GOVERNMENT OF TAMIL NADU

STANDARD FIVE

MATHEMATICS
SCIENCE
SOCIAL SCIENCE

Term - III

Volume-2

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MATHEMATICS

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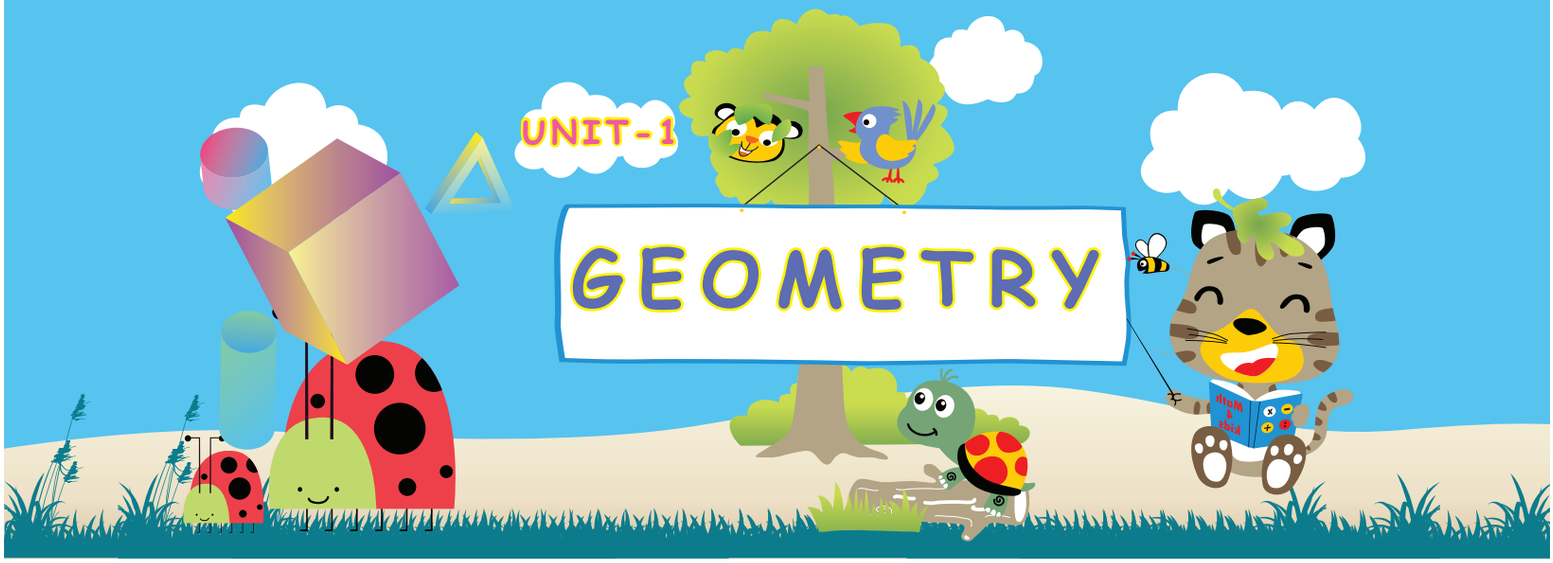


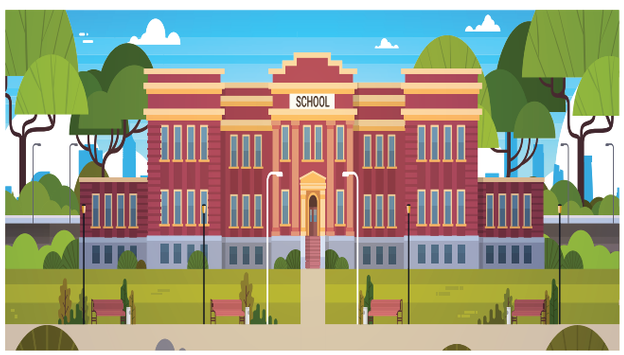
E9W2M6

Perimeter and Area

Perimeter of the rectangle and square

Situation

Raju is a class 5 student of a Panchayat union middle school. Raju's head master wanted to fence the school as there is disturbance caused by the tresspassers. Hence the headmaster decided to fence the school.



The headmaster asked Raju and his classmates to measure the length of the boundary of the school premises, so as to buy the required fencing wire.

Raju and his friends measured the length of each side and added them to find the total length.

Length of the boundary = sum of the length of each side

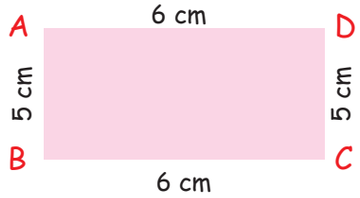
Here the length of the boundary is called as perimeter,

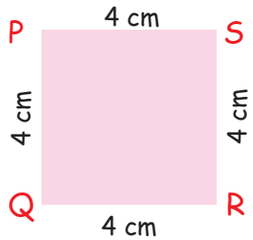
Hence, the sum of the length of all the sides of a closed area is called its perimeter

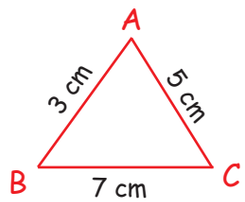
Perimeter is used in framing a photo, for fencing a vacant land, etc..,

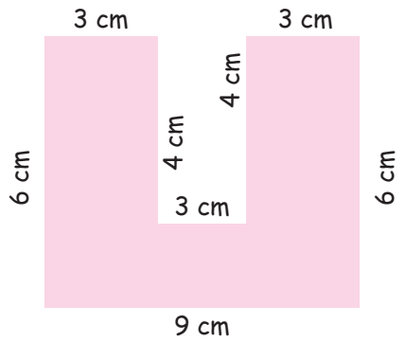
Activity 1

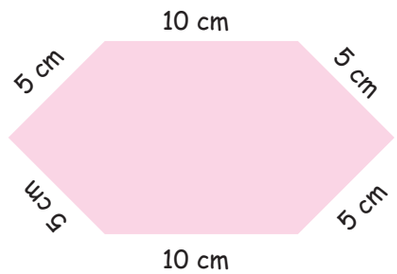
Write the perimeter of each figure:

1. 

2. 

3. 

4. 

5. 

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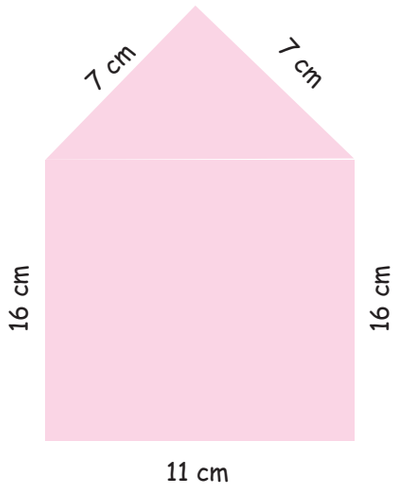
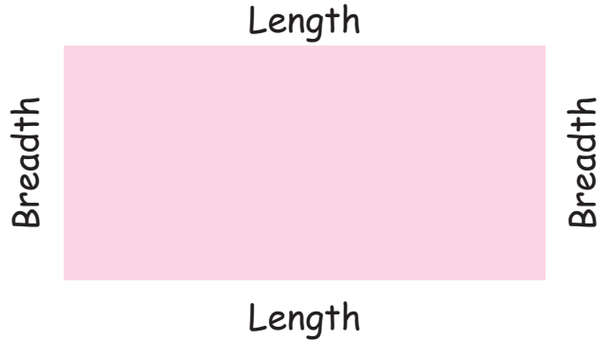


Formula for the perimeter of a rectangle:



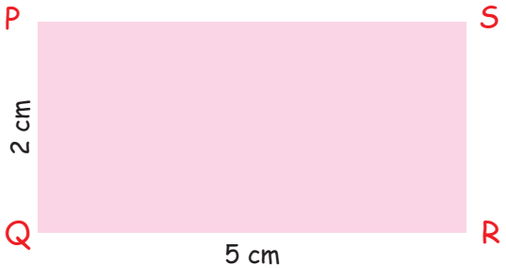
Perimeter = length + breadth + length + breadth (opposite sides of a rectangle are equal)

So, the perimeter of a rectangle = twice the length + twice the breadth

Perimeter of a rectangle = (2 x length) + (2 x breadth)

Example 1.1

The length of the rectangle below is 5cm and its breadth is 2cm. Find its perimeter.

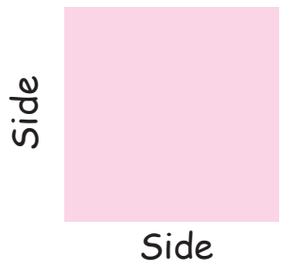


Solution

Perimeter of rectangle PQRS = (2 x length) + (2 x breadth)
= (2 x 5) + (2 x 2)
= 10 + 4
= 14

Therefore, the perimeter of the rectangle is 14 cm.

Formula for the perimeter of a square



The lengths of all the sides of a square are equal.
Therefore, the perimeter of a square = four time the length of one of its sides

Perimeter of a square = 4 x (the length of one side)

Example 1.2

The length of one side of a square is 7cm. Find its perimeter.

Solution

The perimeter of a square is four times the length of one side.

Perimeter of a square = 4 x (length of one side)
= 4 x 7
= 28

Therefore, the perimeter of the square is 28 cm.

Example 1.3

The length of a rectangular park is 60 cm, while its width is 50 cm. What is its perimeter?

Solution

Perimeter of the rectangle = (2 x length) + (2 x breadth)

$= (2 \times 60) + (2 \times 50)$

$= 120 + 100$

$= 220$

Therefore, the perimeter of the rectangular park is 220 cm.

Example 1.4

How much wire will be needed to put a triple fence around a square plot with side 20m? What will be the total cost of the wire at ₹ 50 per metre?

Solution

To put a single fence around the square plot, we need to find its perimeter

Perimeter of a square = 4 x length of one side = 4 x 20 = 80

The perimeter of the square plot is 80 metres. Since the fence is to be a triple fence we must triple the perimeter

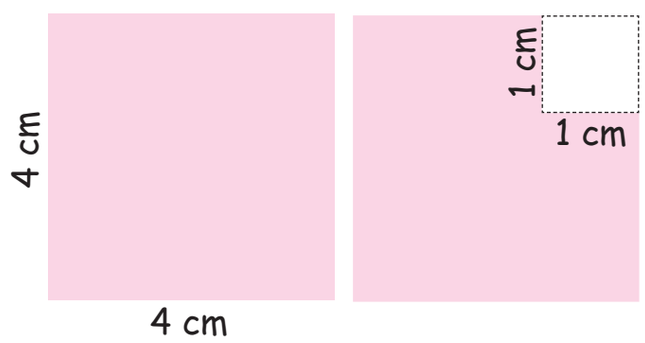
80 x 3 = 240 m of wire will be needed to fence the square plot.

Now let us find out how much the wire will cost. One metre of wire costs ₹ 50

Therefore the cost of 240 m of wire will be 240 x 50 = 12,000

The total cost of wire for putting a triple fence around the plot will be ₹ 12,000

Try this



If a square of side 1 cm is cut out of the corner of a larger square with side 4 cm (See the figure). What will be the perimeter of the remaining shape?

Exercise 1.1

1. How much wire will be needed to make a rectangle of length 6 cm and breadth 3 cm?
2. If the length of a rectangle is 14 m and its breadth is 10 m, what is its perimeter?
3. Each side of a square is 7 m long. Find its perimeter.
4. If we take 2 rounds of a field, that is 340 m long and 160 m wide. Find the distance covered in kilometers?
5. Sanju completes 10 rounds around a square park every day. If one side of the park is 110 m, then find the distance covered by sanju in a day in terms of kilometers and metres.

Area of the rectangle and square

Situation

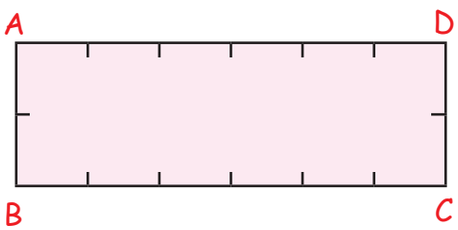
There are lot of mosquitoes in Kavitha's house. These mosquitoes enter her house through the windows. Kavitha's mother decided to cover the windows by a mesh. What kind of measurement is required by Kavitha's mother to cover the window using the mesh?

The measurement required by Kavitha's mother to cover the window is the area.

Area can be defined as the space occupied by a flat shape or the surface of an object.

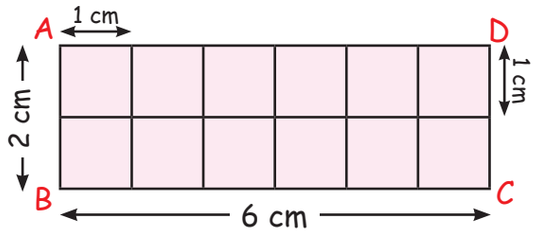
The unit denoted for the area of an object is square units. (Example: 16 sq. cm, 24 sq. m).

Formula for the area of a rectangle



I3U3U5

In the rectangle ABCD given above, 1 cm divisions were marked on each side.



The points on opposite sides were joined as shown in the figure above. The length of the sides of each square thus created is 1 cm.

Therefore, the area of each square is 1 sq.cm, which is the unit square.

In the rectangle ABCD we have created 2 rows of 6 squares each.

Therefore, the number of squares in the rectangle ABCD is $6 \times 2 = 12$

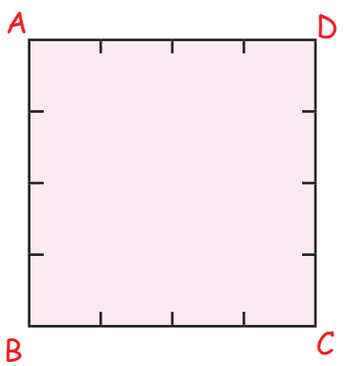
Here, the length of the rectangle ABCD is 6 cm and its breadth is 2 cm.

The number of unit squares formed are the same as the product of the length and breadth of the rectangle.

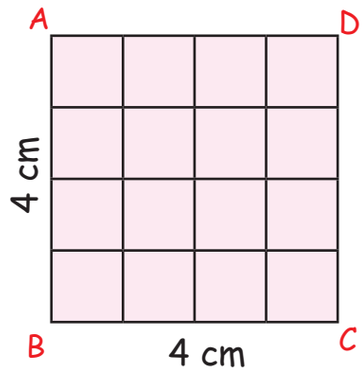
Therefore, the area of rectangle ABCD = $6 \times 2 = 12$ sq.cm

Therefore, the area of the rectangle = length x breadth

Formula for the area of a square:



In the square ABCD given above, 1 cm divisions were marked on each side.



The points on opposite sides were joined as shown in the figure above. In the square ABCD we have created 4 rows of 4 squares each. The length of the sides of each square thus created is 1 cm.

Therefore, the area of each square is 1 sq.cm, which is the unit square.

Look at the square given above. The side of the square is 4 cm and we have 16 squares of 1cm each within this square.

The number of unit squares formed are the same as the product of two sides of the square.

Since the length of each side of the square is 4 cm the area of the square = 4 x 4 = 16 sq.cm.

Therefore, the area of a square = length of a side x length of a side

It is not necessary to divide a square or rectangle into small squares every time when you calculate their area. The advantage of a formula is that you can calculate the area simply by substituting the appropriate values.

Example 1.5

What is the area of a rectangle of length 10 cm and breadth 8 cm?

Solution

Area of a rectangle = length x breadth

= 10 x 8

= 80

Therefore, the area of the rectangle is 80 sq.cm.

Example 1.6

A wall that is 6 m long and 2 m wide has to be painted. If the labour charges are ₹20 per sq.m, then what is the cost of labour for painting the wall?

Solution

First let us calculate the area of the wall to be painted

Area of the wall = length of the wall x breadth of the wall

= 6 x 2 = 12

Thus, the area of the wall is 12 sq.m.

Labour cost of 1 sq.m is ₹20.

So, the labour cost for 12 sq.m. = 12 x 20 = ₹240.

Therefore, the cost of labour for painting the wall is ₹240.

Example 1.7

What is the area of a square with side 12 cm?

Solution

Area of a square = length of a side x length of a side

= 12 x 12 = 144

Therefore, the area of the square is 144 sq.cm.

Example 1.8

One side of a square room is 3 m. If the cost of labour for laying 1 sq.m of the floor is ₹25, then what is the total cost of labour?

Solution

First we must find the area of the square room

Area of the square room = length of a side x length of a side

= 3 x 3 = 9

Therefore, the area of the square room is 9 sq. m.

The labour cost of laying 1 sq.m of flooring is ₹25.

Therefore, the cost of laying 9 sq.m of flooring is 25 x 9 = ₹225.

Exercise 1.2

1. The length of the side of each square is given below. Find its area.
   (i) 10 metres (ii) 5 cm (iii) 15 metres (iv) 16 cm

2. Find the area of the following rectangles.
   (i) length = 6 cm and breadth = 3 cm
   (ii) length = 7 m and breadth = 4 m
   (iii) length = 8 cm and breadth = 5 cm
   (iv) length = 9 m and breadth = 6 m

V6Z1R7

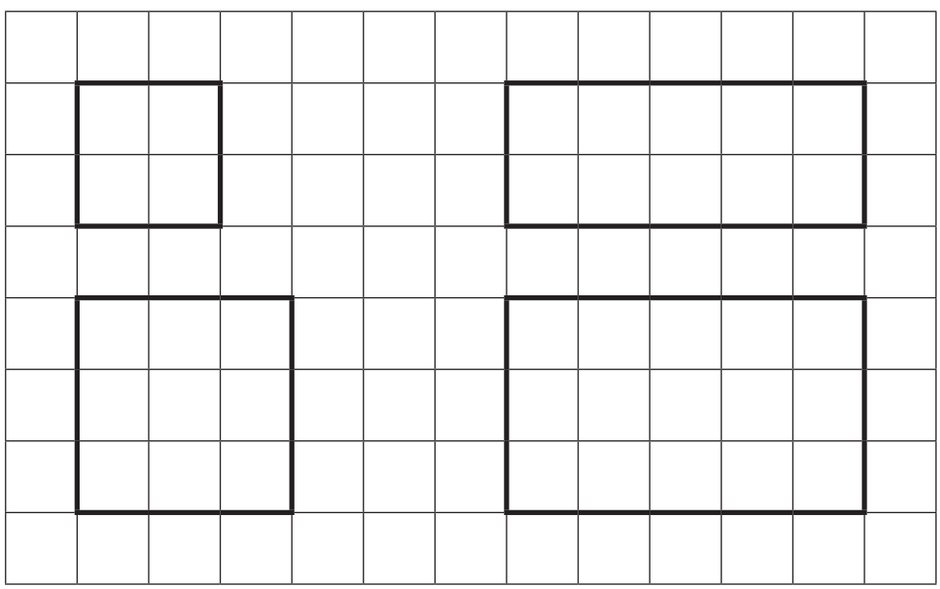
3. If the cost of 1 sq.m of a plot is ₹800, then find the total cost of the plot that is 15 m long and 10 m breadth.

4. The side of a square is 6 cm. The length of a rectangle is 10 cm and its breadth is 4 cm. Find the perimeter and area of both the square and rectangle.

5. What will be the labour cost of laying the floor of an assembly hall which is 14 m long and 10 m breadth if the cost of laying is ₹60 per sq.m?

Activity 2

Using the grid sheet find the area and perimeter of the rectangles and squares. Each square is 1 sq. cm.



2.1 Estimation

Situation 1

There are two bunches of grapes find the number of grapes in bunch 'A' and bunch 'B' without counting it.

B2R3M2

A

B

Number of grapes in bunch 'A' ----------

Number of grapes in bunch 'B' ----------

Then count the exact number of grapes and note it.

Exact number of grapes in bunch 'A' ----------

Exact number of grapes in bunch 'B' ----------

Situation 2

The estimated bus fare for a trip from trichy to Chennai is ₹ 300

The Exact bus fare is ₹ 286.

Therefore, the value which is nearest to the correct value is called its estimated value.

The symbol for estimate is ≈

Let us Know

Other words denoting estimates are 'About', 'Approximate', 'nearby', …….

Activity 1

Fill and enjoy (individual)

	Estimated value	Exact value
Number of bananas in a bunch		
Number of Tamarind seeds in your hand		
Number of leaves in small neem stick		
Your weight		
Your teacher's height		

Able to estimate a number upto two digit

Estimating a number to our desired number is called estimation.

To estimate a number, first underline the digit that is to be estimated. If the underlined digit is less than 5 then the number should be rounded down to the nearest underlined digit.

For example, when we estimate 64 to its nearest Tens place the number have to be rounded down to 60.

If the underlined digit is greater than or equal to 5, then the number should be rounded upto the nearest underlined digit.

For example, when we estimate 65 to its nearest Tens place the number have to be rounded upto 70.

Example 2.1

Estimate 48 to its nearest Tens place.

Solution

Estimating 4$\underline{8}$ to its nearest Tens place, we get 50.

Since the unit place is 8, which is greater than 5, the number have to be rounded upto 50.

Therefore, 48 $\simeq$ 50.

Example 2.2

Estimate 74 to its nearest Tens place.

Solution

Estimating 7$\underline{4}$ to its nearest Tens place, we get 70.

Since the unit place is 4, which is less than 5, the number have to be rounded down to 70.

Therefore, 74 $\simeq$ 70.

Example 2.3

Estimate 144 to its nearest Tens place.

Solution

Estimating 14$\underline{4}$ to its nearest Tens place, we get 140.

Since the unit place is 4, which is less than 5, the number have to be rounded down to 140.

Therefore, 144 $\simeq$ 140.

Example 2.4

Estimate 155 to its nearest Tens place.

Solution

Estimating 155 to its nearest Tens place, we get 160.

Since the unit place is 5, which is equal to 5, the number have to be rounded upto 160.

Therefore, 155 ≃ 160.

Able to estimate sums, differences products and quotients up to two digit numbers.

Example 2.5

If the cost of 1 kg apple is ₹ 95 and the cost of 1 kg Guava is ₹ 48 then estimate their cost nearest to Tens place and find their sum. Also, find the difference between the estimated sum and actual sum.

Solution

		Actual value	Estimated value
The cost of 1kg apple	=	₹ 95	₹ 100
The cost of 1kg Guava	=	₹ 48	₹ 50
Sum	=	₹ 143	₹ 150

Difference between estimated value and actual value = Estimated value - Actual value

= 150 - 143

= ₹ 7

Example 2.6

If the cost of a note book is ₹ 42 and the cost of a pen is ₹ 27, then estimate their cost nearest to Tens place and find their difference. Also, find the difference between the estimated value and actual value.

Solution

		Actual amount	Estimated amount
The cost of a note book	=	₹ 42	₹ 40
The cost of a pan	=	₹ 27	₹ 30
Difference	=	₹ 15	₹ 10

Difference between actual value and estimated value = Actual value - Estimated value

= 15 - 10

= ₹ 5

Try this

Write down the estimated value of numbers and find their sum. Also, find the difference of their sum.

Numbers	Estimated sum	Actual sum	Difference
68, 31	70 + 30 = 100	68 + 31 = 99	1
33, 42			
46, 52			
29, 35			

Example 2.7

If the cost of 1 metre cloth is ₹ 86, then estimate its cost nearest to Tens place and find the cost of 5 metre cloth.

Solution

		Actual cost	Estimated cost
The cost of 1 metre cloth	=	₹ 86	₹ 90
The cost of 5 metre cloth	=	86 x 5	90 x 5
	=	₹ 430	₹ 450

Therefore, the cost of 5 metre cloth is ₹ 450

Example 2.8

If the cost of 3 kg potato is ₹ 63, then estimate its cost nearest to Tens place and find the cost of 1 kg potato.

Solution

		Actual cost	Estimated cost
The cost of 3 kg potato	=	₹ 63	₹ 60
The cost of 1 kg potato	=	63÷3	60÷3
	=	₹ 21	₹ 20

Therefore, the cost of 1 kg potato is ₹ 20

Try this

Write down the estimated value of numbers and divide. Then find the difference between estimated value and actual value.

Numbers	Estimated sum	Actual sum	Difference
42, 14	40 ÷ 10 = 4	42 ÷ 14 = 3	1
81, 9			
63, 21			
36, 9			

Exercise 2.1

1 Fill in the blanks

(i) Estimation of 27 to its nearest Tens place is ----------

(ii) Estimation of 65 to its nearest Tens place is ----------

(iii) The cost of 1kg pomegranate is ₹ 93. Then the estimated cost is ----------

(iv) Estimation of 76 bananas to its nearest Tens place is ---------

A7Y9L2

2. There are 27 girls and 38 boys in a class. Find the sum and estimate the sum to its nearest Tens place.

3. If the cost of a geometry box is ₹ 53 and the cost of a note book is ₹ 36, then estimate their cost to its nearest Tens place and find the sum. Also, find the difference between the estimated value and the actual value.

4. If Kavitha has 93 pictures and she gave 42 pictures to her friend Neela, then estimate the picutres to its nearest Tens place and find their difference. Also, find the difference between actual value and the estimated value.

5. The cost of a pen is ₹ 32. Find the cost of 6 pens and estimate it to its nearest Tens place.

6. Arun has ₹ 47, Raja has ₹ 54. Find the sum and estimate it to its nearest Hundreds place.

7. There are 21 chocolate bars in a packet. Find the number of chocolate bars in 9 such packets and estimate it to its nearest Hundreds place.

8. 132 peanut candies are shared equally with 12 students. Find the share for one student and estimate it to its nearest Tens place.

2.2 Systematic Ordering

Logically find out something based on the condition.

Z8E2P1

LOGICALLY TRY AND SOLVE THE PROBLEM

Know the sequence of numbers

Sequence of natural numbers	1, 2, 3, 4, 5…….
Sequence of odd numbers	1, 3, 5, 7, 9……..
Sequence of even numbers	2, 4, 6, 8, ……
Sequence of square numbers	1, 4, 9, 16, 25 ……

Sequence of prime numbers	2, 3, 5, 7, 11 .....
Multiples (Multiples in 2)	2, 4, 6, 8, 10 .....
Multiples is 4	4, 8, 12,16.....
Add the same number and set a successive Numbers	1, 4, 7, 10.....
Subtract the same number and set a successive Numbers	37, 32, 27, 22.....
Multiple the same number and set a successive Numbers	1, 3, 9, 27.....
Divide the same number and set a successive Numbers	64, 32, 16.....

LET'S GIVE NUMBERS TO THE ENGLISH ALPHABLET.

A	B	C	D	E	F	G	H	I	J	K	L	M
1	2	3	4	5	6	7	8	9	10	11	12	13

N	O	P	Q	R	S	T	U	V	W	X	Y	Z
14	15	16	17	18	19	20	21	22	23	24	25	26

Example 2.9

(i) If CAT is 24 [3 + 1 +20],

Then BAT is 23 [2 + 1 +20]

(ii) If BOY is 21525 [2 15 25],

Then GIRL is 791812 [7 9 18 12]

(iii) If PEN is 35 [16 + 5 + 14]

Then PENCIL is 59 [16 + 5 + 14 + 3 + 9 + 12]

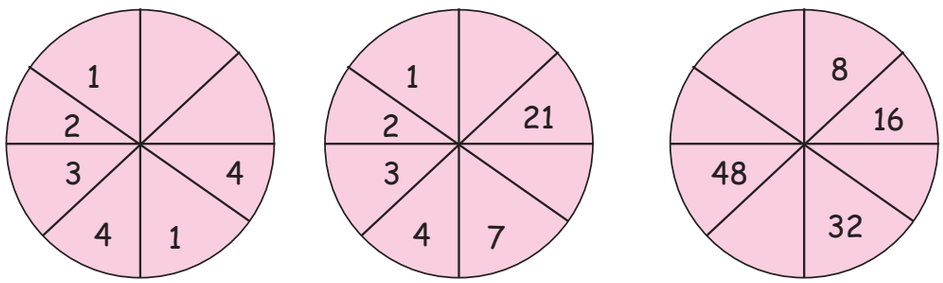
Activity 2

A. Colour the number's row with the help of the following tips.

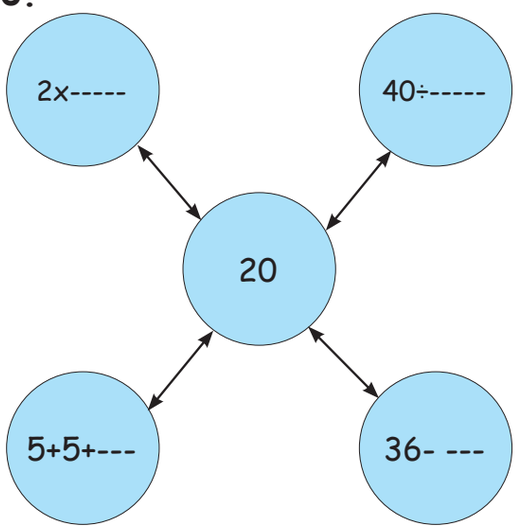
2	23	5	37	61	13	17	29	97
1	16	4	25	9	36	49	64	81
1	3	5	7	9	11	13	15	17
2	4	6	8	10	12	14	16	18
6	12	18	24	30	36	42	48	54
8	16	24	32	40	48	56	64	72

1. **Orange** colour to the prime number row.
2. Don't colour the odd number row.
3. **Blue** colour to multiples of 6 row.
4. **Orange** colour to the square number row.
5. Don't colour the even number row.
6. **Blue** colour the multiples of 8 row.

B. Let us fill the number wheel



C. Complete the circle using the given four basic operators to get the number 20.



D. Fill in the blanks:

1. 5, 10, 15, ------, 25
2. 30, 24, -----, 12, 6
3. 7, 9, 11, -----, ------, 17
4. 1, 4, 9, ------, 25
5. 1, 4, 7, ------, 13, -----, 19

E. Answer the following

1. If BOOK is 43,
   Then PEN is ----------
2. If SCHOOL is 1938151512,
   Then CLASS is ----------
3. If BAG is 10,
   Then BOOK is ----------
4. If LION is 50,
   Then TIGER is ----------
5. If HEN is 8514,
   Then COCK is ----------

To know the volume of a solid body by informal measurement

Situation 1

Venba's uncle gave her a sweet box. The sweet box contains 10 pieces of soan papdi. Now, we can tell that the capacity of the sweet box is 10 soan papdi. So, we can tell that the volume of that sweet box is the space occupied by 10 pieces of soan papdi.

G5H1T2

Situation 2

Kuralini arranged her books in her school bag. She kept five books in her bag. Hence, we can say that the capacity of the bag is 5 books.

Here, 5 books occupy the space in one bag.

The volume of 5 books is one bag.

The volume of 1 book is $\frac{1}{5}^{th}$ of a school bag.

Capacity of a container is the atmost quantity of an item the container can hold.

Volume of a solid is the space occupied by the solid.

Exercise 3.1

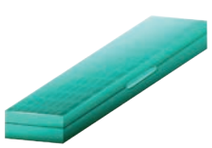
1 Tick the object which has more volume







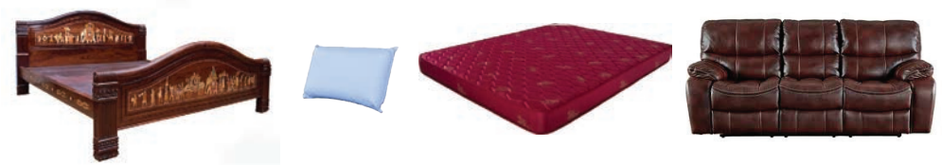


2 Arrange the given objects according to their volume

(i) 

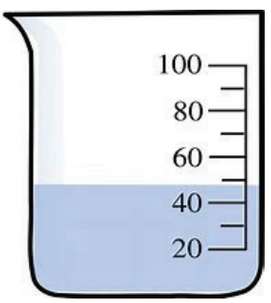
(ii) 

(iii) 

Activity 1

Measure the height of the water level by put the object into the beaker.

Mark millimeter and centimeter with a scale in a glass. Then fill the water at zero level.



Put a marble into the glass and note the height of the water level.

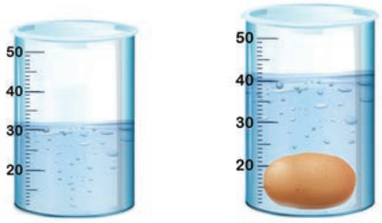
Similarly, put the items given in the table into the glass and note the height of the water level.

Name of the objects	Water level (mm)
Marble	
Eraser	
Coin	
Stone	
Potato	
Tomato	

Activity 2

- Take some water in a beaker and mark its level.
- Take a solid, that is, potato and immerse it in the beaker containing water.

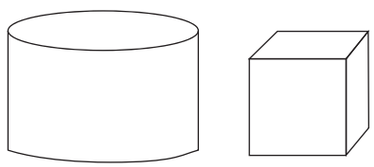
What do you observe?



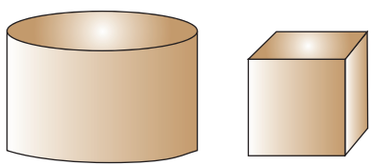
E9R1F5

Activity 3

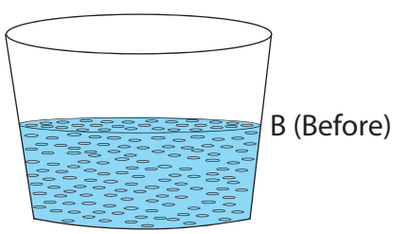
1. Take 2 sheets of same size (may be an old rough paper).
2. Using scissor and glue make a cylindrical and a cubical box.



3. Fill both with sand and cover all the ends.



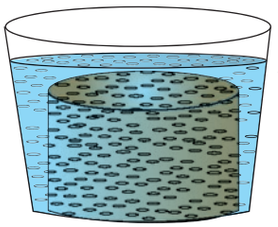
4. Take a bucket. Partially, fill the bucket/tub with water. Mark the water line.



Before immersion

5. Now, if we dip the sand-filled cubical box inside the bucket/tub, will there be any change in the water level? If so, will it increase or decrease?

6. Now, dip the sand-filled cubical box inside the bucket/tub. Mark the water level as "A" (after).



A (After)

Let the children observe the rise in the water level. Ask them the following:

- What do you observe? Is there any changes in the water level?
- What could be the reason for change in the level?
- Could you find the space occupied by the cylindrical box?

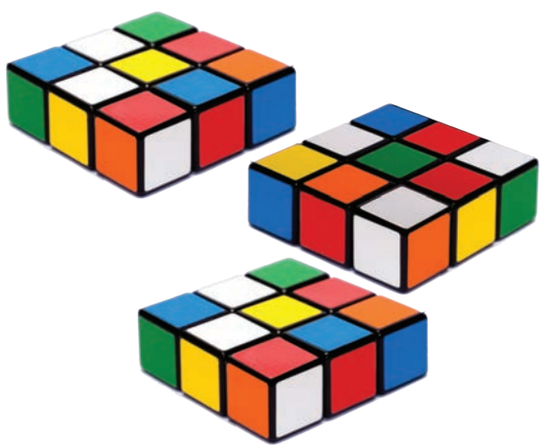
Finding volume using unit cubes.

We shall measure the volume of solid objects using unit cubes. Unit cubes are cubes with dimension of length = 1 unit, breadth = 1 unit and height = 1 unit. The units may be Centimetre or Metre.

Rubik's cube:

1 Cube = 3 x 3 x 3 = 27 Units.

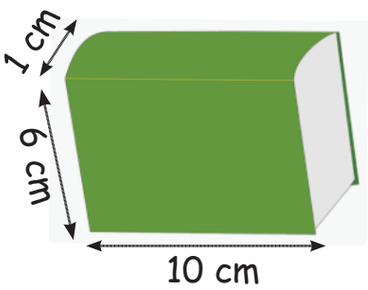
The cube can be filled by 3 layers of 3 rows and 3 columns of unit cube, that is, the volume of cube is 3 x 3 x 3 = 27 Units.



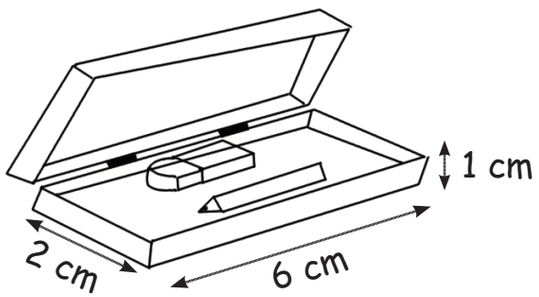
Activity 4

We shall follow the method of unit cubes to calculate or find the volume of the objects given below. The dimensions of the objects are mentioned.

Book



Pencil box



_____ _____

Exercise 3.2

1. Volume of regular solids such as cube and cuboid can be found by multiplying the dimensions. Complete the given table by finding the volume of the given objects.

S.No.	Objects	l	b	h	Volume (cubic cm)
1.	Note books	6 cm	15 cm	1 cm	
2.	Name board	20 cm	90 cm	2 cm	
3.	Show case cub board	70 cm	250 cm	70cm	
4.	Gift box	10 cm	10 cm	10 cm	
5.	Dice	1 cm	1 cm	1 cm	

2 Complete the given table by finding the volume of the given objects.

S.No.	Objects	l	b	h	Volume (cubic units)
1.	Brick	6 cm	8 cm	10 cm	—
2.	Windowpane	3 cm	—	45 cm	900 cubic cm
3.	Sunshade	70 cm	20 cm	—	4200 cubic cm
4.	Steps	80 cm	—	20 cm	32000 cubic cm
5.	Room	—	4 m	3 m	36 cubic m

3 Find the number of bricks of dimension 20 cm x 5 cm x 10cm required to construct a wall of dimension 300 cm x 200 cm x 20 cm.

F3W8I8

4 How many sack of dimension 15 cm x 45 cm x 90 cm filled with rice can be kept in a room of dimension 3 m x 18 m x 9 m.

Situation

Mala: Sir, my brother said he was studying algebra. What is algebra?

Sir: To put it simply, algebra consists of the use of numbers and letters to state and solve problems.

Arun: Does that mean addition and subtraction of letters? How do we do that?

Sir: To prepare for that, let's first learn a few things using numbers.

Equality

Whenever we add, subtract, multiply or divide two numbers, the answer we get is always another number. For example when we add 4 and 2, we get the number 6. We write this as 4 + 2 = 6. Similarly, 10 - 4 =6 , 12 ÷ 2 = 6, 6 x 1 = 6.

Now, let us think about this in another way.

Suppose that, by performing a mathematical operation on two numbers, we have obtained the number 10. Let us find pairs of such numbers.

They could be (5 + 5), (17 - 7), (5 x 2), (20 ÷ 2) etc.

When we want to say a number obtained by adding 5 and 5, it is easier to express it by using brackets like this: (5 + 5).

(17 - 7) means a number obtained by subtracting 7 from 17.

(5 x 2) means a number obtained by multiplying 5 by 2.

(20 ÷ 2) means a number obtained by dividing 20 by 2.

Arrangement of numbers like (5 + 5), (17 - 7), (5 x 2) and (20 ÷ 2) are called expressions. The value of each of these expressions is 10, which means all these expressions are equal to each other.

Hence, we can also write this as,

(5 + 5) = (17 - 7) = (5 x 2) = (20 ÷ 2)

An expression such as (5 + 5) = (17 - 7) or (5 + 5) = (20 ÷ 2) is called an 'equality'.

5 + 2 = 7, 8 x 1 = 8 are also equalities.

Exercise 4.1

1. Using brackets, write three pairs of numbers whose sum is 12. Use them to write three equalities.
2. Find four pairs of numbers, one for each of addition, subtraction, multiplication and division that make the number 16. Write the equalities for each of them.

Inequality

The value of the expressions (6 + 3) and (6 x 3) are 9 and 18 respectively. It means the above two expressions are not equal.

We can consider another example. Take two numbers 4 and 5. We know that 4 is not equal to 5. But, still we can relate those two numbers by a relationship.

If two expressions or numbers are not equal, one of them is greater or smaller than the other. To show 'greater than' and 'lesser than', we use the symbols '>' and '<' respectively.

This kind of representation is called an 'inequality'.

Let us consider another example, the value of (9 - 5) is 4 and the value of (25 ÷ 5) is 5 and we know that 4 < 5. So, the relation between the expressions (9 - 5) and (25 ÷ 5) can be shown as (9 - 5) < (25 ÷ 5).

Note: In your higher class you will learn about two more inequalities, that is '≥' and '≤'. These, two symbols can be read as, greater than or equal to (≥) and lesser than or equal to (≤).

Example 4.2

Fill in the boxes between the expressions with <, = or > as required in the following.

(i) (7 + 8) ☐ (20 ÷ 2)

Solution

First, we have to add 7 and 8

7+8 = 15,

Now, we divide 20 by 2, we get

20 ÷ 2 = 10

Therefore, (7 + 8) ☐ (20 ÷ 2)

15 ☐ 10

Hence, (7 + 8) ☐ (20 ÷ 2).

(ii) (12x3) ☐ (9x4)

Solution

First, we have to multiple 12 by 3

12 x 3 = 36

Now, multiplying 9 by 4, we get,

9 x 4 = 36,

Since, (12 x 3) and (9 x 4) is equal, we have,

(12 x 3) ☐ (9 x 4).

(iii) (15-5) ☐ (8x3)

Solution

First, we have to subtract 5 from 15.

15 - 5 = 10

Now, multiplying 8 by 3, we get,

8 x 3 = 24

Since, (15 - 5 = 10) is less than (8 x 3 = 21), we have,

(15 - 5) ☐ (8 x 3).

Example 4.2

Write a number in the box that will make this statements correct.

(i) $(6 \times 4) = (\square - 6)$

Solution

The value of the expression 6x4 is 24. So, the number in the box has to be one that gives 24 when 6 is subtracted from it. Subtracting 6 from 30 gives 24.

Therefore, $(6 \times 4) = (\boxed{30} - 6)$

(ii) $(35 \div 5) < (2 + \square)$

Solution

The value of the expression $35 \div 5$ is 7. So, the number in the box has to be such that when it is added to 2, the sum is greater than 7.

Therefore, $(35 \div 5) < (2 + \boxed{6})$

Instead of 6, the solution for this condition can be 7, 8,....

Exercise 4.2

1 Say whether true or false.

(i) $(23 + 4) = (4 + 23)$ (ii) $(9 + 4) > 12$

(iii) $(9 + 4) < 12$ (iv) $121 > 121$

(v) $142 < 142$ (vi) $112 = 112$

(vii) $(6 \times 5) = (32 - 2)$ (viii) $\frac{49}{7} > 7$

(ix) $(4 \times 3) = (3 \times 4)$ (x) $(21 + 0) = 21$

2 Fill in the blanks with the right symbol (<, > or =).

(i) $(54 \div 9) \square (8 - 3)$

(ii) $(6 + 2) \square (4 \times 2)$

(iii) $(10 \times 2) \square (15 + 20)$

J4M8Z1

3 Fill in the blanks in the expressions with the suitable number.

(i) (1 x 9) = (☐ x 1) (ii) (6 x 3) > (8 x ☐)

(iii) (36 ÷ 6) < (☐ x 7) (iv) (0 + 2) > (7 x ☐)

(v) (42 ÷ 7) = (4 + ☐) (vi) (6 - ☐) < (1 + 2)

Using letters

Symbols are frequently used in mathematical writing. The use of symbols makes the writing very short. For example, using symbols, division of 63 by 9 gives us '7' can be written in short as "63 ÷ 9 = 7". It is also easier to grasp.

Letters can be used like symbols to make our writing short and simple

While adding, subtracting or carrying out other operations on numbers, you must have discovered many properties of the operations.

For example, what properties do you see in sums like (7 + 3), (3 + 7)?

The sum of any two numbers and the sum obtained by reversing the order of the two numbers and the sum obtained by reversing the order of the two numbers is the same.

Now see how much easier and faster it is to write this property using letters.

Let us use a and b to represent any two numbers. Their sum will be 'a + b'

Changing the order of those numbers will make the addition as 'b + a'. Therefore, the rule will be, for all values of 'a' and 'b'

(a + b) = (b + a).

Let us see two more examples

- Multiplying any number by 1 gives the number itself. It the number is replaced by an alphabet 'a', then the above statement can be represented as a x 1 = a.
- Given two unequal numbers, the division of the first by the second is not the same as the division of the second by the first.

In short, if a and b are two different numbers, then
(a ÷ b) is not equal to (b ÷ a)

Take the valve of 'a' as 6 and the value 'b' as 2 and verify the above property by yourself.

Activity

Use a letter for "any number" and write the following properties in short.

(i) The sum of a number and zero is the number itself

(ii) The product of any two numbers and the product obtained after changing the order of those numbers is the same.

(iii) The product of a number and zero is zero

(iv) Write the following properties in words

(i) n-0=n

(ii) m÷1=m

Recall:

We have already learnt about the conversion of money in the interconcept chapter in the previous term. Let us try to fill in the following.

Try this

₹1 = 100 Paise

₹5 = _____ Paise

775 Paise = ₹7.75

425 Paise = ₹_____

Addition and Subtraction using money

B9Y7B9

Situation 1

Sarathi and Meenu went to a temple car festival (Thaer thiruvizha) with their parents. In the festival, Sarathi bought a watch for ₹70,

Meenu bought bangles and earrings for ₹90 and their mother bought a chain for ₹160. The shopkeeper asked them to pay money for what they bought. Meenu didn't know how much money she had to pay. So, she asked her mother. Her mother told her to add the cost of the items purchased. She added as follows.

Cost of the watch = ₹70

Cost of bangles and earrings = ₹90

Cost of the chain = ₹160

Total cost = 70 + 90 + 160 = ₹320.

So Meenu had to pay ₹320 to the shopkeeper.

Situation 2

Vasu had a stationery shop. He wanted to check the stock of pen. Vasu didn't know how to find out the remaining items. For that he asked his friend. His friend helped him to form a table. The table is given below.

S.No	Name of the item	Cost of available item	Cost of sold out item	Cost of remaining item
1.	Pen	₹ 3750	₹ 1680	₹ 2070

To get the cost of remaining item, we have to subtract the cost of sold out items from the cost of available items.

That is, cost of remaining items = cost of available item – cost of sold out items

= ₹ 3750 – ₹ 1680

= ₹ 2070

Example 5.1

Arun bought a T.V, a Washing Machine and a bike at the cost of ₹ 12,500, ₹ 14,999 and ₹ 75,000 respectively. Find the total amount spent by Arun.

Solution

Cost of a T.V	= ₹. 12,500	
Cost of a Washing machine	= ₹. 14,999	(+)
Cost of a Bike	= ₹. 75,000	(+)
Total amount	= ₹. 1,02,499	

Example 5.2

Find the total amount by adding the amounts ₹7678.75, ₹50875.50, ₹4071.50 and ₹675.75

Solution

Rupees	Paise
7678	75
50875	50
4071	50
675	75
63301	50

Add the paise 75+50+50+75 and covert into rupees.

75 + 50 + 50 + 75 = 250 paise

100 paise = 1 rupees

250 paise = $\frac{250}{100}$ = 2.50 rupees

Therefore, the total amount = ₹7678.75 + ₹50875.50 + ₹407.50 + 675.75

= ₹63,301.50

Example 5.3

A colony of people had arranged for a tour for three days. They allotted an amount of rupees ₹18,540 for the same. They spent ₹6235 on the first day. How much money was left for the next two days?

Solution

Amount allotted for three days	= ₹ 18,540
Amount spent on the first day	= ₹ 6,235
Remaining amount	= ₹ 12,305

Therefore, remaining amount for the next two days is ₹12,305.

Example 5.4

Geetha wants to buy a table for her family. She has paid an amount of ₹4,529.50 to the Shop Keeper. He has given ₹439.75 as balance to her. What is the cost of the table?

Solution

Amount paid by Geetha	= ₹	4,529.50
Balance amount given by the		(–)
Shop Keeper	= ₹	439.75
Cost of the table	= ₹	4,089.75

When we subtract 75 pasie from 50 paise convert ₹1 into paisa and add with 50 paise and then subtract.

₹ 1 = 100 paise

100 + 50 = 150 paise

150 – 75 = 75 paise

Activity

Match the big bag with small bags

Big Bag		Small Bags				
 ₹50	. . . . .	₹575	–	₹38	–	₹20
 ₹73	. . . . .	₹489	+	₹258	+	₹49
 ₹517	. . . . .	₹123	–	₹33	–	₹17
 ₹796	. . . . .	₹32	+	₹16	+	₹2

Exercise 5.1

1 **Fill in the blanks**

(i) ₹35.50 + ₹ 4.50 = _____

(ii) ₹7500 + ₹3000 = _____

(iii) ₹1000 – ₹230 = _____

(iv) ₹75.50 – ₹30.25 = _____

2 **Match the following**

(i)	₹950.50 + ₹350	-	(a) ₹399.50
(ii)	₹8000 – ₹3500	-	(b) ₹91.25
(iii)	₹50.75 + ₹40.50	-	(c) ₹1300.50
(iv)	₹750 – ₹350.50	-	(d) ₹4500

3 **Add the following**

(i) ₹8987.75 + ₹9565.50 + ₹7693.50

(ii) ₹29763.50 + ₹95675.50 + ₹4973.50

(iii) ₹9978.75 + ₹7695.50 + ₹635.00

4 **Subtract the following**

(i) ₹1985 – ₹798.25

(ii) ₹688 – ₹215

(iii) ₹49689 – ₹33462.50

5 Arun purchased gold coins in different weights in a Jewellery shop. The price of the gold coins were ₹18965.75, ₹26998.00 and ₹3589.50 respectively. Find the total price of the gold coins.

6 In a textiles shop, father, mother, son and daughter were purchasing clothes. The price of each of their clothes were ₹8950, ₹14875, ₹7895 and ₹9780 respectively. Find the total cost of their clothes.

7. A farmer wanted to buy a tractor. The price of the tractor was ₹6,72,598, but he had only ₹2,86,760. How much more amount was required to buy the tractor?

8. A man had ₹17,246 in his savings account. If he had taken ₹8,891 to pay for house rent, then how much amount was left in his savings account?

Multiplication and Division in Money

Situation 1

A book company announced a discount on dictionaries to school students. After discount, the cost of a dictionary was ₹425 and 25 students wanted to buy it. How much money in total was required for them to buy? For this, we have to multiply the number of students with the cost of a dictionary.

The cost of each dictionary = ₹425

Therefore, the total cost of 25 dictionaries = 25 X ₹425

= ₹10,625

Situation 2

8 students of a school participated in an International Competition and won a cash award of ₹5,000. They wanted to share the amount among themselves. How much share would each one get?

I8A4N5

For this, we have to divide the total amount by the number of students.

₹5,000 ÷ 8 = ₹625

Therefore, each one's share is ₹625.

Example 5.5

The cost of a chair is ₹520. What will be the cost of 9 chairs?

Solution

Cost of one chair = ₹520

Cost of 9 chairs = ₹520 × 9

= ₹4680

Example 5.6

Rani buys a saree which costs ₹675.50. She wants to buy 12 such sarees. What will be the cost of 12 sarees?

Solution

Cost of one saree = ₹675.50

Cost of 12 sarees = ₹675.50 × 12

= ₹8106

(i) Multiply the paise

50 × 12 = 600 paise

Convert the paise into rupees 600 paise } = ₹6

(ii) Multiply the rupees

625 × 12 = 8100

Now, add (i) and (ii) to get

= 8100+6

= 8106

Example 5.7

Find the answer for ₹65,295 ÷ 9

Solution

$$
\begin{array}{r}
7255 \\
9\overline{)65295} \\
63 \\
\hline
22 \\
18 \\
\hline
49 \\
45 \\
\hline
45 \\
45 \\
\hline
0
\end{array}
$$

Therefore, ₹65295 ÷ 9 = ₹7,255

Example 5.8

The total cost of 7 pens is 105. Find the cost of one pe

Solution

Total cost of 7 pens is = ₹105

Therefore, cost of one Pen = ₹105 ÷ 7

= ₹15

Therefore, the cost of one pen is ₹15.

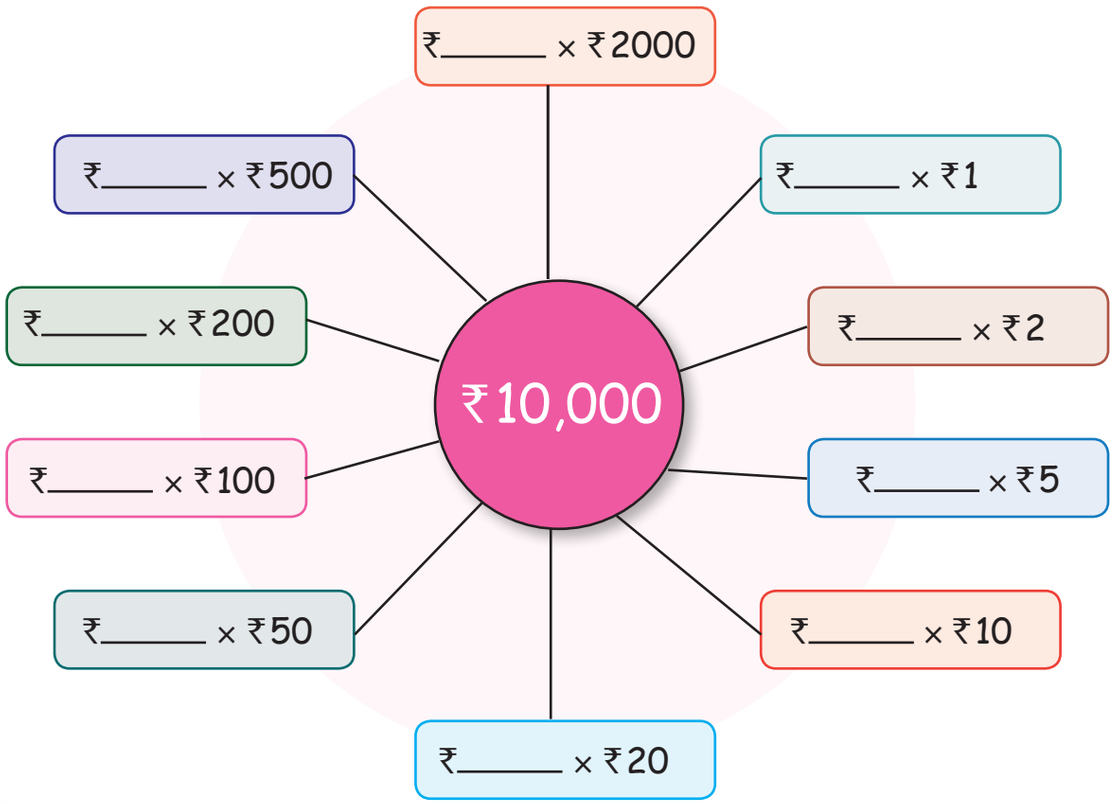
$$
\begin{array}{r}
15 \\
7\overline{)105} \\
7 \\
\hline
35 \\
35 \\
\hline
0
\end{array}
$$

Let's think

Divide 1000 paise equally for 5 students. How many rupees does each student get?

Activity

Find out how many denominations of ₹1, ₹2, ₹5, ₹10, ₹20, ₹50, ₹100, ₹200, ₹500 and ₹2,000 are there in ₹10,000?



Exercise 5.2

1 **Fill in the blanks**

(i) ₹75 × 5 = _____

(ii) ₹200.25 ÷ 25 = _____

(iii) ₹3500 ÷ 500 = _____

(iv) ₹15.50 × 100 = _____

P2X6C1

2 **Answer the following**

(i) ₹98725 × 5

(ii) ₹679.68 × 7

(iii) ₹362.37 × 12

(iv) ₹324.52 ÷ 28

(v) ₹7980 ÷ 8

(vi) ₹397.10 ÷ 11

3. The cost of 1kg of tomato is ₹15. Find the cost of 5 kg of tomatoes?

4. The cost of one egg is ₹4.50. Find the cost of 20 eggs.

5. The school management has decided to give a pen for all children participating in the Children's day celebration. The cost of a pen is ₹18 . How much money do they need to buy pens for 256 children?

6. A fruit seller buys 8 boxes of grapes for ₹2,000. What is the cost of one box?

7. In a sweet stall, the cost of 18 kg of sweets is ₹2,520. What is the cost of 1kg of sweet?

To collect bills for items bought and compare costs of same items

Situation

Raju and Ravi got two bills of the same items from two different shops which are given below.

Shop 1 (Raju's Bill)

S. No	Name of the item	Quantity	Cost of the item (in ₹)	
			Rupees	Paise
1	Pencil	10 Nos.	37	50
2	Eraser	12 Nos.	15	00
3	Pen	11 Nos.	60	50
Total			₹113	00

Shop 2 (Ravi's Bill)

S. No	Name of the item	Quantity	Cost of the item (in ₹)	
			Rupees	Paise
1	Pencil	10 Nos.	40	00
2	Eraser	12 Nos.	12	00
3	Pen	11 Nos.	66	00
Total			₹118	00

They have shown the above bills to the teacher in the class. Teacher asks the students to sit in groups and discuss and compare the cost of items. After a few minutes, the teacher asks the following question regarding bills.

Teacher: In which shop is the cost of an eraser less? By how much?

Student: In shop 2, it is less by ₹ 3.

Teacher: What is the difference in total between shop 1 and shop 2?

Student: ₹ 5.

Teacher: Is the cost of a pencil high or less in shop 1 compared to shop 2?

Student: The cost of a pencil is less in shop 1.

Teacher: What is the cost of a pen in shop 1 and shop 2? Also find the difference between the costs?

Student: The cost of 1 pen in shop 1 is ₹ 5.50 and in shop 2, it is ₹ 6. The difference between the cost is 50 paise.

The teacher concludes that the cost vary from place to place depending on factors like travel, rent, wages for labour and electricity etc., used by the shopkeeper.

Activity

Observe at the vegetables shop nearby your house and find out the cost of items sold over there. Compare it with the cost of vegetables sold at the supermarket nearby to your house.

To find and reason out for being expensive and inexpensive

Situation

Rani bought 1 kg of brinjal from a vegetable vendor nearby her house. Its cost was ₹ 50. Her friend Kala bought the same quantity of brinjal in a wholesale market. Its cost was ₹ 30. What did you understand from the above situation?

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From the above situation, we come to understand that the brinjal bought by Kala is inexpensive, but for Rani, it is expensive.

Activity

Check the cost of items bought from the provision store nearby your house and the cost of the same item in the supermarket. Find out which is expensive and inexpensive.

Use of vocabularies such as expensive, inexpensive costly, cheap, affordable and luxurious

Situation 1

Ravi goes to a provision store to buy provisions for his family. He wants to buy boiled rice. He sees many brands of boiled rice and from that he selected a brand. In that particular brand, there are different types, with a range of costs. It is given below.

Type-1 = ₹42 per kg

Type-2 = ₹48 per kg

Type-3 = ₹52 per kg

Type-4 = ₹56 per kg

He buys Type-1 boiled rice which costs ₹42 per kg. Why does he choose to buy that type and not other types? Though it is affordable for him to buy other types also, he thinks that Type-1 is cheaper for him.

Situation 2

Three families namely A, B and C in a city wanted to buy a car. They had gone to a car showroom. There, they saw cars of minimum price and maximum price and also the imported car.

Family A selected the car of minimum price. Why did family A select the car of minimum price? Though they had money to buy the car of maximum price, they felt that the car of minimum price is inexpensive for them.

Family B selected the car of maximum price. Why did family B select the car of maximum price? Though they had money to buy other cars also, they selected the car of maximum price which is expensive.

Family C selected the imported car because they wanted a luxurious car.

Now, we can see the meaning of following words:

(i) Expensive - Costing much in price.
(ii) Inexpensive - Low cost.
(iii) Costly - High in price.
(iv) Cheap - Low in price.
(v) Affordable - Reasonable price.
(vi) Luxurious - Highly expensive.

Activity

Ask the students to go to the market and find out the selling price of each and every vegetable in various shops over there and make them to prepare a list of their observations. Let them discuss about this in the classroom like which is cheaper, costlier and affordable with their pair groups. The teacher has to instruct the students while discussing.

Activity

Fruit seller-1, uses her bike to sell her fruits for ₹150 and spends ₹170 for petrol. But fruit seller-2 sitting outside of an office and sells her fruits for ₹250.

Make the students to sit in groups to discuss about this situation on which is costlier and which is cheaper?

6.1 Compare fractions

Finds a number corresponding to a part of collection in the form of fractions

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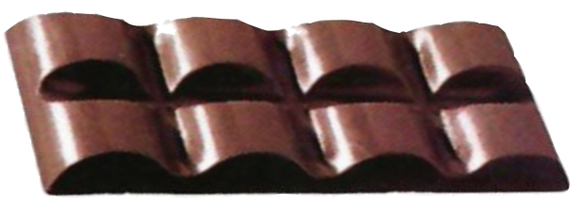
Situation



Radhika bought a chocolate bar, which is divided into 8 pieces. She wants to share it with his brother Tharun. She gave him 2 parts out of 8 parts. But he denied to have that. He needed more. Then she gave him 3 out of 8 parts, which was also refused by him. So she finally decided to give him 4 out of 8 parts. Again, he was not willing to take. He wants more. But she explained him that she had given him equal share only.

Consider the above situation. How will you express 2 out of 8 parts mathematically?

$\frac{2}{8}$ Isn't it?

How will you express 3 out of 8 parts ?

$\frac{3}{8}$ Isn't it?

Here, $\frac{2}{8}$ and $\frac{3}{8}$ are fractions.

Fraction is a part of a whole or collection.

Example 6.1

Given below is a collection of 7 stars, ☆ ☆ ★ ★ ★ ★ ★

How will you represent the shaded and unshaded stars given above as fractions?

Solution

Total stars = 7

Shaded stars = 5

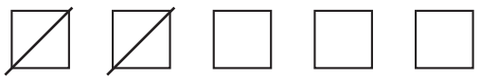
Unshaded stars = 2

Fraction of the shaded stars = $\frac{5}{7}$

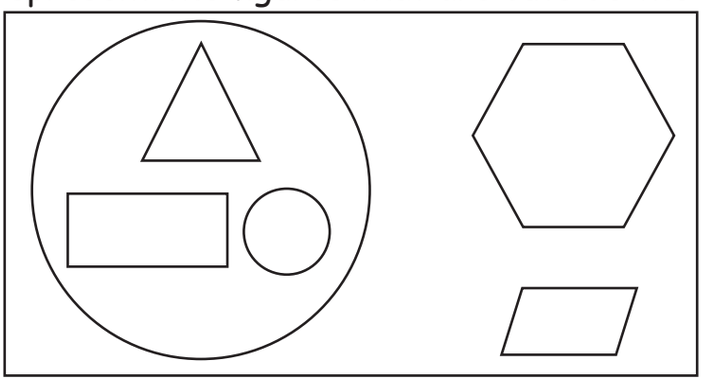
Fraction of the unshaded stars = $\frac{2}{7}$

Try these

i. Represent the crossed out part as a fraction.



ii. Represent the figures that are outside the circle as a fraction.



To identify the terms like numerator and denominator.

Consider the same situation. In $\frac{2}{8}$, the number above the line represents the numerator that is '2' and the number below the line represents the denominator, that is '8'. The small line that is inbetween the top number and bottom number is the division bar.

Try these

i. In $\frac{3}{7}$, ___ is the numerator and ___ is the denominator.

ii. In $\frac{6}{10}$, ___ is the numerator and ___ is the denominator.

To compare different simple fractions

Consider the same situation

In the first sharing

Radhika's share = $\frac{6}{8}$

Tharun's Share = $\frac{2}{8}$.

Who gets more pieces of chocolate?

Radhika will get more pieces of chocolate.

How do you know that?

By comparing the numerator. Denominator is equal here in both the fractions.

Check the Numerator: $2 < 6$ (or) $6 > 2$.

Therefore,

$\frac{2}{8} < \frac{6}{8}$ (or) $\frac{6}{8} > \frac{2}{8}$

Example 6.2

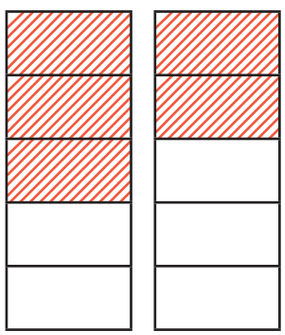
Represent the following figures in fraction, compare them and say which is greater ?

Solution

Fraction represented in fig(i) is $\frac{3}{5}$ and the fraction represented in fig (ii) is $\frac{2}{5}$.

As the denominators in both the fractions are equal, checking the numerator, we get, $3 > 2$. Therefore,

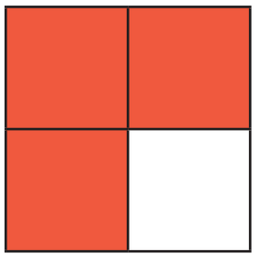
$\frac{3}{5} > \frac{2}{5}$

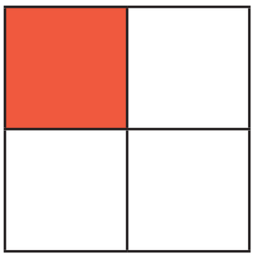


(i) (ii)

Example 6.3

Write the following figures in fractions and say which is smaller?

(i) 

(ii) 

Solution

Fraction represented in fig(i) is $\frac{3}{4}$.

Fraction represented in fig(ii) is $\frac{1}{4}$.

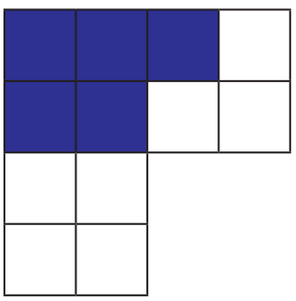
As the denominators in both the fractions are equal, checking the numerator, we get $1 < 3$.

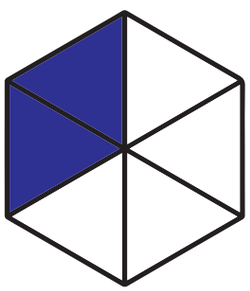
Therefore,

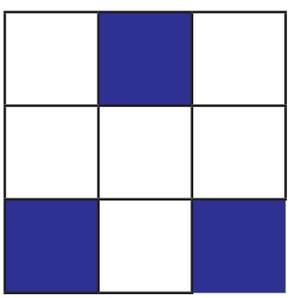
$$\frac{1}{4} < \frac{3}{4}$$

Exercise 6.1

1 Write the fraction shown by the shaded parts.

(i) 

(ii) 

(iii) 

2 Write the fractions for the following and find the numerator and the denominator.

(i) Sheela got 12 marks out of 20 marks in science.

(ii) Six fruits are rotten out of forty fruits in a basket.

(iii) In a colony of 50 houses, 17 houses are not occupied.

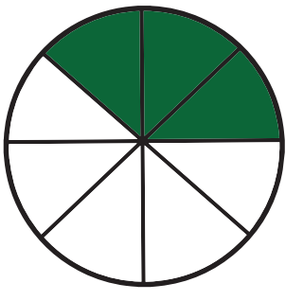
3 Find out which is greater in the following fractions.

(i) $\frac{5}{12}$ and $\frac{7}{12}$ (ii) $\frac{22}{48}$ and $\frac{17}{48}$ (iii) $\frac{11}{56}$ and $\frac{27}{56}$

4 Which is smaller in the following fraction?

(i) $\frac{10}{42}$ and $\frac{21}{42}$ (ii) $\frac{31}{37}$ and $\frac{15}{37}$

Types of fractions:



Represent the following figure in fraction.

It is $\frac{3}{8}$. In this, 3 is the numerator which is smaller than the denominator, that is, $3 < 8$.

This type of fraction is called as proper fraction.

Proper fraction: In a fraction, if the numerator is smaller than the denominator, then it is called as a proper fraction

Examples: $\frac{3}{5}, \frac{4}{15}, \frac{9}{21}$.

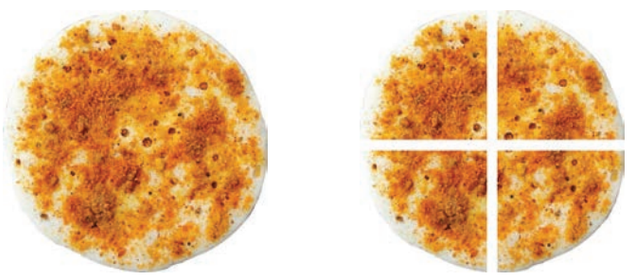
Improper fraction: In a fraction, if the numerator is greater than the denominator, then it is called as an improper fraction.

Examples: $\frac{9}{5}, \frac{11}{3}, \frac{21}{17}$.

Mixed fraction:

Kavitha had five dosas. She wanted to share the dosas among herself and her 3 friends equally. Each one got a dosa. She didn't know how to divide the remaining one dosa equally.

So, she requested her teacher to help. The teacher asked her to divide the remaining 1 dosa into 4 parts, so that each one would get 1 out of 4 parts. Teacher explained her how much did each one of them get out of 5 dosas. That is, each one got 1 and $\frac{1}{4}$ dosas.

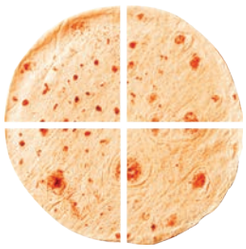


Also, she told her that these type of fractions are called mixed fractions.

A fraction which contains a whole number and a proper fraction is called as a mixed fraction. In the above situation, 1 is the whole number and $\frac{1}{4}$ is the proper fraction.

6.2 Equivalent fractions

If one chappathi is divided equally between two people then, each one will get half a chappathi. The fraction half, is written as $\frac{1}{2}$. Here, 1 is the numerator and 2 is the denominator.



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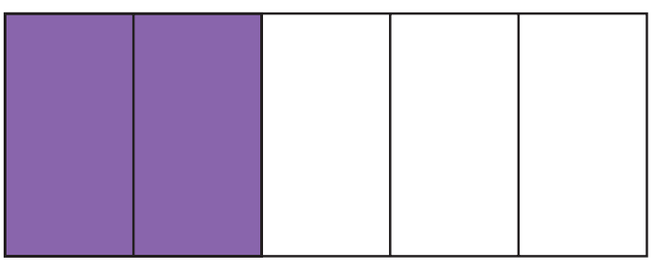
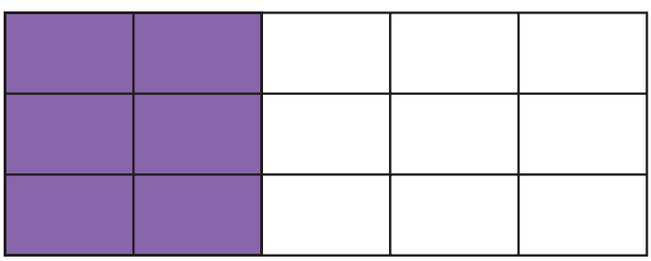
The same chappathi is divided into four equal parts. Two parts were given to each person. This is shown as $\frac{2}{4}$. Here 2 is the numerator and 4 is the denominator.

It means that the value of two fractions is the same. That is, $\frac{1}{2} = \frac{2}{4}$.

Such fractions of equal value are called equivalent fractions.

Obtaining equivalent fractions





Two of the five equal parts in the figure are coloured. The coloured part is $\frac{2}{5}$ of the whole figure.

When two lines are drawn horizontally in the same figure, the figure gets divided into 15 equal parts. So, the fraction that shows the coloured part now has changed. Now, the fraction of the coloured part is $\frac{6}{15}$ but coloured size is the same.

Two figures that have the same size are called equivalent fractions.

Therefore, we see that $\frac{2}{5} = \frac{6}{15}$

When the numerator and denominator of a fraction are multiplied by the same non-zero number, we get a fraction that is equivalent to the given fraction.

Example 6.4

Find a fraction with denominator 20 which is equivalent to $\frac{2}{5}$.

Solution

$\frac{2}{5} = \frac{\square}{20}$. We must find the right number for the box.

Here, 4 times the denominator 5 is 20. So, multiply the numerator also by 4

Therefore,

$$\frac{2}{5} = \frac{2 \times 4}{5 \times 4} = \frac{8}{20}$$

Hence, the fraction $\frac{8}{20}$ is equivalent to $\frac{2}{5}$.

Example 6.5

Find a fraction equivalent to $\frac{8}{20}$ with denominator 5.

Solution

$\frac{8}{20} = \frac{\square}{5}$. We must find the number for the box.

In both the fractions denominator is given, that is 20 and 5.

Here, we get 5 in one of the fractions if we divide 20 (denominator of the other fraction) by 4.

So, we can get the required number (in box), if we divide 8 by 4.

That is $8 \div 4 = 2$.

Therefore $\frac{8}{20} = \frac{8 \div 4}{20 \div 4} = \frac{\boxed{2}}{5}$

Thus, the fraction $\frac{2}{5}$ is equivalent to the fraction $\frac{8}{20}$.

Exercise 6.2

1 Write the suitable number in the box.

(i) $\frac{1}{2} = \frac{\square}{8}$ (ii) $\frac{1}{3} = \frac{7}{\square}$ (iii) $\frac{9}{11} = \frac{18}{\square}$

(iv) $\frac{5}{15} = \frac{\square}{3}$ (v) $\frac{14}{26} = \frac{\square}{13}$ (vi) $\frac{\square}{4} = \frac{8}{16}$

(vii) $\frac{1}{\square} = \frac{7}{28}$ (viii) $\frac{\square}{5} = \frac{15}{25}$

2 Find an equivalent fraction with denominator 18 for each of the following fractions.

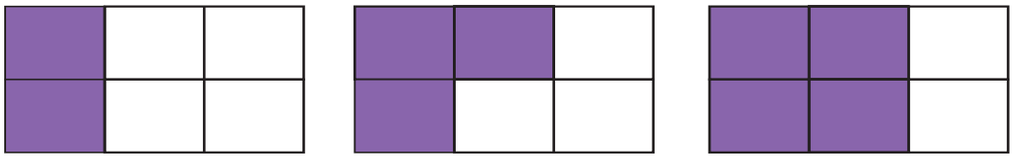
$\frac{1}{2}, \frac{2}{3}, \frac{4}{6}, \frac{2}{9}, \frac{7}{9}, \frac{5}{3}$

3 Find an equivalent fraction with denominator 5 for each of the following fractions.

$\frac{6}{15}, \frac{10}{25}, \frac{12}{30}, \frac{6}{10}, \frac{21}{35}$

Like fractions and unlike fractions

Consider the following figures:



(i) (ii) (iii)

The fraction represented by (i) is $\frac{2}{6}$. The fraction represented by (ii) is $\frac{3}{6}$. The fraction represented by (iii) is $\frac{4}{6}$.

In $\frac{2}{6}$, $\frac{3}{6}$ and $\frac{4}{6}$, the denominators are the same. Such fractions are called as like fractions.

Like fractions

Fractions with same denominators are called **like fractions**.

Examples: $\frac{1}{5}$, $\frac{4}{5}$, $\frac{3}{5}$

Unlike fractions

Fractions with different denominators are called **unlike fractions**.

Examples: $\frac{1}{7}$, $\frac{2}{9}$, $\frac{9}{11}$

Converting unlike fractions into like fractions

To convert unlike fractions into like fractions, we change the denominators of the given fractions into a common denominator. This can be done by finding the common multiples of the denominator.

Example 6.6

Convert $\frac{5}{6}$ and $\frac{7}{9}$ into like fractions.

Solution

Find common multiples for the numbers 6 and 9

Multiples of 6 : 6,12,18,24,30,36,...

Multiples of 9 : 9,18,27,36,45,.....

Here, the number 18 is a multiple of both 6 and 9 and so 18 is the first common denominator of both the fractions.

$\frac{5}{6} = \frac{5 \times 3}{6 \times 3} = \frac{15}{18}$ | $\frac{7}{9} = \frac{7 \times 2}{9 \times 2} = \frac{14}{18}$

Thus, $\frac{15}{18}$ and $\frac{14}{18}$ are like fractions, respectively equivalent to $\frac{5}{6}$ and $\frac{7}{9}$.

Example 6.7

Convert $\frac{4}{8}$ and $\frac{5}{16}$ into like fractions.

Solution

As 16 is twice 8, it is easy to make 16 as the common denominator.

$\frac{4}{8} = \frac{4 \times 2}{8 \times 2} = \frac{8}{16}$

Thus $\frac{8}{16}$ and $\frac{5}{16}$ are the required like fractions.

Example 6.8

Find a common denominator for $\frac{2}{5}$ and $\frac{3}{7}$.

Solution

The number 35 is a common multiple of both 7 and 5.
So, take 35 as the common denominator.

$\frac{2}{5} = \frac{2 \times 7}{5 \times 7} = \frac{14}{35}$ | $\frac{3}{7} = \frac{3 \times 5}{7 \times 5} = \frac{15}{35}$

Therefore $\frac{14}{35}$ and $\frac{15}{35}$ are the required like fractions.

Exercise 6.3

1. Convert the following into like fractions.

(i) $\frac{1}{4}, \frac{3}{8}$ (ii) $\frac{2}{5}, \frac{1}{7}$ (iii) $\frac{2}{5}, \frac{3}{10}$ (iv) $\frac{2}{7}, \frac{1}{6}$

(v) $\frac{1}{3}, \frac{3}{4}$ (vi) $\frac{5}{6}, \frac{4}{5}$ (vii) $\frac{1}{8}, \frac{3}{7}$ (viii) $\frac{1}{6}, \frac{4}{9}$

Comparing like fractions

To compare like fractions, check the numerators of the given fractions.

Example 6.9

Compare the shaded and unshaded part in the following figure.

Solution

A strip is divided into 7 equal parts. It means that each part represents $\frac{1}{7}$.

The coloured part is $\frac{3}{7} = \frac{1}{7} + \frac{1}{7} + \frac{1}{7}$

The uncoloured part is $\frac{4}{7} = \frac{1}{7} + \frac{1}{7} + \frac{1}{7} + \frac{1}{7}$

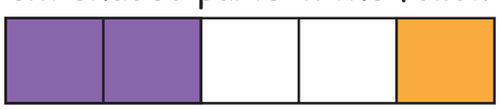
The coloured part is less than the uncoloured part.

This tells us that $\frac{3}{7}$ is less than $\frac{4}{7}$

This is written as $\frac{3}{7} < \frac{4}{7}$

Example 6.10

Compare the different shaded parts in the following figure.



Solution

This strip is divided into 5 equal parts. 2 out of 5 parts have one colour and 1 has another colour.

The fraction of blue coloured part = $\frac{2}{5}$

The fraction of yellow coloured part = $\frac{1}{5}$

Comparing the numerators 2 and 1, we find $2 > 1$

Therefore $\frac{2}{5} > \frac{1}{5}$.

In like fractions, the fraction with the greater numerator is the greater fraction.

Comparing fractions with equal numerators

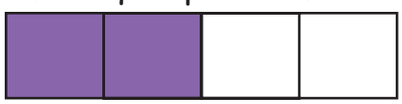
You have learnt that the value of fractions with numerator 1 decreases as the denominator increases.

Even if the numerator is not 1, the same rule applies for all the fractions that have a common numerator. For example, look at the figures below, all the shaded strips in the figure are alike.

2 out of 3 equal parts of the strip is given as

$\frac{2}{3}$

2 out of 4 equal parts of the strip is given as



$\frac{2}{4}$

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2 out of 5 equal parts of the strip is given as

$\frac{2}{5}$

The figures show that $\frac{2}{3} > \frac{2}{4} > \frac{2}{5}$

Out of two fractions with equal numerators, the fraction with the greater denominator is the smaller fraction.

To compare unlike fractions, convert them into their equivalent fractions so that their denominators are the same.

Exercise 6.4

1. Write the proper symbol from < , >, or = in the box

(i) $\frac{3}{5} \square \frac{2}{5}$ (ii) $\frac{2}{8} \square \frac{1}{8}$ (iii) $\frac{2}{11} \square \frac{10}{11}$ (iv) $\frac{3}{15} \square \frac{10}{30}$ (v) $\frac{3}{8} \square \frac{3}{7}$

(vi) $\frac{4}{7} \square \frac{4}{11}$ (vii) $\frac{5}{12} \square \frac{1}{6}$ (viii) $\frac{4}{9} \square \frac{4}{9}$ (ix) $\frac{3}{7} \square \frac{5}{9}$ (x) $\frac{4}{11} \square \frac{1}{5}$

Addition of like fractions

While adding like fractions, add only the numerators of the two fractions and write the denominator as it is.

Example 6.11

$\frac{3}{7} + \frac{1}{7} = ?$

Solution

Here, the denominators are the same, that is 7. So, add only the numerators.

$$\frac{3}{7} + \frac{1}{7} = \frac{3+1}{7}$$

$$= \frac{4}{7}$$

Example 6.12

Add: $\frac{1}{8} + \frac{3}{8} + \frac{2}{8}$

Solution

Here, the denominators are the same, that is 8. So, add only the numerators.

$$\frac{3}{8} + \frac{2}{8} + \frac{1}{8} = \frac{3+2+1}{8}$$

$$= \frac{6}{8}$$

Example 6.13

Add $\frac{2}{6}$ and $\frac{4}{6}$

Solution

Here, the denominators are the same, that is 6. So, add only the numerators.

$$\frac{2}{6} + \frac{4}{6} = \frac{2+4}{6}$$

$$= \frac{6}{6} = 1$$

Note: If the numerator and denominator of a fraction are equal, the fraction is equal to one.

Exercise 6.5

1. Add the following fractions

(i) $\frac{1}{5} + \frac{3}{5}$ (ii) $\frac{1}{7} + \frac{3}{7}$ (iii) $\frac{5}{12} + \frac{2}{12}$

(iv) $\frac{3}{9} + \frac{7}{9}$ (v) $\frac{2}{15} + \frac{3}{15}$ (vi) $\frac{2}{7} + \frac{1}{7} + \frac{3}{7}$

(vii) $\frac{3}{10} + \frac{5}{10} + \frac{2}{10}$ (viii) $\frac{2}{9} + \frac{1}{9}$ (ix) $\frac{3}{8} + \frac{2}{8}$

2. Mother gave $\frac{2}{8}$ of guava to Meena and $\frac{3}{8}$ of guava to Geetha. How many parts of the guava did she give them altogether?

3. The girls of Std V cleaned $\frac{3}{5}$ of a field, while the boys cleaned $\frac{1}{5}$ part of the field. What part of the field was cleaned altogether?

Subtraction of like fractions

U7L5P6

When subtracting a like fraction from another like fraction, write the difference between the numerators in the numerator and write the common denominator in the denominator.

Example 6.14

Subtract $\frac{2}{13}$ from $\frac{5}{13}$

Solution

Here, the denominators are the same, that is 13. So, subtract only the numerators.

$$\frac{5}{13} - \frac{2}{13} = \frac{5-2}{13} = \frac{3}{13}$$

Example 6.15

If Raju got $\frac{7}{12}$ part of a sugarcane and Sanju got $\frac{5}{12}$ part of it, how much did Raju get as extra part?

Solution

To find out the extra part, we must subtract $\frac{5}{12}$ from $\frac{7}{12}$.

Raju's extra part $= \frac{7}{12} - \frac{5}{12}$

$= \frac{7-5}{12}$

$= \frac{2}{12}$

Thus, Raju got $\frac{2}{12}$ as extra part.

Exercise 6.6

1. Subtract the following.

(i) $\frac{4}{7} - \frac{1}{7}$ (ii) $\frac{4}{8} - \frac{3}{8}$ (iii) $\frac{5}{9} - \frac{1}{9}$ (iv) $\frac{7}{11} - \frac{3}{11}$

(v) $\frac{7}{13} - \frac{4}{13}$ (vi) $\frac{5}{10} - \frac{3}{10}$ (vii) $\frac{7}{12} - \frac{2}{12}$ (viii) $\frac{8}{15} - \frac{2}{15}$

2. $\frac{5}{10}$ of a wall is to be painted. Ramu painted $\frac{2}{10}$ of it. How much more is to be painted?

Multiplication of fractions by a single digit number

While multiplying a fraction with a single digit number, the numerator only is multiplied with the single digit number and denominator remains the same.

Example 6.16

Multiply $\frac{2}{3}$ with 5.

Solution

$$\frac{2}{3} \times 5 = \frac{2 \times 5}{3} = \frac{10}{3}$$

Example 6.17

If Iniyan gets $\frac{1}{4}$ part of a chocolate bar everyday, then how much chocolate will he get for 3 days?

Solution

Part of the chocolate bar that Iniyan gets everyday = $\frac{1}{4}$

Part of the chocolate bar that Iniyan will get for 3 days = $\frac{1}{4} \times 3 = \frac{1 \times 3}{4}$

$= \frac{3}{4}$

Therefore, Iniyan will get $\frac{3}{4}$ parts of the chocolate bar for 3 days.

Exercise 6.7

1 **Multiply the following**

(i) $\frac{1}{7} \times 4$ (ii) $\frac{3}{8} \times 5$ (iii) $\frac{7}{11} \times 6$ (iv) $\frac{21}{50} \times 2$ (v) $\frac{15}{32} \times 3$

2 John has 300 ml of water in a glass and he drinks $\frac{2}{3}$ ml of water. How many ml of water does he drink?

Relationship between Fractions and Decimals

To introduce the concept of decimal

Take a rectangle and split the rectangle into 10 equal parts

How will you represent each part of the above rectangle?

That is $\frac{1}{10}$, $\frac{1}{10}$ and so on. Shade 1 part of the rectangle.

Here , 1 part is shaded out of 10 parts. Fractional representation is $\frac{1}{10}$. It can be written in another way as 0.1. In 0.1, 0 is called as the whole number part, 1 is called as the decimal part and "." is called as the decimal point which separates the unit place from tenth place.

The decimal number 0.1 is read as "zero point one".

Able to convert the fraction to decimals and vice versa

To convert a fraction to a decimal, keep the point before the numerator as per the number of zeros in the denominator.

Example 6.18

Convert the following fraction into decimals.

(i) $\frac{3}{10}$ (ii) $\frac{45}{10}$ (iii) $\frac{112}{10}$

Solution

(i) $\frac{3}{10} = 0.3$ (ii) $\frac{45}{10} = 4.5$ (iii) $\frac{112}{10} = 11.2$

Example 6.19

Convert the following decimals into fractions

(i) 3.6 (ii) 20.7 (iii) 18.9

Solution

(i) $3.6 = \frac{36}{10}$

(ii) $20.7 = \frac{207}{10}$

(iii) $18.9 = \frac{189}{10}$

Exercise 6.8

Y1J6W5

1. Write the following decimals in words

(i) 0.5 = _____

(ii) 0.8 = _____

(iii) 3.5 = _____

(iv) 6.9 = _____

2. Express the following fractions as decimals.

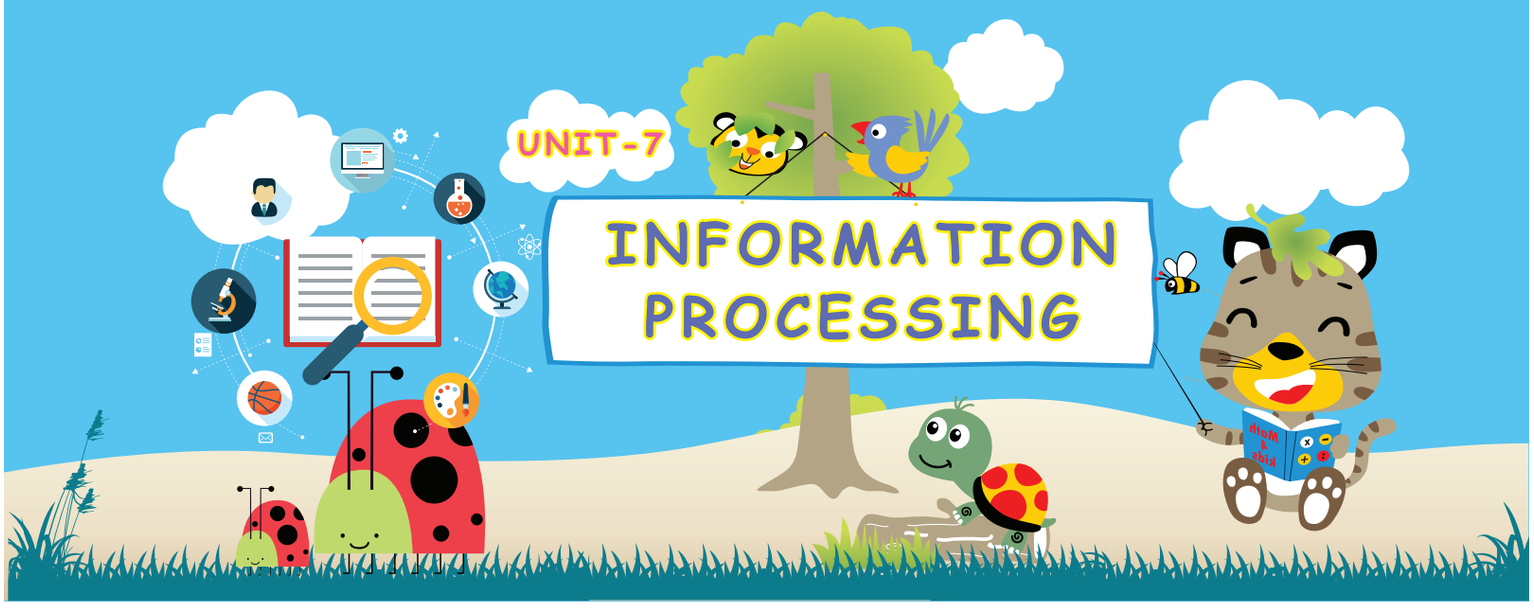
(i) $\frac{4}{10}$ (ii) $\frac{12}{10}$

(iii) $\frac{23}{10}$ (iv) $\frac{146}{10}$

3. Express the following decimals as fractions.

(i) 38.9 (ii) 9.8

(iii) 10.4 (iv) 0.8



Able to split bigger task into smaller known task

H8W8L4

Situation 1

Karkuyil and Kayalvizhi are sisters. Their mother asked them to arrange their cupboards. Karkuyil arranged her cupboard within 10 minutes while Kayalvizhi could not arrange them. When Kayalvizhi asked Karkuyil about this, she told her that she had split the task of arranging the cupboards in two smaller tasks namely,

1. Sorting the things and
2. Keeping the things in shelves

Karkuyuil could complete the work in less time and easily also.

Situation 2

Mugilan is the secretary of the Math club in his school. The principal of the school has announced for a quiz competition and Mugilan is given the incharge of arranging for the competition.

Write the tasks to be done by Mugilan.

_____ _____

_____ _____

_____ _____

Activity

Consider the situation

Vizhyan's birthday is on Wednesday. His father asked his sister Poovizhi to arrange for the party. She is happy to do it but does not know how to arrange for the party. Her father suggested her to first break the event into smaller tasks and complete those tasks one by one. Poovizhi thought that this way she could easily arrange for the party. If you are Poovizhi what would be tasks you will plan for. Write the smaller tasks which you will arrange.

Solving a multiplication problem involving 2 three digit numbers.

Let us split the task of multiplying 2 three digit numbers into the following steps.

Multiplying 2 three digit numbers can be done easily if we do it step by step.

Step 1 – Multiplying the ones digit with the first number

$$\begin{array}{r} 567 \times 253 \\ \hline 1701 \end{array}$$

Step 2 – Multiplying the tens digit with the number

$$\begin{array}{r} 567 \times 253 \\ \hline 2835 \end{array}$$

Step 3 – Multiplying the hundreds digit with the first number

$$\begin{array}{r} 567 \times 253 \\ 1134 \end{array}$$

Step 4 – Add all the results of step 1, step 2 and step 3 to find the multiplication of

$$\begin{array}{r} 567 \times 253 \\ \hline 1701 \\ 2835 \\ 1134 \\ \hline 143451 \end{array}$$

Exercise 7.1

1. Find the product of the following numbers:

(i) 234 x 765 (ii) 908 x 512 (iii) 481 x 503

To enable how to find out easy and difficult ways to solve tasks and justify with reason.

Situation

Kavitha and Bavitha were planning for a picnic with their family. Kavitha said it would be better to pre book a taxi for sightseeing before reaching the spot while Bavitha preferred to hire a taxi after reaching the spot.

Whose idea is better?

Suggest other ways also for planning the picnic.

Activity

Arranging 50 books orderly by number on them in 5 hours

Ezhilan and Iniyan has been asked to arrange two sets of fifty books each in two book shelves of a library. The books were numbered from 1 to 50 and there are 5 shelves in each cupboard

Ezhilan arranged 10 books in each shelf atonce while Iniyan placed 1 book at a time in each of the 5 shelves.

Which is the easy way to complete the work and who will arrange the books quickly?

L2U9T3

Factor Bingo

Here is a Board of numbers

2	28	36	4
12	16	5	10
9	14	6	8
3	20	7	40

The teacher gave a number board to Imayan and Varman. Then, he asked them to pick out the factors of the numbers 36, 28 and 40 from the number board.

Imayan used different notations for each number. He circled the factors of 36, drew triangles for the factors of 28 and drew squares for the factors of 40. But, Varman circled the factors of all the three numbers. Whom do you think will complete the task of picking out the factors of each number easily? Justify your answer.

Activity 3

Sort the factors of 40,72 and 75 from the number board given below.

1	40	20	12
2	15	18	6
5	7	10	3
24	4	8	9

Answers

1. Geometry

Exercise 1.1

1. 18 cm 2. 4.8 cm 3. 2.8 cm 4. 1 km 5. 4400 m

Exercise 1.2

1. (i) 100 sq.m (ii) 2.5 sq.m (iii) 40 sq.cm (iv) 54 sq.m
2. (i) 18 sq.cm (ii) 28 sq.m (iii) 40 sq.cm (iv) 54 sq.m
3. 1,20,000 4. 24cm; 36 sq.cm; 28cm; 140 sq.cm 5. 8,4000

2. Numbers

Exercise 2.1

1. (i) 30 (ii) 70 (iii) 90 (iv) 80
2. 70 3. 90; 1 4. 50;1 5. 160 6. 100 7. 190 8. 11;10

3. Measurements

Exercise 3.1

1. (i) 90 cu.cm (ii) 3600 cu.cm (iii) 3, 75, 000 cu.cm
   (iv) 1000cu.cm (v) 1 cu.cm.
2. (i) 480 cu.cm (ii) 4cm (iii) 3cm (iv) 20 cm (vi) 3m
3. 1200 bricks 4. 8000 sacks

4. Algebra

Exercise 4.1

1. (6+6) = (8+4) = (9+3) 2. (8+8) = (18-2) = (8 × 2) = (32÷2)

Exercise 4.2

1. (i) True (ii) True (iii) False (iv) False (v) False (vi) True
   (vii) True (viii) False (ix) True (X) True
2. (i) > (ii) = (iii) <
3. (i) 9 (ii) 2 (iii) 1 (iv) 0 (v) 2 (vi) 4

5. Money

Exercise 5.1

1. (i) ₹ 40 (ii) ₹ 10,500 (iii) ₹ 770 (iv) ₹ 45.25
2. (i) -c (ii) -d; (iii) -b (iv) -a
3. (i) ₹ 26,246.75 (ii) ₹ 1,30,412.50 (iii) ₹ 18,309.25
4. (i) ₹ 1,186.75 (ii) ₹ 473 (iii) ₹ 16,226.50
5. ₹ 49,553.25 6. ₹ 41,500 7. ₹ 3,85,838 8. ₹ 8,355

Exercise 5.2

1. (i) ₹ 375 (ii) ₹ 8.01 (iii) ₹ 7 (iv) ₹ 1,550
2. (i) ₹ 4,93,625 (ii) ₹ 4, 757.76 (iii) ₹ 4,348.44
   (iv) ₹ 11.59 (v) ₹ 997.5 (vi) ₹ 36.1
3. ₹ 75 4. ₹ 90 5. ₹ 4,608 6. ₹ 250 7. ₹ 140

6. Fractions

Exercise 6.1

1. (i) $\frac{5}{12}$ (ii) $\frac{2}{6}$ (iii) $\frac{3}{9}$

2. (i) $\frac{12}{20}$ (ii) $\frac{34}{40}$ (iii) $\frac{17}{50}$

3. (i) $\frac{7}{12}$ (ii) $\frac{22}{48}$ (iii) $\frac{27}{56}$

4. (i) $\frac{10}{42}$ (ii) $\frac{15}{37}$

Exercise 6.2

1. (i) 4 (ii) 21 (iii) 22 (iv) 1
   (v) 7 (vi) 2 (vii) 4 (viii) 3

2. $\frac{9}{18}, \frac{12}{18}, \frac{12}{18}, \frac{4}{18}, \frac{14}{18}, \frac{30}{18}$

3. $\frac{2}{5}, \frac{2}{5}, \frac{2}{5}, \frac{2}{5}, \frac{3}{5}, \frac{4}{5}$

4. $\frac{14}{18}, \frac{28}{36}; \frac{8}{10}, \frac{12}{15}; \frac{6}{22}, \frac{9}{33}$

Exercise 6.3

1. (i) $\frac{8}{32}, \frac{12}{32}$ (ii) $\frac{14}{35}, \frac{5}{35}$ (iii) $\frac{20}{50}, \frac{15}{50}$ (iv) $\frac{12}{42}, \frac{7}{42}$
   (v) $\frac{4}{12}, \frac{9}{12}$ (vi) $\frac{25}{30}, \frac{24}{30}$ (vii) $\frac{7}{56}, \frac{24}{56}$ (viii) $\frac{9}{54}, \frac{24}{54}$

Exercise 6.4

1. (i) > (ii) > (iii) < (iv) < (iv) < (vi) > (vii) > (viii) = (ix) < (x) >

Exercise 6.5

1. (i) $\frac{4}{5}$ (ii) $\frac{4}{7}$ (iii) $\frac{7}{12}$ (iv) $\frac{10}{9}$ (v) $\frac{5}{15}$
   (vi) $\frac{6}{7}$ (vii) $\frac{10}{10}$ (viii) $\frac{3}{9}$ (ix) $\frac{5}{8}$ 2. $\frac{5}{8}$ 3. $\frac{4}{5}$

Exercise 6.6

1. (i) $\frac{3}{7}$ (ii) $\frac{1}{8}$ (iii) $\frac{4}{9}$ (iv) $\frac{4}{11}$ (v) $\frac{3}{13}$
   (vi) $\frac{2}{10}$ (vii) $\frac{5}{12}$ (viii) $\frac{6}{15}$ 2. $\frac{3}{10}$

Exercise 6.7

1. (i) $\frac{4}{7}$ (ii) $\frac{15}{8}$ (iii) $\frac{42}{11}$ (iv) $\frac{42}{50}$ (v) $\frac{45}{32}$ 2. 200 ml

Exercise 6.8

1. (i) Zero point five (ii) Zero point eight (iii) Three point five
   (iv) Six point nine 2. (i) 0.4 (ii) 1.2 (iii) 2.3 (iv) 14.6

3. (i) $\frac{389}{10}$ (ii) $\frac{98}{10}$ (iii) $\frac{104}{10}$ (iv) $\frac{8}{10}$

7. Information processing – Exercise 7.1

1. (i) 1,79,010 (ii) 4,64,896 (iii) 2,41,943