Let's Recap!

1. Choose the correct option.

a. The number after 728 is _____.

i. 725 ii. 729 iii. 727 iv. 730

b. What is the expanded form of 498?

i. 4 + 9 + 8 ii. 400 + 90 + 8 iii. 40 + 90 + 8 iv. 4 + 90 + 8

c. If 38 students attended an Arts class on Monday and 39 students on Tuesday, how many students attended the class on both these days?

i. 77 ii. 78 iii. 79 iv. 80

d. A baker baked 150 loaves of bread and sold 128 loaves. How many loaves of bread were left unsold?

i. 25 ii. 28 iii. 50 iv. 22

e. 38 × 5 =

i. 180 ii. 190 iii. 380 iv. 390

f. Samik had 30 sweets. He distributed them equally in 6 packets. How many sweets did he put in each packet?

i. 3 ii. 4 iii. 5 iv. 6

g. In 24 ÷ 4 = 6, the dividend is

i. 24 ii. 4 iii. 6 iv. 2

h. Which one of these shapes has no corner?

i. Circle ii. Triangle iii. Rectangle iv. Square

i. Which container has the largest capacity?


A


B


C


D

i. C ii. D iii. A iv. B

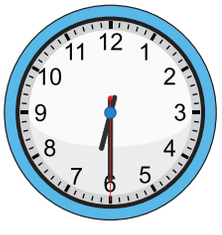
j. The time on the clock is

i. 6 o'clock

ii. 6:30

iii. 6:15

iv. 6:45



Features Highlighted

Let's Recap! A variety of questions based on the previous grade for quick recapitulation

2 Addition, Subtraction and Their Applications

Prior Knowledge

- 8- and 9-digit numbers in both Indian and International Number Systems
- Place value and face value
- Comparing numbers
- Ascending and descending order

Learning Objectives

- Addition of large numbers
- Subtraction of large numbers
- Word problems on addition and subtraction

Let's Get Started

Nungsang owns a nursery. He grows plants of many kinds.

Read the sentences and circle the correct operation.

Nungsang grows 34 daisy plants and 56 cactus plants. How many more cactus plants are there than daisy plants?

+ − ÷ ×

Nungsang sold 35 rose, 23 pansy and 12 marigold plants in a day. How many plants did he sell in all?

+ − ÷ ×

35 rose plants are arranged equally in 5 rows. How many plants are there in each row?

+ − ÷ ×

He had grown 56 sunflower plants. 18 sunflower plants fell due to the rain. How many were still intact?

+ − ÷ ×

Features Highlighted

Prior Knowledge: List of topics to help construct connections between old and new knowledge
Learning Objectives List of main topics that will be covered in a chapter
Let's Get Started Interactive exercise to begin a chapter with real-life connect and addressing 21st Century Skills

Law 3: $(a^m)^n = a^{m \times n}$

When a number with a power is raised to another power, the powers are multiplied. This is known as **power law**.

Example 10: Simplify the following expressions.

a. $(8^4)^5$

Solution: Using product law,

$(8^4)^5 = 8^{4 \times 5} = 8^{20}$

b. $(6^3)^8$

Solution: Using product law,

$(6^3)^8 = 6^{3 \times 8} = 6^{24}$

Law 4: $a^n b^n = (ab)^n$

That is, to multiply numbers that have the same exponent, the bases have to be multiplied.
For example: $4^3 \times 5^3 = (4 \times 5)^3$

Law 5: $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$

When a fraction is raised to a power, we raise both the numerator and the denominator of the fraction to the given power. **For example:** $\left(\frac{3}{5}\right)^4 = \frac{3^4}{5^4}$

Law 6: Any non-zero number raised to the power 0 is 1. That is, $a^0 = 1$, where $a \neq 0$.

For example: $5^0 = 1$; $2^0 = 1$; $7^0 = 1$ and $8^0 = 1$

Law 7: Any number raised to the power 1 is the number itself. That is, $a^1 = a$.

For example: $5^1 = 5$; $452^1 = 452$ and $1000^1 = 1000$

SIMPLIFYING THE EXPONENTIAL FORM OF EXPRESSIONS

Example 11: Simplify: $\left(2^4\right)^3 - \frac{4^4 \times 18^4}{81 \times 12^3}$

Solution: Applying $(a^m)^n = a^{m \times n}$, $a^m \times a^n = a^{m+n}$ and $a^m \div a^n = a^{m-n}$

$(2^4)^3 = 2^{4 \times 3} = 2^{12}$

$4^4 = (2 \times 2)^4 = 2^4 \times 2^4 = 2^8$

$18^4 = (3 \times 3 \times 2)^4 = 3^4 \times 3^4 \times 2^4 = 3^8 \times 2^4$

$81 = 3^4$ and $12^3 = (3 \times 2 \times 2)^3 = 3^3 \times 2^3 \times 2^3 = 3^3 \times 2^6$

$$\left(2^4\right)^3 - \frac{4^4 \times 18^4}{81 \times 12^3} = 2^{12} - \frac{2^8 \times 3^8 \times 2^4}{3^4 \times 3^3 \times 2^6} = 2^{12} - \frac{3^8 \times 2^{8+4}}{3^{4+3} \times 2^6} = 2^{12} - \frac{3^8 \times 2^{12}}{3^7 \times 2^6}$$

$$= 2^{12} - 3^{8-7} \times 2^{12-6} = 2^{12} - 3 \times 2^6 = 2^{12} - (3 \times 64)$$

$$= 4096 - (3 \times 64) = 4096 - 192 = 3904$$

ALERT

1. $(5 + 3)^2 = 5^2 + 3^2$. ✗
   But $(5 \times 3)^2 = 5^2 \times 3^2$. ✓
2. $a^m \times a^m = (a^m)^2 = a^{2m}$. ✓
   or
   $a^m \times a^m = a^{m+m} = a^{2m}$. ✓

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Alert: Snippets to clear common misconceptions and mistakes

SIMPLIFICATION OF A MATHEMATICAL EXPRESSION

To simplify any mathematical expression, the operations have to be performed in the given order.

1. **B**rackets

   The brackets are simplified (removed) in the given order.

   a. Bar or Line bracket —

   b. Parentheses or Round brackets ( )

   c. Curly brackets or Braces { }

   d. Square brackets or Box brackets [ ]

2. **O**f 3. **D**ivision 4. **M**ultiplication

5. **A**ddition 6. **S**ubtraction

This order can be remembered by the rule or word **BODMAS**.

REMEMBER

A mathematical expression is a collection of numbers connected by one or more of the mathematical operations of addition, subtraction, multiplication and division.

Example 25: Simplify the following expression.

$16 + 8 \div 4 - 2 \times 3$

Solution: $16 + 8 \div 4 - 2 \times 3$

$= 16 + 2 - 2 \times 3$ [Performing division]

$= 16 + 2 - 6$ [Performing multiplication]

$= 18 - 6$ [Performing addition]

$= 12$ [Performing subtraction]

Example 26: Simplify the following expressions.

a. $36 - [18 - \{14 - (15 - 4 \div 2 \times 2)\}]$

Solution: $36 - [18 - \{14 - (15 - 4 \div 2 \times 2)\}]$

$= 36 - [18 - \{14 - (15 - 2 \times 2)\}]$ [Performing division]

$= 36 - [18 - \{14 - (15 - 4)\}]$ [Performing multiplication]

$= 36 - [18 - \{14 - 11\}]$ [Removing ( )]

$= 36 - [18 - 3]$ [Removing { }]

$= 36 - 15$ [Removing [ ]]

$= 21$

b. $27 - [18 - \{16 - (5 - \overline{4 - 1})\}]$

Solution: $= 27 - [18 - \{16 - (5 - 3)\}]$

$= 27 - [18 - \{16 - 2\}]$

$= 27 - [18 - 14]$

$= 27 - 4$

$= 23$

Exercise 3.4

Solve the following word problems.

1. A factory has 145 employees. Each employee gets ₹3170 in a week. What is the total amount that the factory gives out each week?
2. A television costs ₹43,775. A shopping mall installs 28 televisions. How much money did the shopping mall spend on the televisions?
3. A high-rise building has 25 floors. If there are 6875 bulbs and the bulbs are to be fitted equally among all the floors, how many bulbs will be fitted in each floor?
4. 17,884 spectators went to watch a football match. If each ticket costs ₹95, how much money was collected from the spectators?
5. A big library has 29,164 books. It has 23 rooms. The books are to be kept in the rooms such that each room has the same number of books. How many books will be kept in each room?
6. A teacher distributed 342 books among 25 students. How many books did each student get and how many books were left?
7. A class has 15 students. Each student is given 2 pens. How many pens do we need for 4 such classes?
8. Out of 250 tickets sold in a movie hall, 30 people did not come. The rest spend ₹12 each during the interval. What was the total amount they spent if each ticket cost ₹350?
9. ₹63,000 is to be distributed between 70 families. How much will each family get?
10. A total of 872 books are to be packed in 14 boxes. How many books will be packed and how many books will be left?
11. Out of 530 students in a school, 20 students were absent. The rest brought ₹5 each to buy a flag. What was the total amount collected?
12. A certain amount was distributed among 25 people. If each person received ₹500 and ₹175 was still left, what was the total amount?

Features Highlighted

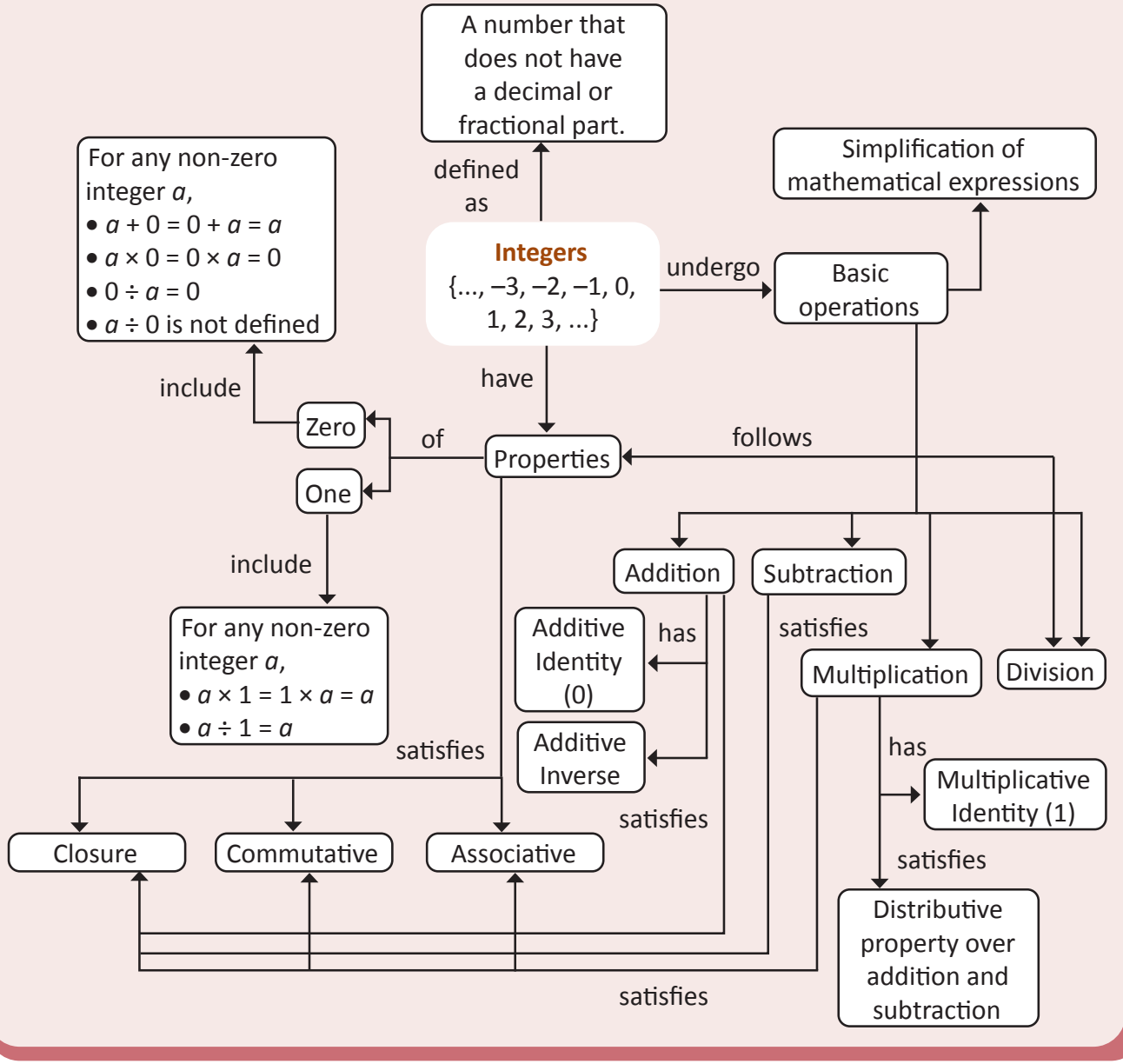
Exercise: Purposefully designed in-text exercises

Exercise 1.7

Simplify using the BODMAS Rule.

1. $(-15) + 4 \div (5 - 3)$
2. $(-40) \times (-1) + (-28) \div 7$
3. $(-3) + (-8) \div (-4) - 2 \times (-2)$
4. $-25 + 14 \div (5 - 3)$
5. $30 \div 5 \times 3 + (9 - 4)$
6. $25 + 27 \div (2 + 7) - 5 \times 5$
7. $45 - [38 - \{60 \div 3 - (6 - 9 \div 3) \div 3\}]$
8. $32 - [11 - 42 \div (11 + 8 \times 2 - 20)]$
9. $7 - [12 \times 6 + 13 \times 15 \div (-3)]$
10. $75 - [24 - \{16 - (5 - \overline{4 - 1})\}]$
11. $16 - [8 - \{15 + 12 \div (7 - \overline{5 - 2})\}]$
12. $21 \div (3 \text{ of } 2 - 4 + 5) - 2(16 - 7)$

Key Concepts



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Key Concepts: A graphic organizer to recap the chapter

Test Paper 2

1. Choose the correct option.

a. The simplest form of $5\frac{1}{2} : 1\frac{3}{8}$ is _____.

i. 2 : 1 ii. 4 : 1 iii. 5 : 1 iv. 6 : 1

b. If the cost of 25 chocolates is ₹125, then the cost of 15 chocolates is _____.

i. ₹5 ii. ₹50 iii. ₹75 iv. ₹90

c. Profit is the difference between the selling price and the _____.

i. loss ii. cost price iii. profit iv. None of these

d. Rate of interest (R) in terms of simple interest (SI), time (T) and principal (P) is _____.

i. $\frac{P \times T}{100 \times SI}$ ii. $\frac{100 \times T}{P \times SI}$ iii. $\frac{SI \times 100}{P \times T}$ iv. $\frac{SI \times T}{100 \times P}$

e. Time taken (T) by a vehicle in terms of speed (S) and distance (D) is _____.

i. D + S ii. D × S iii. D ÷ S iv. S ÷ D

2. Write T for True and F for False.

a. In a proportion, product of means = 2(product of extremes).

b. 0.003 is expressed as 0.03%.

c. If loss per cent and selling price (SP) are known, the cost price (CP) can be calculated as

$CP = \frac{\{100\} \times SP}{100 - Loss\%}$

d. The simple interest on ₹1000 at 5% for 2 years is ₹500.

e. If an object travels equal distances in equal intervals of time, then the object has a uniform speed.

3. Answer the following questions briefly.

a. Find the simple interest on ₹75,000 at $5\frac{1}{5}$% per annum for a year. Also find the amount.

b. A person sold two wireless routers for ₹3000 each, gaining 20% on one and losing 20% on the other. Find the gain percentage or loss percentage.

4. Answer the following questions.

a. An amount of ₹462 is to be divided into three parts such that first one is $\frac{3}{5}$ of the second and the ratio between the second and the third parts is 7 : 2. Find the three parts.

b. A vehicle covers a certain distance in 52 minutes with a uniform speed of 60 km/h. How much time will it take to cover the same distance when its speed is decreased to 26 km/h?

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Test Paper: Variety of questions based on the entire book

Revision Exercise

1. Fill in the blanks.

a. The product of a number multiplied by ____ is that number itself.

b. The product of a number multiplied by ____ is 0.

c. If the order of the number multiplied is changed, the product remains the _____.

d. 47,386 × 1 = _____

e. 79,248 × 0 = _____

f. 62,934 × 817 = 817 × _____

g. A number divided by _____ remains the same.

h. A number divided by itself is equal to _____.

i. We cannot divide a number by _____.

j. 64,385 ÷ 1 = _____

k. 75,439 ÷ 75,439 = _____

l. To find the average, we _____ the total of all the items by the number of items.

2. Match the following.

a.	Division	i.	The leftover number
b.	Dividend	ii.	The number that divides the dividend
c.	Divisor	iii.	The number that is being divided
d.	Quotient	iv.	Equal sharing or equal grouping
e.	Remainder	v.	The number of times that the divisor will go into the dividend

3. Multiply the following.

a. 7219 × 438	b. 2486 × 307	c. 92,145 × 86	d. 2517 × 531
e. 37,842 × 306	f. 5318 × 2583	g. 2,34,567 × 173	h. 4223 × 3809
i. 46,219 × 63	j. 21,268 × 2346	k. 32,784 × 3745	l. 10,869 × 1074

4. Divide the following.

a. 49,523 ÷ 24	b. 16,036 ÷ 25	c. 34,509 ÷ 13	d. 43,273 ÷ 70
e. 5,22,860 ÷ 52	f. 1,43,250 ÷ 125	g. 5,54,668 ÷ 46	h. 7,86,468 ÷ 112
i. 20,19,636 ÷ 125	j. 8,31,65,432 ÷ 72	k. 3,16,665 ÷ 155	l. 14,06,346 ÷ 62

5. 1254 mango saplings are planted with 43 saplings in each row. Find out the number of complete rows and the number of saplings that will be left.

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Revision Exercise: Variety of questions based on the topics covered in the Chapter

Answers

Chapter 1

Exercise 1.1

1. a. One crore twenty-nine lakh twenty-three thousand eight hundred seventy-four
   b. Two crore eighty-eight thousand four hundred thirty
   c. Four crore seven lakh thirty-two thousand nine hundred eighty-three
   d. Seven crore twenty lakh fifty-three thousand nine hundred six
   e. Twenty-eight crore four thousand six hundred seventy
   f. Ninety-nine crore eighty-nine lakh ninety-eight thousand nine hundred ninety-nine
2. a. 2,40,20,072
   b. 5,79,10,206
   c. 11,00,27,000
   d. 21,90,82,000
   e. 70,02,03,001
3. a. Twelve million five hundred sixty-seven thousand one hundred thirty-one
   b. Twenty-eight million seven
   c. Thirty-five million two hundred ninety-four thousand six hundred seventy-one
   d. One hundred thirty million five thousand seventy-five
   e. Four hundred thirty-five million eight thousand one hundred
   f. Four hundred thirty-eight million seven hundred twenty-six thousand five hundred eighty-one
4. a. 20,430,055 b. 23,000,004 c. 35,269,720
   d. 709,825,001 e. 870,495,200
5.

	Indian System of Numeration	International System of Numeration
b.	3,09,16,839	30,916,839
c.	20,97,10,342	209,710,342
d.	51,90,26,192	519,026,192

6. a. 61,92,07,539 b. 81,79,438
   c. 52,10,879 d. 8,91,57,613

Exercise 1.2

1. a. < b. < c. > d. >
   e. = f. >
2.

Digit	Place Value	Face Value
4	4,00,00,000	4
3	30,00,000	3
2	20	2

3. a. 19,970 b. 4,99,991
   c. 6400 d. 59,91,000
4. a. 5,32,79,169 < 5,32,79,660 < 5,32,79,679 < 5,32,79,969 < 53,27,96,699
   b. 4,39,20,021 < 4,39,28,021 < 43,92,80,021 < 43,92,80,091 < 43,92,86,021
5. a. 63,97,74,989 > 63,97,74,988 > 63,97,74,918 > 6,39,77,498 > 6,39,77,488
   b. 72,00,00,010 > 72,00,00,001 > 7,20,00,100 > 7,20,00,010 > 7,20,00,001
6. a. 5,68,94,910 b. 39,48,90,181
7. a. 9,32,19,899 b. 49,68,09,918
8. a. 1,00,00,000 b. 99,99,99,999
   c. 9,87,54,210 d. 10,23,45,789
   e. 9,97,63,310 f. 1,33,35,778

Exercise 1.3

1. a. I b. L c. M
   d. V e. C f. D
2. a. XXI b. L c. XXX
   d. LXVI e. LXX f. LXXIX
   g. LXXX h. LXXXV i. XC
   j. C k. XCIX l. D
   m. DCCC n. CCXCIII o. DXXVIII
   p. M q. CDLXVII r. CMXXXV
   s. MMMDCLXXIX t. MMCMXLI
3. a. 8 b. 16 c. 20
   d. 30 e. 39 f. 40
   g. 49 h. 10 i. 77
   j. 98 k. 100 l. 159
4. a. < b. < c. <
5. a, e, f

Exercise 1.4

1. a. 40 b. 250 c. 6980
   d. 46,730 e. 2,98,330
2. a. 100 b. 200 c. 6400
   d. 57,600 e. 9,87,700
3. a. 2000 b. 3000 c. 16,000
   d. 6,26,000 e. 17,49,000
4. 89,300 5. 6,62,000
6. 25,080 7. 9,36,000
8. 5,26,80,000
9. a. 46,980 b. 47,000 c. 47,000
10. About 27,900 visitors attended the book fair.

Revision Exercise

1. a. iv b. iii c. i
   d. i e. iii f. iii
2. a. False b. False c. False
   d. True e. True
3. a. Seven crore twenty-eight lakh forty-nine thousand nine hundred eighty-three
   b. One hundred three million twenty-seven thousand five
4. 3,00,005
5. Thirty-five million four hundred ninety-eight thousand seven hundred sixteen
6. 34,000,926
7. a. Indian System:
   i. 9,65,897 ii. 20,05,68,914 iii. 5,86,24,510
   b. International System:
   i. 965,897 ii. 200,568,914 iii. 58,624,510
8. 23,87,989 < 5,86,23,486 < 6,08,49,493 < 37,86,41,386 < 96,86,00,136

Features Highlighted

Answer Key Solution to Exercises and Revision Exercise