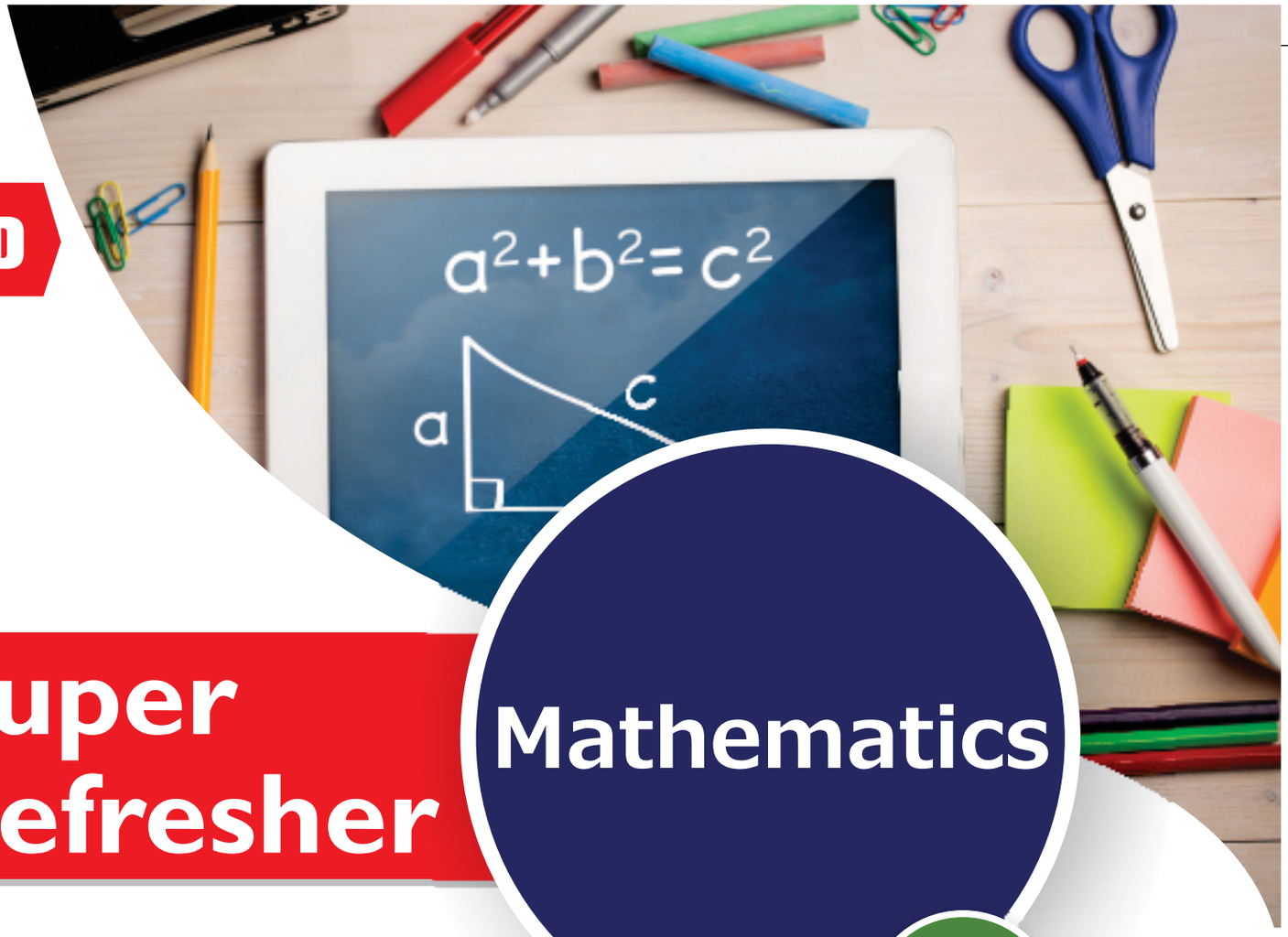


MBD

Super Refresher

Mathematics

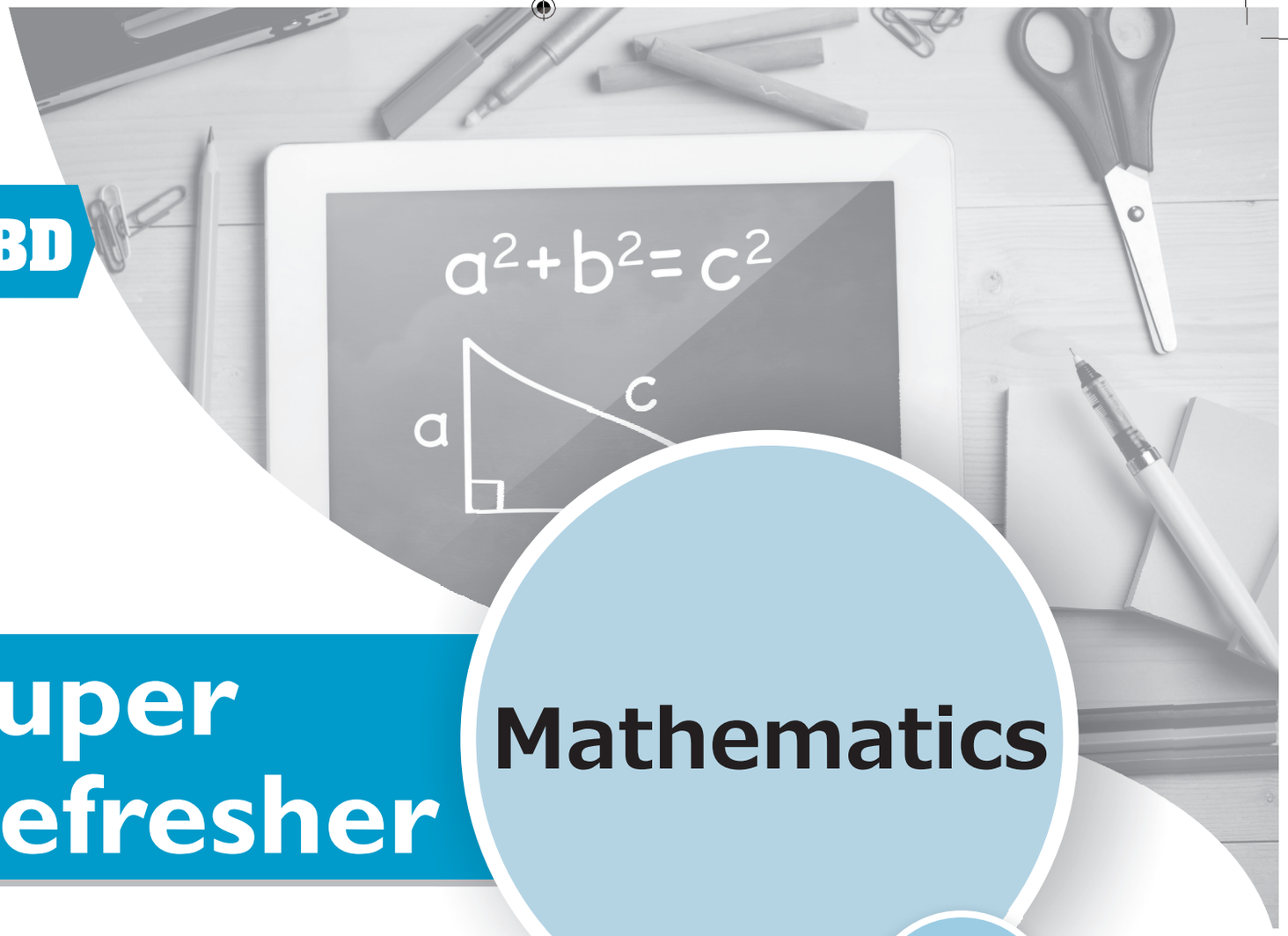
7

- **NCERT** Textbook Exercises and Exemplar Problems with solutions
- Comprehensive explanation of each sub-topic
- Large pool of Objective, Short and Long answer type questions

Highlights important information and questions for last minute revision

Includes **HOTS** and **Value Based** questions

Based on the latest syllabus and textbook(s) issued by CBSE/NCERT



MBD

Super Refresher Mathematics 7

By
Vinay Sharma
H. K. Thakur

Edited by
Mukta Bhardwaj
Vipul Jain

Based on the latest syllabus and textbook(s) issued by **CBSE/NCERT**

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We are committed to serve students with best of our knowledge and resources. We have taken utmost care and attention while editing and printing this book but we would beg to state that Authors and Publishers should not be held responsible for unintentional mistakes that might have crept in. However, errors brought to our notice, shall be gratefully acknowledged and attended to.

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SYLLABUS

MATHEMATICS (CLASS–VII)

NUMBER SYSTEM (50)

(i) Knowing Our Numbers (Integers):

- Multiplication and division of integers (through patterns). Division by zero is meaningless.
- Properties of integers (including identities for addition & multiplication, commutative, associative, distributive through patterns). These would include examples from whole numbers as well. Involve expressing commutative associative properties in a general form. Construction of counter examples, including some by children. Counter examples like subtraction is not commutative.
- Word problems including integers (all operations).

(ii) Fractions and Rational Numbers:

- Multiplication of fractions.
- Fraction as an operator.
- Reciprocal of a fraction.
- Division of fractions.
- Word problems involving mixed fractions.
- Introduction to rational numbers (with representation on number line).
- Operations on rational number (all operations).
- Representation of rational number as a decimal.
- Word problems on rational numbers (all operations).
- Multiplication and division of decimal fractions.
- Conversion of units (lengths & mass).
- Word problems (including all operations).

(iii) Powers:

- Exponents only natural numbers.
- Laws of exponents (through observing patterns to arrive at generalization).
  - (i) $a^m \cdot a^n = a^{m+n}$
  - (ii) $(a^m)^n = a^{m \times n}$
  - (iii) $\frac{a^m}{a^n} = a^{m-n}$, where $m-n \in N$
  - (iv) $a^m \cdot b^n = (ab)^m$.

ALGEBRA (20)

Algebraic Expressions:

- Generate algebraic expressions (simple) involving one or two variables.
- Identifying constants, coefficient, powers.
- Like and unlike terms, degree of expressions e.g. x^2y etc. (exponent ≤ 3 number of variables ≤ 2).
- Addition, subtraction of algebraic expressions (coefficients should be integers).
- Simple linear equations in one variable (in contextual problems) with two operations (avoid complicated coefficients).

RATIO AND PROPORTION (20)

- Ratio and proportion (revision).
- Unitary method continued consolidation, general expression.
- Percentage-an introduction.
- Understanding percentage as a fraction with denominator 100.
- Converting fractions and decimals into percentage and vice-versa.
- Application to profit & loss (single transaction only).
- Application to simple interest (time period in complete years).

GEOMETRY (60)

(i) Understanding Shapes:

- Pairs of angles (linear, supplementary, complementary, adjacent, vertically opposite) verification and simple proof of vertically opposite angles.
- Properties of parallel lines with transversal (alternate, corresponding, interior, exterior angles).

(ii) Properties of Triangles:

- Angle sum property (with notions of proof & verification through paper folding, proofs using property of parallel lines, difference between proof and verification).
- Exterior angle property.
- Sum of two sides of a Δ > its third side.
- Pythagoras Theorem (Verification only).

(iii) Symmetry:

- Recalling reflection symmetry.
- Idea of rotational symmetry, observations of rotational symmetry, observations of rotational symmetry of 2D objects. (90°, 120°, 180°)
- Operation of rotation through 90° & 180° of simple figures.
- Examples of figures with both rotation and reflection symmetry (both operations).
- Examples of figures that have reflection and rotation symmetry and vice-versa.

(iv) Representing 3D in 2D:

- Drawing 3D figures in 2D showing hidden faces.
- Identification & counting of vertices, edges, faces, nets (for cubes cuboids & cylinders, cones).
- Matching pictures with objects (Identifying names).
- Mapping the space around approximately through visual estimation.

(v) Congruence:

- Congruence through superposition (examples–blades, stamps etc.).
- Extend congruence to simple geometrical shapes e.g. triangles, circles.
- Criteria of congruence (by verification) SSS, SAS, ASA, RHS.

(vi) Construction (Using Scale, Protractor and Compass):

- Construction of a line parallel to a given line from a point outside it. (Simple proof as remark with the reasoning of alternate angles).
- Construction of simple triangles, like given three sides, given a side and two angles on it, given two sides and the angle between them.

MENSURATION (15)

- Revision of perimeter, Idea of p, Circumference of Circle.

Area

- Concept of measurement using a basic unit area of a square, rectangle, triangle, parallelogram and circle, area between two rectangles and two concentric circles.

DATA HANDLING (15)

(i) Collection and organisation of data—choosing the data to collect for a hypothesis testing.

(ii) Mean, median and mode of ungrouped data—understanding what they represent.

(iii) Constructing bar graphs.

(iv) Feel of probability using data through experiments. Notion of chance in events like tossing coins, dice etc. Tabulating and counting occurrences of 1 through 6 in a number of throws. Comparing the observation with that for a coin. Observing strings of throws, notion of randomness.

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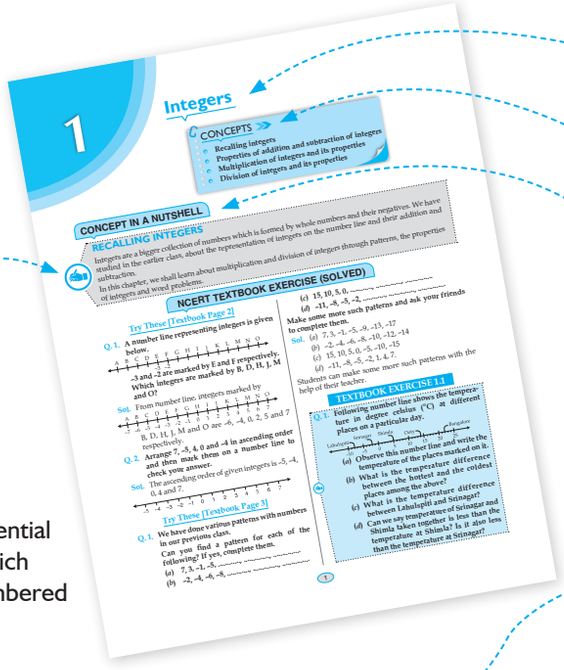
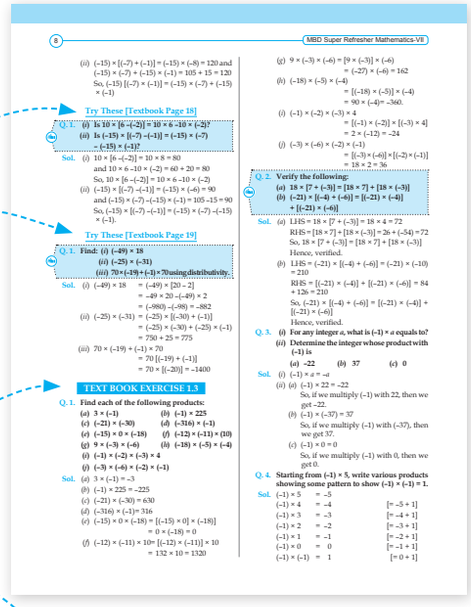
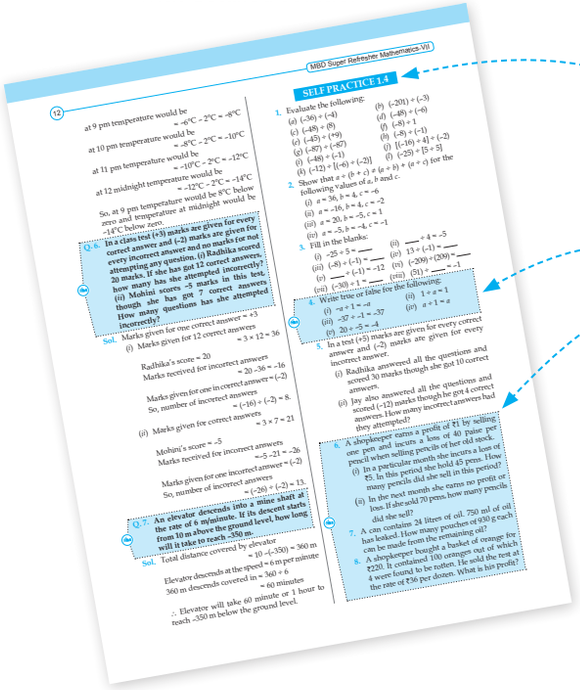

1
Integers
CONCEPTS
Recalling integers
Properties of addition and subtraction of integers
Multiplication of integers and its properties
Division of integers and its properties
CONCEPT IN A NUTSHELL
RECALLING INTEGERS
NCERT TEXTBOOK EXERCISE (SOLVED)
TEXTBOOK EXERCISE 1.1

- All chapters as per **NCERT** Syllabus and Textbook
- Every chapter divided into **Sub-topics**
- **Concept in a Nutshell** provides a complete and comprehensive summary of the concept
- **Highlights** essential information which must be remembered

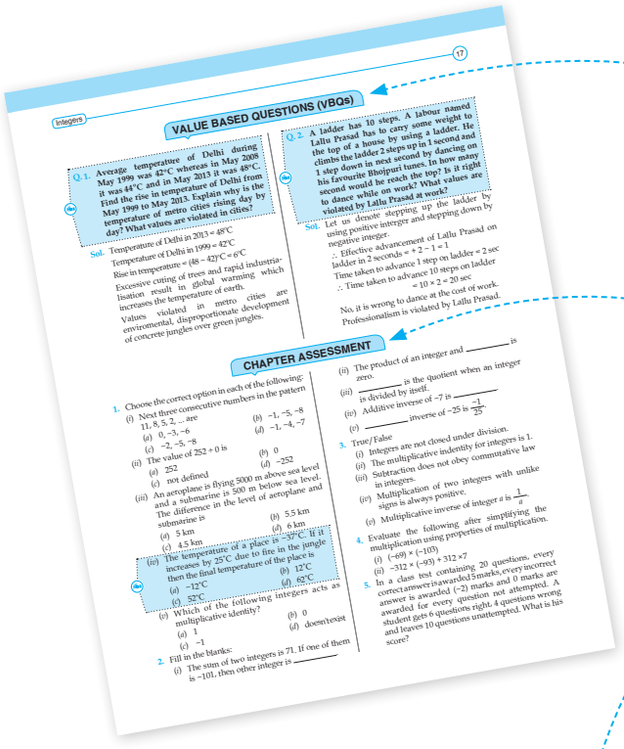

Try These [Textbook Page 18]
Try These [Textbook Page 19]
TEXT BOOK EXERCISE 1.3

- **Try These** and **Do This** with page numbers fully solved to help the learners
- NCERT **Textbook Exercises** with detailed solution


SELF PRACTICE 1.4

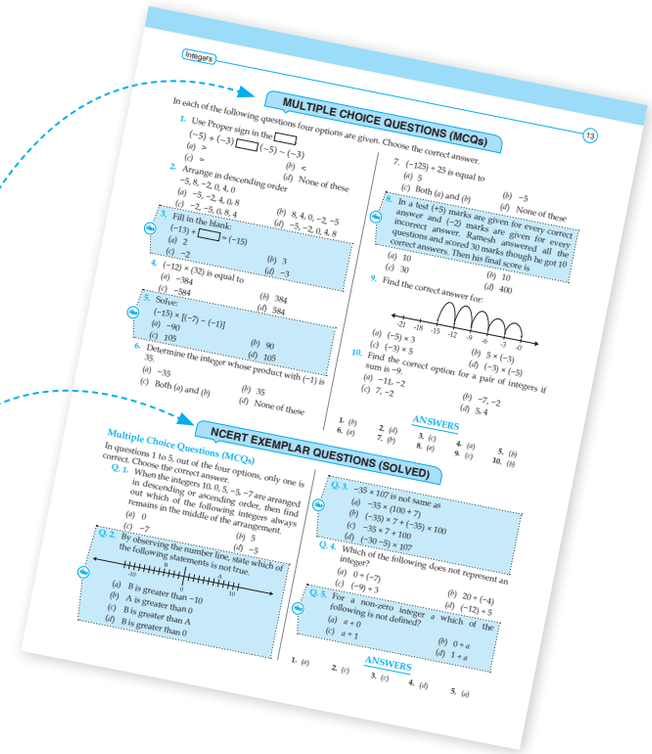
- **Self Practice** questions for consolidation of each concept
- **Important Questions** from examination point of view to ensure passing marks

Mathematics



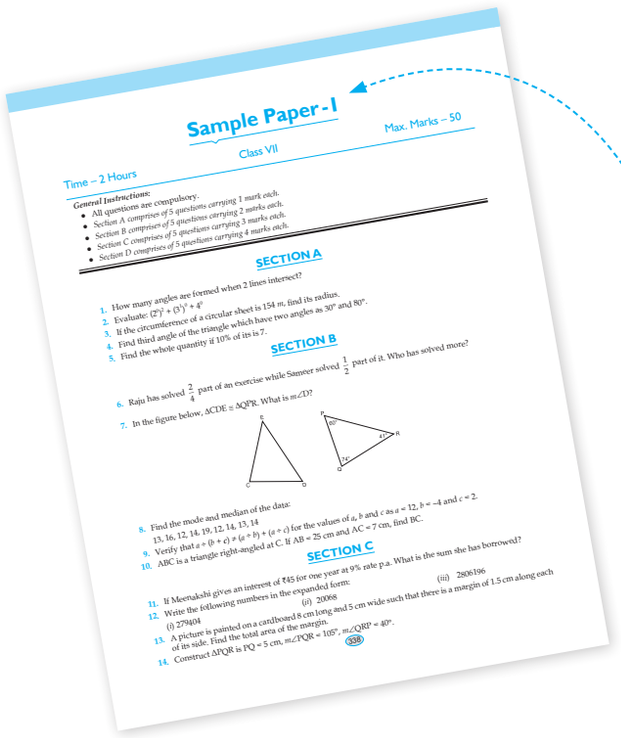
Value-Based Questions
to apply mathematical concepts to real life situations with stress on social values

Chapter Assessment with answers at the end of each chapter



Multiple Choice Questions (MCQs)
for testing conceptual skills of students

NCERT Exemplar Problems
with complete solution to supplement the entire NCERT support material



Four Sample Papers
for Practice

CONTENTS

1 Integers

CONCEPTS

- Recalling integers
- Properties of addition and subtraction of integers
- Multiplication of integers and its properties
- Division of integers and its properties

CONCEPT IN A NUTSHELL

RECALLING INTEGERS

Integers are a bigger collection of numbers which is formed by whole numbers and their negatives. We have studied in the earlier class, about the representation of integers on the number line and their addition and subtraction.

In this chapter, we shall learn about multiplication and division of integers through patterns, the properties of integers and word problems.

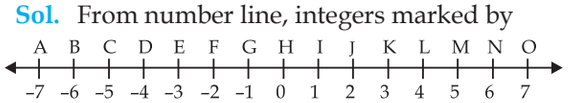
NCERT TEXTBOOK EXERCISE (SOLVED)

Try These [Textbook Page 2]

Q. 1. A number line representing integers is given below.

–3 and –2 are marked by E and F respectively. Which integers are marked by B, D, H, J, M and O?

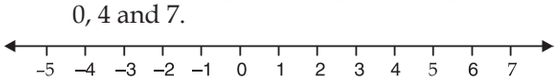
Sol. From number line, integers marked by



B, D, H, J, M and O are –6, –4, 0, 2, 5 and 7 respectively.

Q. 2. Arrange 7, –5, 4, 0 and –4 in ascending order and then mark them on a number line to check your answer.

Sol. The ascending order of given integers is –5, –4, 0, 4 and 7.



Try These [Textbook Page 3]

Q. 1. We have done various patterns with numbers in our previous class.

Can you find a pattern for each of the following? If yes, complete them.

(*a*) 7, 3, –1, –5, ..., ..., ...

(*b*) –2, –4, –6, –8, ..., ..., ...

(*c*) 15, 10, 5, 0, ..., ..., ...

(*d*) –11, –8, –5, –2, ..., ..., ...

Make some more such patterns and ask your friends to complete them.

Sol. (*a*) 7, 3, –1, –5, –9, –13, –17

(*b*) –2, –4, –6, –8, –10, –12, –14

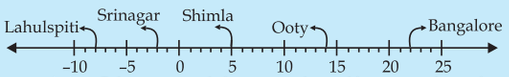
(*c*) 15, 10, 5, 0, –5, –10, –15

(*d*) –11, –8, –5, –2, 1, 4, 7.

Students can make some more such patterns with the help of their teacher.

TEXTBOOK EXERCISE 1.1

Q. 1. Following number line shows the temperature in degree celsius (°C) at different places on a particular day.



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

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

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

(*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?

Sol. *(a)* Temperature of Lahulspiti = –8°C
Temperature of Srinagar = –2°C
Temperature of Shimla = 5°C
Temperature of Ooty = 14°C
Temperature of Bangalore = 22°C

(b) Temperature of hottest place = 22°C
Temperature of coldest place = –8°C
Difference between hottest and coldest place
= 22°C – (–8°C)
= 22°C + 8°C
= 30°C

(c) Temperature of Lahulspiti = –8°C
Temperature of Srinagar = –2°C
Difference between temperature of Lahulspiti and Srinagar
= –8°C – (–2°C)
= –8°C + 2°C
= –6°C

(d) Temperature of Srinagar and Shimla
= –2°C + 5°C
= 3°C

Yes, temperature of Srinagar and Shimla together is less than the temperature of Shimla but it is not less than the temperature of Srinagar.

Q. 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?

Sol. Total of Jack's score
= 25 + (–5) + (–10) + 15 + 10
= 25 – 5 – 10 + 15 + 10
= 25 + 15 + 10 – 5 –10
= 50 – 15 = 35

Thus, Jacks's final score was 35.

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

Sol. Temperature on Monday = –5°C
Since temperature dropped by 2°C on Tuesday
∴ Temperature on Tuesday = –5°C –2°C
= –7°C.
Now temperature rose by 4°C on Wednesday
∴ Temperature on Wednesday = –7°C + 4°C
= –3°C.

Q. 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?

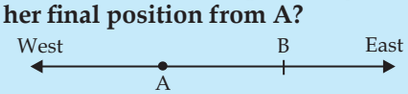
Sol. Vertical distance between submarine and plane
= 5000 m + 1200 m
= 6200 m
∴ Thus, vertical distance between submarine and plane is 6200 m.

Q. 5. Mohan deposits ₹2000 in his bank account and withdraws ₹1642 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.

Sol. Amount deposited by Mohan = ₹2000
Amount withdraws by Mohan = ₹1642
Balance of Mohan's account = ₹(2000 –1642)
= ₹358

∵ Withdrawal of amount is represented by a negative integer.
∴ Deposite of amount is represented by a positive integer.

Q. 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?



Sol. ∵ Rita moves firstly towards west which is represented by a positive integer then she moves towards east which is opposite to west. So, distance travelled towards east is represented by negative integer.
Final position of Rita from A = 20 km – 30 km
= –10 km
∴ Rita is 10 km towards East.

Q. 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*)

Sol. *(i)* Sum of first row = 5 + (–1) + (–4)
= 5 – 1 – 4 = 4 – 4 = 0
Sum of 2nd row = –5 + (–2) + 7
= –5 – 2 + 7 = – 7 + 7
= 0
Sum of 3rd row = 0 + 3 + (–3)
= 0 + 3 – 3 = 3 – 3 = 0
Sum of 1st column = 5 + (–5) + 0
= 5 – 5 = 0
Sum of 2nd column = (–1) + (–2) + 3
= – 1 – 2 + 3
= – 3 + 3 = 0
Sum of 3rd column = (–4) + 7 + (–3)
= – 4 + 7 – 3
= 3 – 3 = 0
Sum of 1st diagonal = 5 + (–2) + (–3)
= 5 – 2 – 3 = 5 – 5 = 0
Sum of 2nd diagonal = – 4 + (–2) + 0
= – 4 – 2 = –6

∴ Sum of each row, each column and one diagonal is 0 but sum of 2nd diagonal is –6.

∴ *(i)* square is not a magic square.

(ii) Sum of first row = 1 + (–10) + 0
= 1 – 10 = –9
Sum of 2nd row = (–4) + (–3) + (–2)
= – 4 – 3 – 2 = –9
Sum of 3rd row = (–6) + 4 + (–7)
= – 6 + 4 – 7
= – 2 – 7 = –9
Sum of 1st column = 1 + (–4) + (–6)
= 1 – 4 – 6
= 1 – 10 = –9
Sum of 2nd column = (–10) + (–3) + 4
= –10 – 3 + 4
= – 13 + 4
= –9
Sum of 3rd column = 0 + (–2) + (–7)
= 0 – 2 – 7 = –9
Sum of 1st diagonal = 1 + (–3) + (–7)
= 1 – 3 – 7
= 1 – 10 = –9
Sum of 2nd diagonal = 0 + (–3) + (–6)
= 0 – 3 – 6
= –9

∴ Sum of each row, each column and each diagonal is –9.

∴ *(ii)* square is a magic square.

Q. 8. **Verify $a - (-b) = a + b$ for the following values of a and b.**
(*i*) $a = 21, b = 18$ (*ii*) $a = 118, b = 125$
(*iii*) $a = 75, b = 84$ (*iv*) $a = 28, b = 11$

Sol. *(i)* Given that, $a = 21, b = 18$
Consider $a - (-b) = 21 - (-18)$
$= 21 + 18 = 39$
and $a + b = 21 + 18 = 39$
∴ $a - (-b) = a + b$
Hence, verified.

(ii) Given that, $a = 118, b = 125$
Consider $a - (-b) = 118 - (-125)$
$= 118 + 125$
$= 243$
and $a + b = 118 + 125$
$= 243$
∴ $a - (-b) = a + b$
Hence, verified.

(iii) Given that, $a = 75, b = 84$
Consider $a - (-b) = 75 - (-84)$
$= 75 + 84$
$= 159$
and $a + b = 75 + 84$
$= 159$
∴ $a - (-b) = a + b$
Hence, verified.

(iv) Given that, $a = 28, b = 11$
Consider $a - (-b) = 28 - (-11)$
$= 28 + 11$
$= 39$
and $a + b = 28 + 11$
$= 39$
∴ $a - (-b) = a + b$
Hence, verified.

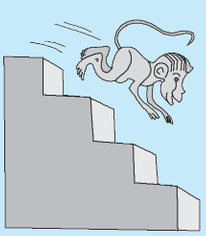
Q. 9. **Use the sign of >, < or = in the box to make the statement true.**

(*a*) (–8) + (–4) ☐ (–8) – (–4)
(*b*) (–3) + 7 –(19) ☐ 15 – 8 + (–9)
(*c*) 23 – 41 + 11 ☐ 23 – 41 – 11
(*d*) 39 + (–24) –(15) ☐ 36 + (–52) –(–36)
(*e*) – 231 + 79 + 51 ☐ – 399 + 159 + 81

Sol. *(a)* (–8) + (–4) < (–8) – (–4)
(b) (–3) + 7 – (19) < 15 – 8 + (–9)
(c) 23 – 41 + 11 > 23 – 41 – 11
(d) 39 + (–24) – (15) < 36 + (–52) – (–36)
(e) –231 + 79 + 51 < –399 + 159 + 81

Q. 10. A water tank has steps inside it. A monkey is sitting on the topmost (*i.e.*, the first step). 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?



(*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?

(*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?

Sol. Let, number of steps moved down is represented by negative integers and number of steps moved up is represented by positive integers

Total number of steps to be moved up and down = 9

(*i*) Number of steps moved down in one jump = 3

Number of steps moved up in one jump = 2

According to question,

Number of jumps in which, he will reach the water level = –9 + (–3 + 2) = –10

Hence, in 11 jumps he will reach the water level.

(*ii*) In one jump number of steps moved up = 4

In one jump number of steps moved down = –2

∴ Distance covered in single jump = 4 – 2 = 2

Now, total number of steps for top step = 9

Hence, he will reach back the top step in 5 jumps.

(*iii*) (*a*) – 3 + 2 – 3 + 2 – 3 + 2 – 3 + 2 – 3 + 2 – 3 = –8

(*b*) 4 – 2 + 4 – 2 + 4 = 8

Sum 8 in (*b*) represents going up 8 steps.

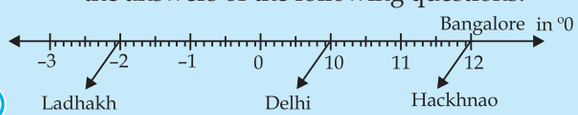
SELF PRACTICE 1.1

1. Arrange the following numbers on number line and write them in ascending as well as in decending order:

7, –5, 4, 0 and –4

2. On a certain day temperature of Delhi at 9 o'clock was 23°C. At midnight it was 19°C. How much was decrease in the temperature of Delhi?

3. Read the following number line, where temperature of different places is given. Give the answers of the following questions:



(*i*) Name the coldest place.

(*ii*) Write the places whose temperatures are 10°C and –0.5°C.

(*iii*) What is the difference of temperature between Lucknow and Ladhakh?

4. In a certain examination, positive marks are given for correct answer and negative marks are given for incorrect answers. If Rita's score in four successive rounds are: –7, –9, 4 and 16. Find the total score of Rita.

5. Madhu goes 10 steps ahead and then comes back by 5 steps. Her friend Mohini goes 15 steps ahead and then comes back by 7 steps. Who move more steps and by how much? Where steps move ahead are given positive signs and steps move back are given negative signs.

6. A submarine is moving at a depth, 6000 m below the sea level. At a certain point it is exactly below an aeroplane flying at a height 2000 m above the sea level. What is the vertical distance between them?

7. Radha deposits ₹2000 in her bank and after two days, she withdraws ₹800 from her account. If withdraw of the amount is represented by negative integer and deposit amount is represented by positive integer. Find the balance in Radha's account.

8. Verify that $a + (-b) = a - b$ for the following values of a and b.

(*i*) $a = -56$, $b = 73$

(*ii*) $a = 125$, $b = -101$

(*iii*) $a = -133$, $b = 82$

(*iv*) $a = 113$, $b = 82$

CONCEPT IN A NUTSHELL

PROPERTIES OF ADDITION AND SUBTRACTION OF INTEGERS

(1) Integers are closed for addition and subtraction both *i.e.*, $a + b$ and $a - b$ are again integers, where a and b are any integers.
(2) For any two integers a and b; addition is commutative *i.e.*, $a + b = b + a$.
(3) For any integers a, b and c addition is associative *i.e.*, $(a + b) + c = a + (b + c)$
(4) Integer 0 is the identity under addition.
i.e., $a + 0 = 0 + a = a$ for every integer a.

Try These [Textbook Page 8]

Q. 1. Write a pair of integers whose sum gives:
(*a*) a negative integer.
(*b*) zero.
(*c*) an integer smaller than both the integers.
(*d*) an integer smaller than only one of the integers.
(*e*) an integer greater than both the integers.

Sol. (*a*) If a and b be any integers such that $a < b$.
then $a + (-b) = a - b$; is an integer whose sum is a negative integer.

(*b*) If a is any integer, then
$a + (-a) = a - a = 0$.

(*c*) For this both integers a and b should be negative, *i.e.* $-a + (-b) = -a - b$
e.g. (*i*) $-2 + (-3) = -2 - 3 = -5$
(*ii*) $-10 + (-8) = -10 - 8 = -18$ and so on.

(*d*) For this, one integer should be positive and other should be negative, *i.e.*
(*i*) $-5 + 4 = -5 + 4 = -1$; which is smaller than 4.
(*ii*) $9 + (-6) = 9 - 6 = 3$; which is smaller than 9.

(*e*) For this both integers a and b should be positive, *i.e.*
$4 + 5 = 9$; which is greater than both integers
$18 + 10 = 28$; which is greater than both integers and so on.

Q. 2. Write a pair of integers whose difference gives:
(*a*) a negative integer.
(*b*) zero.
(*c*) an integer smaller than both the integers.
(*d*) an integer greater than only one of the integers.
(*e*) an integer greater than both the integers

Sol. (*a*) For this two integers a and b be such that $a < b$
i.e., $a + (-b) = a - b$
(*i*) $4 - (+5) = 4 - 5 = -1$
(*ii*) $(-9) + 5 = -9 + 5 = -4$ and so on.

(*b*) For any integer a
$a + (-a) = (-a) + a = 0$
(*i*) $(-5) + 5 = -5 + 5 = 0$
(*ii*) $5 + (-5) = 5 - 5 = 0$

(*c*) (*i*) $10 - (8) = 10 - 8 = 2$
(*ii*) $25 - 16 = 9$ and so on.

(*d*) (*i*) $10 - 2 = 8$
(*ii*) $39 - 13 = 26$ and so on.

(*e*) For this, we take both integers a and b negative.
e.g. (*i*) $-2 - (-3) = -2 + 3 = 1$
(*ii*) $-5 - (-8) = -5 + 8 = 3$ and so on.

TEXTBOOK EXERCISE 1.2

Q. 1. Write down a pair of integer whose—
(*a*) sum is –7 **(*b*) difference is –10.**
(*c*) sum is 0.

Sol. One such pair could be:
(*a*) $(-3) + (-4)$ or $2 + (-9)$
(*b*) $5 - 15$ or $-13 - (-3)$
(*c*) $(-3) + 3$ or $7 + (-7)$

Q. 2. (*a*) Write a pair of negative integers whose difference gives 8.
(*b*) Write a negative integer and a positive integer whose sum is –5.
(*c*) Write a negative integer and a positive integer whose difference is –3.

Sol. One such pair could be:
(*a*) $(-13) - (-21)$ or $(-6) - (-14)$
(*b*) $3 + (-8)$ or $(-7) + 2$
(*c*) $-2 - (1)$

Q. 3. In a quiz, team A scored –40, 10, 0 and team B scored 10, 0, –40 in three successive rounds. Which team scored more? Can we say that we can add integers in any order?

Sol. Team A scored total scores $= -40 + 10 + 0 = -30$
Team B scored total scores $= 10 + 0 + (-40)$
$= -30$
$\therefore$ Both teams A and B scored equal.
Yes, we can add integers in any order.

Q. 4. Fill in the blanks to make the following statements true.
(*i*) (–5) + (–8) = (–8) + (.....)
(*ii*) –53 + ... = –53.

(iii) 17 + ... = 0
(iv) [13 + (–12)] + (....) = 13 + [(–12) + (–7)]
(v) (–4) + {15 + (–3)] = [–4 + 15] + ...

Sol. (i) (–5) + (–8) = (–8) + (–5)
(ii) – 53 + 0 = –53
(iii) 17 + (–17) = 0
(iv) [13 + (–12)] + (–7) = 13 + [(–12) + (–7)]
(v) (–4) + [15 + (–3)] = [(–4) + 15] + (–3)

SELF PRACTICE 1.2

1. Write down a pair of integers whose
   (a) sum is –5 (b) sum is –9
   (c) sum is 0 (d) difference is –20.
2. (a) Write a pair of negative integers whose difference gives 6.
   (b) Write a negative integer and a positive integer whose sum is –15.
   (c) Write a negative integer and a positive integer whose difference is –13.
3. In a Quiz compitition, team A scored –15, –10, 0 and 2 scores in four round and team B scored –2, –23, –15 and 10 in four rounds. Who scored more and won the compitition?
4. Fill in the blanks:
   (i) (–13) + ( ) = (–15) + ...
   (ii) –2 + ... = 0
   (iii) –10 + ... = –11
   (iv) –15 + ... = –15
   (v) –23 + ... = 25 + ...
   (vi) [13 + (–2)] + (.....) = ...[(–2) + (7)]
   (vii) 4 + [..... + (–2)] = [..... + 9] –(–2)]
5. Write true or false:
   (i) –2 + 2 = 0 (ii) (–5 + 3) + 2 = (–5 + 2) + 3
   (iii) –4 + 2 = 2 (iv) 17 + –17 = –1

CONCEPT IN A NUTSHELL

MULTIPLICATION OF INTEGERS AND ITS PROPERTIES

Multiplication of a Positive and a Negative Integer

Multiplying a positive integer and a negative integer, we multiply them as whole numbers and put a minus sign (–) before the product. We thus get a negative integer.
In general, for any two positive integers a and b we can say

$$a \times (-b) = (-a) \times b = -(a \times b)$$

Multiplication of two Negative Integers

The product of two negative integers is a positive integer. We multiply the two negative integers as whole numbers and put the positive sign before the product.
In general, for any two positive integers a and b,
$(-a) \times (-b) = a \times b$

Product of three or more Negative Integers.

If the number of negative integers in a product is even, then the product is a positive integer. If the number of negative integers in a product is odd, then the product is a negative integer.

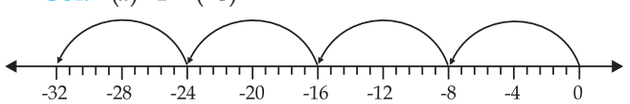
Properties of Multiplication of Integers

(i) Integers are closed under multiplication. *i.e.*, $a \times b$ is an integer for any two integers a and b.
(ii) Multiplication is commutative for integers *i.e.*, $a \times b = b \times a$ for any two integers a and b.
(iii) The integer 1 is the identity under multiplication,
i.e., $1 \times a = a \times 1$ for any integer a.
(iv) Multiplication is associative for integers,
i.e., $(a \times b) \times c = a \times (b \times c)$ for any three integers a, b and c.
(v) Multiplying any number by 0 gives the result zero.
i.e., $a \times 0 = 0 \times a = 0$
(vi) Under addition and multiplication, integers show a property called distributive property.
i.e., $a \times (b + c) = a \times b + a \times c$ for any three integers a, b and c.
All above properties help us to make our calculations easier.

Try These [Textbook Page 10]

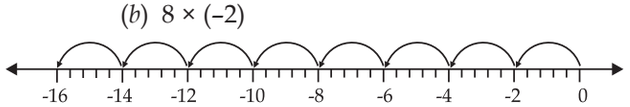
Q. 1. Find 4 × (–8), 8 × (–2), 3 × (–7), 10 × (–1) using number line.

Sol. (a) 4 × (–8)



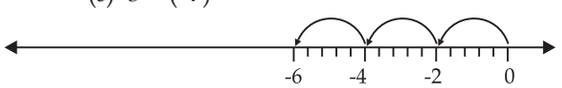
Therefore 4 × (–8) = –32.

(b) 8 × (–2)



Therefore 8 × (–2) = –16.

(c) 3 × (–7)



Therefore 3 × (–7) = –21.

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