:

- a) 28
- b) 0
- c) 74
- d) -15

TRY THESE !!

Q) Add the following integers:

- a) -899 and $900 = 1$
- b) 276 and $-200 = 76$
- c) -1000 and $-100 = -1100$
- d) -8 and $-5 = -13$

Q) Subtract the following integers:

- b) -372 from $-182 = 196$
- c) -41 from $-26 = 15$
- a) 76 from $81 = 5$
- d) -31 from $57 = 88$

Q) State whether the following statements are true or false:

- a) False
- b) True
- c) False
- d) False

Answer Key

Final Check

(i) $(+7) + (+5) = 12$

(ii) $0 + (+9) = 9$

(iii) $(+6) + (+3) = 9$

(iv) $(+1) + 0 = 1$

(v) $(+5) + (+8) = 13$

(vi) $(-5) + (+3) = -2$

(vii) $(-8) + (+1) = -7$

(viii) $(-4) + (+9) = 5$

(ix) $+2 + 7 = 9$

(x) $+4 - 8 = -4$

TRY THESE !!

Q) Add the following integers:

a) -899 and $900 = 1$

b) 276 and $-200 = 76$

c) -1000 and $-100 = -1100$

d) -8 and $-5 = -13$

Q) Subtract the following integers:

a) 76 from $81 = 5$

b) -372 from $-182 = 190$

c) -41 from $-26 = 15$

d) -31 from $57 = 88$

Q) Arrange the following collection of integers in ascending order:

a) $-21, -20, -17, -16, -9, 11, 16$

b) $-63, -31, -21, -5, 11, 14, 20, 28$

Q) Arrange the following in descending order :

a) $21, 13, 9, -12, -15, -24, -32$

b) $89, 39, 21, 10, -1, -11, -12, -23, -39$

Q) Find the absolute value of the following:

$-27 = 27$

$12 = 12$

$-12 = 12$

$743 = 743$

Q) Find the additive inverse of the following:

a) $4567 = -4567$

b) $-543 = 543$

c) $10000 = -10000$

d) $-1 = 1$

PUZZLE TIME

Ans 1 = -2

Ans 2 = $+3$

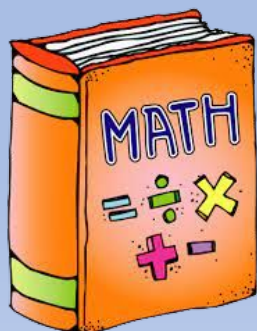
Ans 3 = -6

Ans 4 = $+7$

Glossary

- 1) Natural number- The number we usually count is called natural number, symbol to denote N
- 2) Whole numbers-Natural numbers including zero are whole numbers. Symbol to denote W
- 3) Integers-Whole numbers along with negative natural numbers are called integers. Symbol to denote Z
- 4) Additive Inverse - An additive inverse of a number is the value, which on adding with the original number results in zero value.
- 5) Absolute Value - Absolute value describes the distance from zero that a number is on the number line, without considering direction. Symbol to denote $|x|$
- 6) Acceleration – Acceleration is a rate at which velocity changes with time, in terms of both speed and direction.

Bibliography



MATHEMATICS-NCERT
Textbook for Class VI

COPYRIGHTS

No part of this Graphic novel may be reproduced, or stored in a retrieval system, or transmitted in any form by any means-electronic, mechanical, photocopying, recording or otherwise without the prior permission of the school.

DISCLAIMER

This novel is published as a supportive reading material to enable the students to have a better understanding of the topic. The character used in this novel are fictional and any resemblance of any character or incident is merely a coincident. Art work is done by students and teachers.

ACKNOWLEDGEMENT

This novel is an outcome of the sustained efforts of the entire team. We extend our special gratitude to the Principal, Ms. Shefalee Gupta who provided us help and guidance in completing the Graphic Novel. We are highly grateful to Mr. Sandeep Sethi (Director Education, M.S.M.S.II, Museum Trust) for the ideation and training.

Vision	Ms. Anita Karwal (Secretary, Department of School Education & Literacy, Ministry Of Education)
	Mr. Manoj Ahuja (IAS, Chairman, CBSE)
Concept, Script and Dialogue	Ms. Deepti Sisondia TGT Mathematics
Coordination	Ms. Shefalee Gupta (Principal, TIS,VV)
	Ms. N Saroj (Dean Academics, TIS,VV)
Art Department	Ms. Meena Nagpal, Mr. Koustav Nag
IT Support	Ms. Bhawna Garg
Student Support	Paavani Kapur 7C, Anvi Mansharamani 7C Aahana Jain 7C, Parthivi Bhatia 7B Samriddhi Singh 7C

Summary



The graphic novel “ Magical land of negative numbers ” will help the learners to explore the concept of integers and its application in their real life . It also emphasizes that Mathematics is fun, and it can be learned and applied in day-to-day life. The illustrations have been designed keeping the target learners in mind. It is our attempt to enrich and enliven the teaching of Integers.



Printed and Published by:
TAGORE INTERNATIONAL SCHOOL
B Block, Paschimi Marg
Vasant Vihar, New Delhi-110057
E-mail: info.vv@tagoreint.com
Website: www.tagoreint.com