PREVOCATIONAL PROGRAMME

FORM 2 Part 1

REDISCOVERING MATHEMATICS

ISBN: 978-99903-40-77-8

Designed by

mie graphics section

Printed by

The Government Printing Office

FOREWARD

In view of the reform of the PreVocational Education at Secondary level, we are pleased to provide to Educators and PreVocational students teaching and learning materials in line with the new Curriculum Framework-Secondary (PreVocational) which will now comprise of four years of schooling.

The objective of the PreVocational education is to provide opportunities to learners to obtain a formal qualification after four years of schooling. It will also provide learners with opportunities to branch out in either, further training in a number of vocational areas or to join the world of work or even to reintegrate the academic stream.

This project necessitates a well-planned teaching based on a set of carefully designed materials. The MIE is providing the pedagogical support and appropriate materials for both teachers and pupils. We believe that all children are educable and we have incorporated in the text materials that would provide learning experiences appealing to a diversity of learners. We wish that teaching is based on a collaborative and consensual approach with the students as well as with the support of the home.

We also hope that these materials will help everyone to obtain a clear idea of the PreVocational project. You will surely notice that the materials can benefit any learner and a much wider group of students than just the PreVocational stream. It will be followed by other more exciting ones to cover the whole of the four years.

I wish to thank all the staff of MIE under whose guidance these materials have been produced and the team of MIE graphic designers who have produced a wonderful piece of work. My thanks also go to the staff of the MITD who have been associated with the writing of the materials, the Educators from secondary schools who have contributed in various panels and the PreVocational Inspectors for their constructive comments.

Sheela Thancanamootoo
Director, MIE

INTRODUCTION

The current Mathematics series has been specifically designed to meet the needs of the Prevocational stream. Putting learners at the forefront, the different tailor-made textbooks attempt to give a different mathematical experience to students who are seeking a new start. Further, to offer a success-oriented experience, learners are led to construct mathematical ideas on a concept-by-concept basis, without much requirement of prior mathematical knowledge. Concepts are introduced and developed from the known experiences of learners, using their real-life mathematical knowledge. Much emphasis is laid on sense making.

Each chapter is progressively developed according to the following sequence: introduction box, example box, graded exercises, continuous assessment and profiling. Key mathematical terms have been highlighted as it is known that language is often a barrier to problem solving. Each chapter ends with a profiling table, where teachers are expected to show how much progress has specifically been made in a given area. We have equally attempted to encourage the involvement of parents in monitoring their ward's progress by requiring them to sign the end-of-unit report from the teacher.

The textbooks have been written in such a way that they prompt independent learning. Much care has been taken in presenting the tasks according to their level of complexity so that students can easily move from one level to the other. We have used simple sentences so that learners can read the materials on their own. We hope that the graphical layout of the textbook stimulates students' interest in the learning materials.

The book is also meant to be a guide to teachers in terms of pedagogical strategies. The real-life examples used to introduce concepts and the pedagogical development of mathematical ideas are expected to be beneficial to teachers. We have adopted a unit-by-unit approach so that the textbooks can be used flexibly at any point in time. Such an approach will facilitate the differentiation of instruction in the classroom. We have primarily included basic problems in the different content areas. Teachers are required to supplement other problems as the mastery of mathematical skills requires much practice.

We hope that this series of textbooks will give students a new opportunity to re-enter the world of mathematics as they dedicatedly work through the different units with the support of their committed teachers. We equally hope that students will have an enjoyable mathematical experience, developing both skills and confidence, appreciating and valuing the mathematics in their daily life and work experience.

Mathematics Panel

PANEL MEMBERS

Mauritius Institute of Education

Mr K. Mathoor – Coordinator
Dr A. Ramful – Coordinator

Ministry of Education, Culture & Human Resources

Mr Mamodebaccus Sheik Belal – Educator
Mr Bhantooa Baboojeesing – Educator
Mr Geerwar Hans - Educator

Acknowledgements

The Mathematics Panel would like to thank all those who have directly or indirectly helped in the writing of the Mathematics textbooks.

TABLE OF CONTENT

Unit 1

Unit 2

Unit 3

UNIT 1

By the end of the unit, you should be able to:

- count, read and write numbers up to 10 000.
- compose and decompose numbers up to 10 000.
- perform operations on numbers involving addition and subtraction.
- solve simple word problems.
- work out number patterns and sequences involving even, odd and square numbers.

Counting up to 10 000

In this unit we study numbers up to 10 000. In year 1, you learned how to represent numbers in terms of units, tens and hundreds using notes. Using the same idea, we can represent Rs 7682 as follows:

Rs 7682 = Rs 7000 + Rs 600 + Rs 80 + Rs 2

7682 = (7x1000) + (6x100) + (8x10) + (2x1)

1. Count and complete.

(a) 1000, 1001, 1002, _____ , _____ , _____ , _____ , _____ , _____ , _____ , 1010

(b) 1010, 1020, 1030, _____ , _____ , _____ , _____ , _____ , _____ , 1100

2. Complete the Grid.

1000	**1100**	**1200**	**1300**						**1900**
2000					**2500**				
3000								**3800**	
4000			**4300**						
5000						**5600**			
6000		**6200**							
7000				**7400**					
8000						**8600**			
9000					**9500**				**9900**

3. Complete the sequence of numbers.

(a) 9900, 9910, 9920, _____ , _____ , _____ , _____ , _____ , _____ , _____ , 10 000

(b) 9990, 9991, 9992, _____ , _____ , _____ , _____ , _____ , _____ , _____ , 10 000

(c) 8125, _____ ,8175, 8200, 8225, _____

4. Write the numbers in expanded form.
One example has been done for you.

(a) 6725 = (6x1000) + (7x100) + (2x10) + (5x1)

(b) 9803 =

(c) 8125 =

5. Write the number for each of the following expansions.

(a) (5x1000) + (6x100) + (2x10) + (8x1) = _____

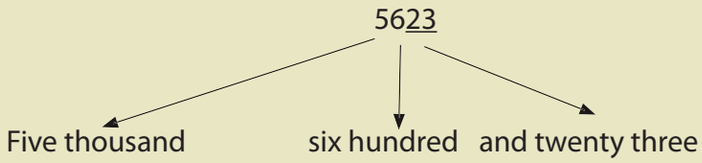
(b) (7x1000) + (0x100) + (3x10) + (2x1) = _____

(c) (4x1000) + (3x100) + (0x10) + (4x1) = _____

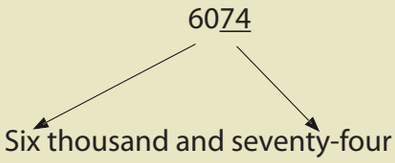
(d) (5x1000) + (0x100) + (0x10) + (5x1) = _____

NUMBER NAME

Example 1:



Example 2:



6. Write in words.

(a) 4322 : _____

(b) 5555 : _____

(c) 7023 : _____

(d) 6740 : _____

7. Write in figures.

(a) Two thousand three hundred and eighteen : _____

(b) Six thousand and five hundred and ninety-nine : _____

(c) Three thousand and eighty : _____

(d) Nine thousand and fourteen : _____

8. Arrange the following numbers in ascending order.

(a) 6537, 3894, 8349, 5062 _____

(b) 5796, 4898, 7904, 6543 _____

(c) 4233, 4034, 4323, 4321 _____

9. Arrange the following numbers in descending order.

(a) 3940, 4098, 3094, 4307, 3049 _____

(b) 3894, 2583, 7940, 5750, 6432 _____

(c) 5624, 5529, 5429, 5623, 5650 _____

10. Write down the value of:

(a) 3 in 3894 : _____

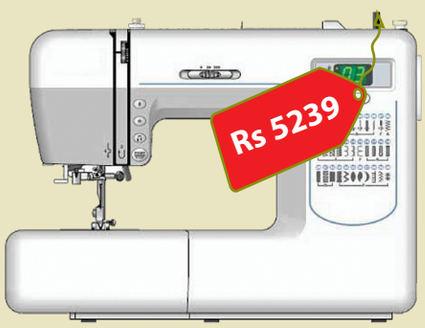
(b) 5 in 4750 : _____

(c) 9 in 2952 : _____

(d) 4 in 9234 : _____

ADDITION

Mrs Kamla buys a microwave oven for Rs 3645 and a sewing machine for Rs 5239.



How much does she pay altogether?

Microwave oven : Rs 3645

Sewing machine : Rs 5239

Total : Rs 8884

$$\begin{array}{r} {\scriptstyle 1} \\ 3645 \\ +\ 5239 \\ \hline 8884 \end{array}$$

She pays Rs 8884 altogether.

Keywods:
Altogether
Sum
In all
Total

11. Work out.

(a) $\begin{array}{r} 4236 \\ +\ 2513 \\ \hline \\ \hline \end{array}$

(b) $\begin{array}{r} 8432 \\ +\ 2007 \\ \hline \\ \hline \end{array}$

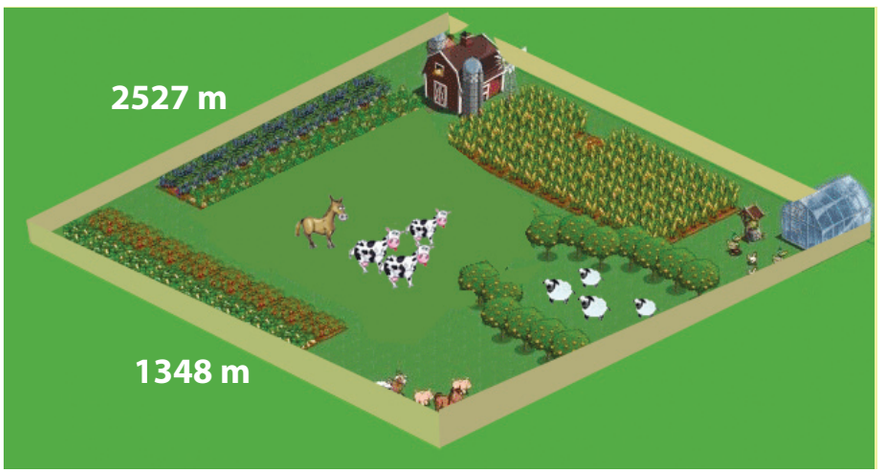
(c) $\begin{array}{r} 3677 \\ +\ 1713 \\ \hline \\ \hline \end{array}$

(d) $\begin{array}{r} 2047 \\ +\ 3094 \\ \hline \\ \hline \end{array}$

(e) $\begin{array}{r} 2999 \\ +\ 3999 \\ \hline \\ \hline \end{array}$

(f) $\begin{array}{r} 3456 \\ +\ 2544 \\ \hline \\ \hline \end{array}$

12. Mr Montocchio has a farm of length and width as shown in the picture below :



How much fencing is required to enclose the farm?

13. The expenditure of Mrs Sarah in March is shown below :

Item	Amount (Rs)
Food	3700
Telephone	1225
Electricity	1375
Water	225
Car fuel	2775

(a) How much does Mrs Sarah spend on food, electricity and water?

(b) How much does she spend on telephone and car fuel?

(c) How much does she spend in all in March?

14. Three candidates in an election obtained 706, 724 and 523 votes respectively. Find the total number of votes obtained by the three candidates.

15. A carpenter is planning to build a cupboard. The table below shows the materials needed and their corresponding costs. Complete the table.

Item	Cost (Rs)
Plywood sheet	2675
Wood and varnish	4878
Nails, screws and glue	649
Total	

SUBTRACTION

Niresh uses 3 five hundred rupee notes to buy a pair of shoes for Rs 1475. How much money is left?

Sum of money : Rs 1500

Cost of shoes : Rs 1425

Amount left : Rs 25

$$\begin{array}{r} {\scriptstyle 4\ 9\ 10} \\ 1\not{5}00 \\ -\ 1475 \\ \hline 25 \end{array}$$

Keywods:
Minus
Subtract
Difference
Deduct
Left

1.

(a) $\begin{array}{r} 5784 \\ -\ 2343 \\ \hline \\ \hline \end{array}$

(b) $\begin{array}{r} 3428 \\ -\ 1203 \\ \hline \\ \hline \end{array}$

(c) $\begin{array}{r} 9425 \\ -\ 1458 \\ \hline \\ \hline \end{array}$

(d) $\begin{array}{r} 7213 \\ -\ 2114 \\ \hline \\ \hline \end{array}$

(e) $\begin{array}{r} 1425 \\ -\ 977 \\ \hline \\ \hline \end{array}$

(f) $\begin{array}{r} 5703 \\ -\ 3909 \\ \hline \\ \hline \end{array}$

2. Work out.

(a) 4735 - 2524 =

(b) 5623 - 2715 =

(c) 5378 - 658 =

(d) 4008 - 3654 =

3. Find the difference between 3456 and 2243.

4. Subtract 2577 from 4322.

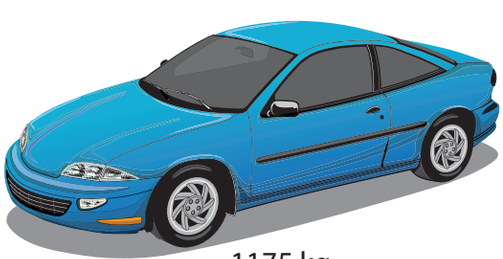
5. The weekly wages of Ajeev and Ravin are Rs 8769 and Rs 9780 respectively. How much more money does Ravin receive in a week?

6. Mrs Sarojini earns a monthly salary of Rs 10 000. A sum of Rs 3577 is deducted from her salary every month for her loan. How much money is left after the deduction?

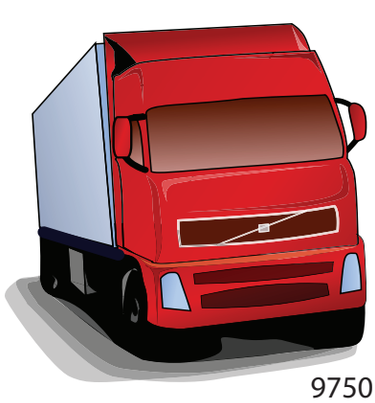
PAY SLIP

Basic salary : Rs 10 000
Deduction : Rs 3 577
Net pay : _____

7. A truck weighs 9750 kg. A car weighs 1175 kg. By how much is the truck heavier than the car?



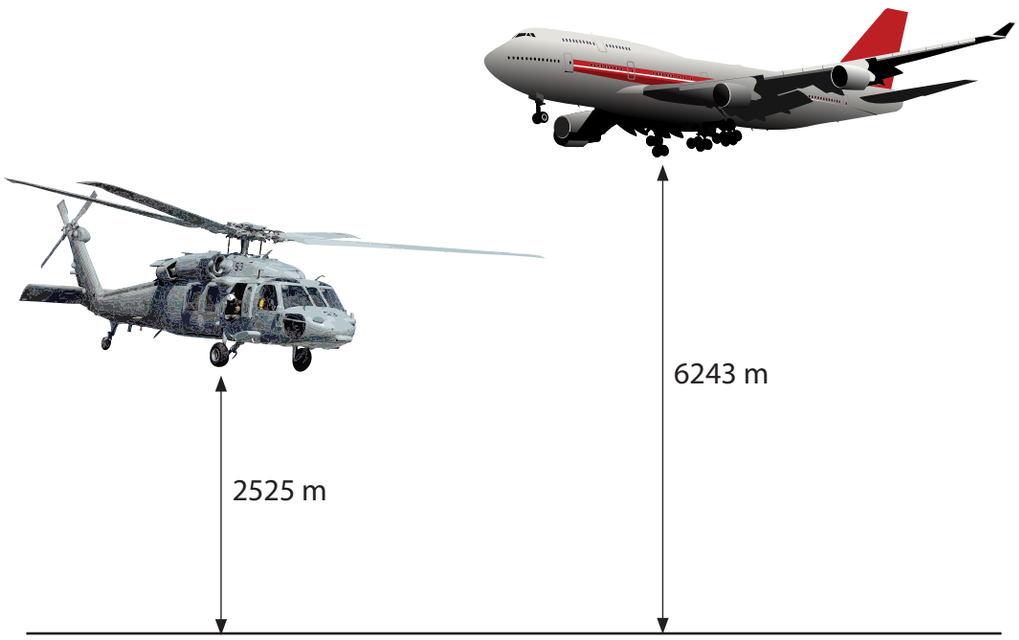
1175 kg



9750 kg

8. Water tank A has a capacity of 2250 L and water tank B has a capacity of 1375 L. How much more water can tank A hold than tank B?

9. A helicopter is flying at a height of 2525 m. An aeroplane is flying at a height of 6243 m. What is the difference in height between the two?



Activity

The aim of this activity is to identify even and odd numbers.

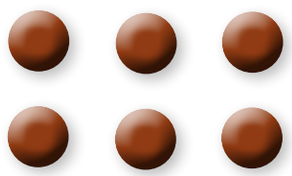
Materials required: 100 counters and a 100-square chart.

Procedure

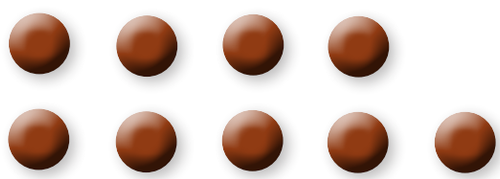
1. Divide class in groups of four.

2. Provide each group a set of 100 counters (e.g., bottle tops) and a 100-square chart.

3. Select 6 counters. Arrange them in pairs as shown below.



4. Now, select 9 counters. Can they be arranged in pairs?



We say that 6 is an **even** number as we can pair the counters.

We say that 9 is an **odd** number as one counter is left unpaired.

Even and odd numbers

✗ 1	✓ 2	✗ 3	✓ 4	✗ 5	✓ 6	✗ 7	✓ 8	✗ 9	✓ 10
11									20
				25					30
						37			40
								49	50
	52								60
61									70
			74						80
							88		90
91		93							100

5. (a) Complete the table.

(b) Put a tick on the **even** numbers and a cross on the **odd** numbers as indicated in the first row.

6. Study the pattern on the chart. What do you observe?

7. Use your chart to find out whether the following numbers are even or odd.

31 _____ 50 _____

73 _____ 42 _____

45 _____ 26 _____

27 _____ 98 _____

UNIT 1

A number which is exactly divisible by 2 is an even number.

An even number ends in 0, 2, 4, 6 or 8.

1. (a) List out all the even numbers less than 20.

_____

(b) List out all the even numbers between 20 and 30.

_____

2. Ring the even numbers from the list below:

(a) 24 , 27 , 38 , 41 , 62 , 73 , 84

(b) 115 , 128 , 142 , 351 , 572 , 890

An odd number ends in 1, 3, 5, 7 or 9.

3. Write down the odd numbers between

(a) 13 and 29,

_____

(b) 49 and 75.

_____

4. Ring the odd numbers from the list below

(a) 4 , 45 , 6 , 12 , 84 , 11 , 31 , 13 , 95

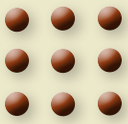
(b) 125 , 148 , 249 , 315 , 500 , 737 , 805.

Square numbers

Consider the numbers 3 , 4 , 5 , 6 , 7 , 8 , 9 , 10 .

Let us use dots to represent each of these numbers.

Investigate which of these numbers can be arranged into a square.

3		Not a square
4		Square
5		Not a square
6		Not a square
7		Not a square
8		Not a square
9		Square
10		Not a square

We observe that 4 dots and 9 dots can be arranged in a square.

The numbers 4 and 9 are called square numbers. Observe that:

$4 = 2 \times 2$

$9 = 3 \times 3$

A square number is obtained when a (non-zero) whole number is multiplied by itself.

Example :

$4 \times 4 = 16$

$5 \times 5 = 25$

16 and 25 are square numbers.

Note that 1 is also a square number as $1 \times 1 = 1$.

Construct other square numbers:

(a) $6 \times 6 =$

(b) $7 \times 7 =$

(c) $8 \times 8 =$

(d) $9 \times 9 =$

(e) $10 \times 10 =$

(f) $11 \times 11 =$

(g) $12 \times 12 =$

5. Write down the square numbers which lie between

(a) 5 and 20 _____

(b) 20 and 40 _____

(c) 40 and 70 _____

(d) 70 and 110 _____

6. Ring the square numbers from the list below:

48 , 64 , 77 , 121

7. Write the next three terms in the following:

(a) 9 , 16 , 25 , _____ , _____ , _____

(b) 81 , 100 , 121 , _____ , _____ , _____

8. Write down

(a) the smallest 3-digit square number that is also odd.

_____

(b)the largest 2-digit square number that is also even.

_____

UNIT 1

Continuous assessment

1. Complete the sequences:

(a) 125, 150, 175, _____, _____, _____, _____

(b) 8750, 8850, 8950, _____, _____, _____, _____

(c) 7635, 7620, 7605, _____, _____, _____, _____

2. Write in words:

(a) 4512 _____

(b) 9785 _____

(c) 3019 _____

3. Write in expanded form:

(a) 2647 = _____

(b) 7652 = _____

(c) 9021 = _____

4. Work out the following:

(a)
$$\begin{array}{r} 4132 \\ +\ 3738 \\ \hline \\ \hline \end{array}$$

(b)
$$\begin{array}{r} 4012 \\ +\ 5904 \\ \hline \\ \hline \end{array}$$

(c) 3175 + 290 + 85 =

(d) 4005 +1300 + 3210 =

5. Work out the following:

(a)
$$\begin{array}{r} 5237 \\ -\ 3218 \\ \hline \\ \hline \end{array}$$

(b)
$$\begin{array}{r} 7689 \\ -\ 4809 \\ \hline \\ \hline \end{array}$$

(c) 5305 – 3530 =

(d) 9378 – 4589 =

6. (a) List out the even numbers between 75 and 100.

_____

(b) Write down the odd numbers between 20 and 40.

_____

(c) Ring the odd numbers and put a cross on the square numbers in the list given below.

2 , 3 , 9 , 24 , 25 , 33 , 41 , 49 , 51 , 58 , 64.

UNIT 1

Profiling

Numbers	Good	Satisfactory	Needs improvement
1. Read numbers up to 10 000			
2. Write numbers up to 10 000			
3. Write number names up to 10 000			
4. Compose and decompose numbers up to 10 000			
5. Perform addition			
6. Perform subtraction			
7. Solve simple word problems			
8. Identify even and odd numbers			
9. Identify square numbers			

Student's Progress

Teacher's comments

_____

_____

_____

_____

_____

_____

Signature of parent: _____ Date: _____

UNIT 2

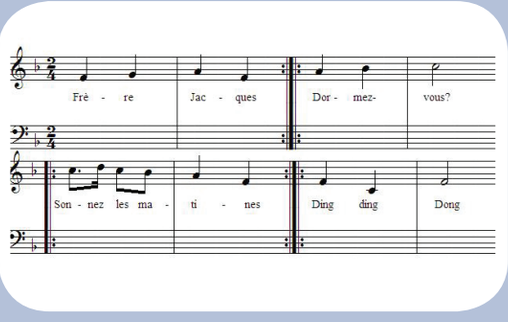
By the end of the unit, you should be able to:

- work out patterns and sequences.
- find factors and multiples of a number.
- perform operations on numbers involving multiplication and division.
- solve word problems.
- perform mental arithmetic operations.

UNIT 2

PATTERNS

Patterns exist all around us. The pictures below show the patterns in a beehive, a music scale, tiles and a piece of fabric.



In this unit, we shall study number patterns.

Number patterns

Consider the 100-number square.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Start at 4 and count by 4s (i.e., 4, 8, 12, ...).

Circle every number you counted.

Describe a pattern.

Pattern in multiplication table 9

Describe the pattern in the table.

$1 \times 9 = 9$
$2 \times 9 = 18$
$3 \times 9 = 27$
$4 \times 9 = 36$
$5 \times 9 = 45$
$6 \times 9 = 54$
$7 \times 9 = 63$
$8 \times 9 = 72$
$9 \times 9 = 81$
$10 \times 9 = 90$

1. Continue the pattern of dots.

(a) 

1 4 9 _____ _____

(b) 

1 3 6 _____ _____

1 1+2 1+2+3 _____ _____

(c) 

1x2 2x3 3x4 _____ _____

(d) 

3 5 7 _____ _____

Complete the number patterns in exercises 1 to 4.

2. Number of bicycles: 1 2 3 4 5

Number of wheels: 2 4 _____ _____ _____

3. Number of cars: 1 2 3 4 5

Number of wheels: 4 8 _____ _____ _____

4. Find the next three terms in each of the following sequences.

(a) 5,7,9, 11, _____ , _____ , _____

(b) 3, 9, 27, 81, _____ , _____ , _____

(c) 160, 80, 40,20, _____ , _____ , _____

(d) $\frac{1}{11}$, $\frac{3}{11}$, $\frac{5}{11}$, $\frac{7}{11}$, _____ , _____ , _____

(e) 2, 3, 5, 8, 13, _____ , _____ , _____

(f) 0.4, 1.2, 3.6, 10.8, _____ , _____ , _____

(g) (0.6, 1.3), (0.5, 1.1), (0.4, 0.9), (_____ , _____), (_____ , _____), (_____ , _____)

Factors

We know that 6 = 2 X 3.

We say that:

2 is a **factor** of 6

3 is a **factor** of 6

Also, 6 = 1 X 6.

1 is a **factor** of 6

6 is a **factor** of 6

So the factors of 6 are 1,2,3,6.

We can also obtain the factors of 6 by arranging 6 beads in rectangular form.

Arrangement 1: 2 rows and 3 columns

2 X 3 = 6

Arrangement 2: 1 row and 6 columns

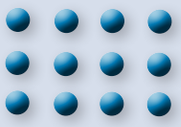
1 X 6 = 6

The factors of 6 are 1, 2, 3 and 6. Note that 6 can be divided by 1, 2, 3 and 6.

Similarly, we can find the factors of 12 by arranging 12 beads in rectangular form.

1 X 12

2 X 6



3 X 4

The factors of 12 are 1 , 2 , 3 , 4 , 6 and 12.

Observe that 12 can be divided exactly by its factors.

12 ÷1 = 12, 12 ÷2 = 6, 12 ÷3 = 4, 12 ÷ 4 = 3, 12 ÷6 = 2, 12 ÷12 = 1.

A factor of a number divides that number exactly.

1. Find the factors of the following numbers by arranging beads in rectangular form

(a) 10

(b) 18

2. Find the factors of the following numbers using the multiplication table.

(a) 15

(b) 20

(c) 24

(d) 30

(e) 36

(f) 50

(g) 17

Prime numbers & Composite numbers

Consider the factors of 2,6,7,8,9,10,11,12,13

Factors of 2 : 1, 2

Factors of 6 : 1, 2, 3, 6

Factors of 7 : 1, 7

Factors of 8 : 1, 2, 4, 8

Factors of 9 : 1, 3, 9

Factors of 10 : 1, 2, 5, 10

Factors of 11 : 1, 11

Factors of 12 : 1, 2, 3, 4, 6, 12

Factors of 13 : 1, 13

We observe that the numbers 2,7,11 and 13 have only 2 factors: 1 and the number itself.

Numbers such as 2, 7, 11 and 13 are called **prime** numbers.

The numbers 6, 8, 9, 10 and 12 have more than 2 factors.

Such numbers are called **composite** numbers.

3. Write all the prime numbers between

(a) 1 to 20

(b) 21 to 50

4. Circle the prime numbers in the list below.

39 , 49 , 59 , 69 , 79 , 89 , 99

5. Ring the numbers which are **not** prime.

11 , 21 , 31 , 41 , 51 , 61 , 71 , 81 , 91

6. Write down all the prime numbers between 50 and 70.

7. Ring each composite number in the list below.

6 , 9 , 13 , 15 , 19 , 38 , 31 , 57 , 79 , 91

8. Write down

(a) the smallest 2-digit composite number.

(b) the largest 3-digit composite number.

9. Which of the following numbers are composite?

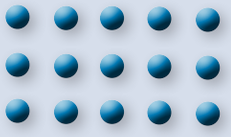
301 , 421 , 517 , 849

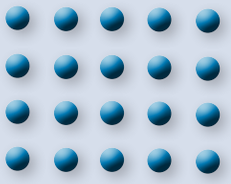
Multiples

Consider sets of 5 objects.

1 set of 5  1 X 5 = 5

2 sets of 5  2 X 5 = 10

3 sets of 5  3 X 5 = 15

4 sets of 5  4 X 5 = 20

We say that 5, 10, 15, 20 are multiples of 5.

To find the multiples of 5, we multiply 1 , 2 , 3 , 4 , 5 , . . . by 5.

A multiple of a number is obtained by multiplying the number by a (non-zero) whole number.

For example, the multiples of 4 are obtained as follows:

4 X 1 = 4

4 X 2 = 8

4 X 3 = 12

.
.
.
.

10. Complete

(a) The first five multiples of 3 are _____ , _____ , _____ , _____ , _____

(b) The first five multiples of 6 are _____ , _____ , _____ , _____ , _____

(c) The first five multiples of 10 are _____ , _____ , _____ , _____ , _____

11. Ring the multiples of 7 from the given numbers

8 , 14 , 17 , 19 , 21 , 28 , 112 , 45 , 56

12. Find the sum of all the multiples of 6 between 42 and 84.

13. Which of the following numbers is a multiple of 9?

129 , 303 , 729

14. Find the sum of all the multiples of 10 between 150 and 200.

Multiplication

In Year 1 (unit 2) you were introduced to multiplication involving 1-digit number. We shall now work with multiplications involving 2-digit numbers.

Example:

A school bus can carry 55 students. How many students can 7 school buses carry?

One bus: 55 students

7 buses: 55 X 7 students

$$\begin{array}{r} {}^{3}5\ 5 \\ \times\ \ 7 \\ \hline 3\ 8\ 5 \\ \hline \end{array}$$

Number of students: 385

1. Work out:

(a) 83 X 4 = _____

(b) 93 X 5 = _____

(c) 89 X 6 = _____

(d) 67 X 8 = _____

(e) 63 X 9 = _____

2. Work out:

(a) 175 X 3 = _____

(b) 234 X 5 = _____

(c) 803 X 6 = _____

(d) 917 X 7 = _____

UNIT 2

Multiplication by multiples of 10

Recall:

$5 \times 20 = 5 \times 2 \times 10$

$= 10 \times 10$

$= 100$

$7 \times 40 = 7 \times 4 \times 10$

$= 28 \times 10$

$= 280$

Key terms:

- Multiply
- Product
- Times
- Of

Multiplication by a 2-digit number

Example : 45 X 13

	40	5
10	10 X 40 = 400	10 X 5 = 50
3	3 X 40 = 120	3 X 5 = 15

45 X 13 = 400 + 120 + 50 + 15

or

45 X 13 = 45 X (3 + 10)

= (45 X 3) + (45 X 10)

= 135 + 450

= 585

$$\begin{array}{r} {}^{1}45 \\ \times\ 13 \\ \hline 135 \\ 450 \\ \hline 585 \end{array}$$

3. Work out

(a) 3 x 20 =

(b) 4 x 70 =

(c) 6 x 80 =

(d) 2 x 70 =

4. Work out the following multiplications using the method shown in the explanation box.

(a)

27
X 13

	20	7
10		
3		

(b)

74
X 35

	70	4
30		
5		

5. Work out

(a)
75
X 25

(b)
48
X 23

(c)
57
X 29

(d)
93
X 27

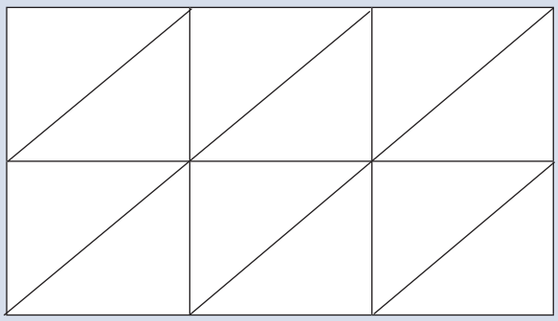
A shortcut method for multiplication

Consider the multiplication: 135 X 12.

A 3-digit number is multiplied by a 2-digit number.

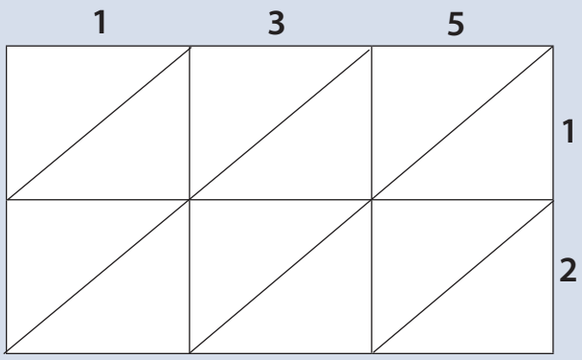
Step 1:

Draw a rectangle and divide it into 3 columns and 2 rows. Divide each small rectangle obtained by a diagonal to store the result.



Step 2:

Place the digits of 135 on top of each column and the digits of 12 besides the rows as shown in the diagram.

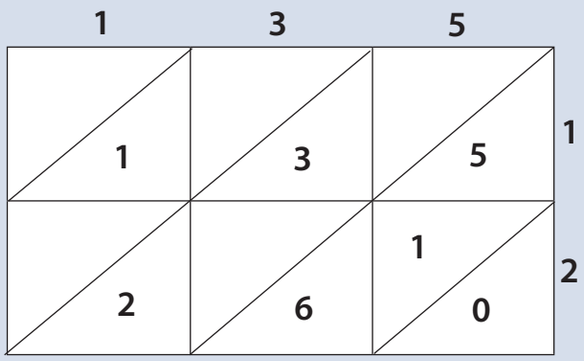


Step 3:

Multiply 1 by 1; 3 by 1 and 5 by 1.

Multiply 1 by 2; 3 by 2 and 5 by 2.

Write the answers in the grid as shown on the next page.

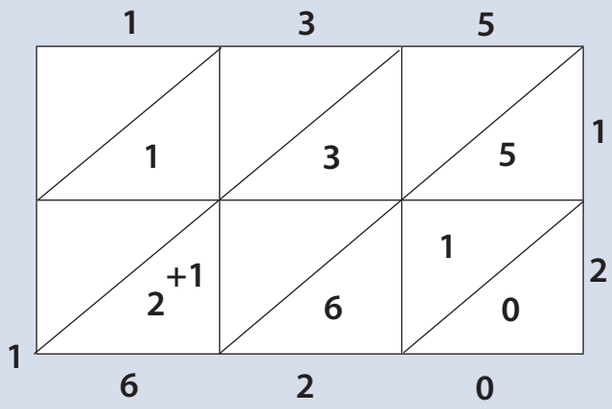


Step 4: (Refer to the diagram below)

Add the numbers along the diagonals starting from the right. The first diagonal contains zero. Thus, write zero below the grid. In the second diagonal, 6+1+5 = 12. Write 2 below the rectangle and carry '1' to the next diagonal.

Thus the sum of the third diagonal is 2+1+3 = 6.

The fourth diagonal contains only the number 1. Write '1' below the grid as shown in the following diagram.

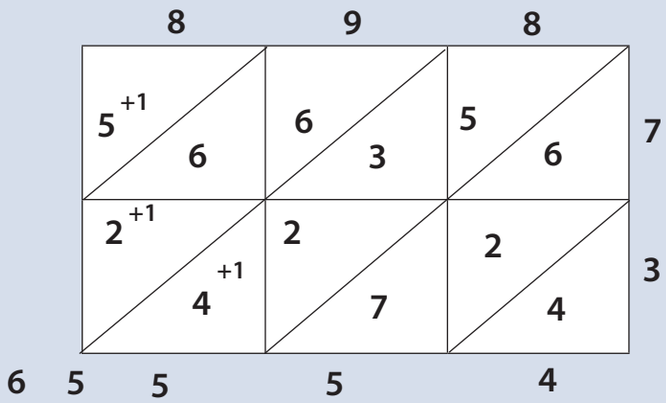


Thus, 135 X 12 = 1620

Check your answer:

$$\begin{array}{r} {}^{1}1^{1}3\,5 \\ \times\ 1\,2 \\ \hline {}^{1}2\,7\,0 \\ 1\,3\,5\,0 \\ \hline 1\,6\,2\,0 \\ \hline \end{array}$$

Example: 898 X 73

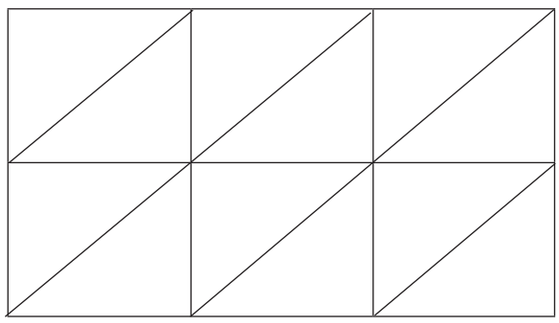


Check:

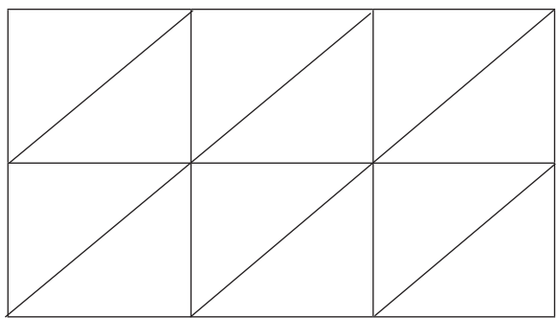
$$\begin{array}{r} {\scriptstyle 6\ 5} \\ {\scriptstyle 2\ 2} \\ 8\,9\,8 \\ \times\quad 7\,3 \\ \hline {}^{1}2\ 6^{1}\ 9\ 4 \\ 6\,2\,8\,6\,0 \\ \hline 6\,5\,5\,5\,4 \end{array}$$

6. Work out

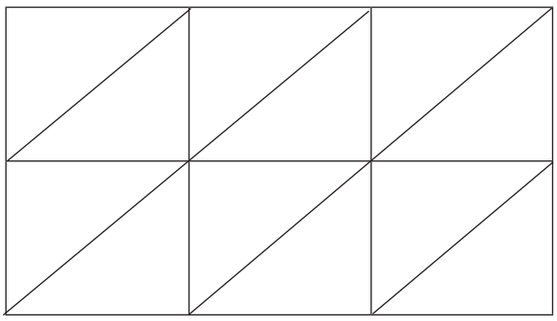
(a) 245 X 32



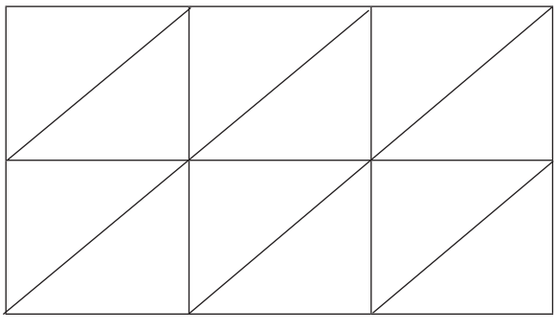
(b) 629 X 45



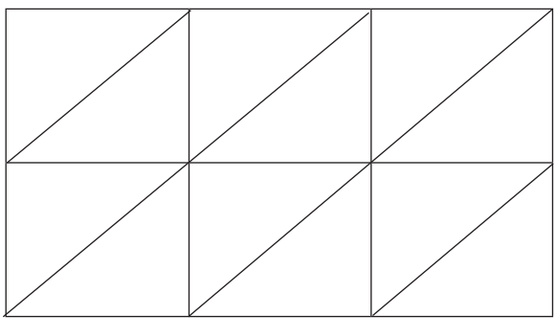
(c) 898 X 73



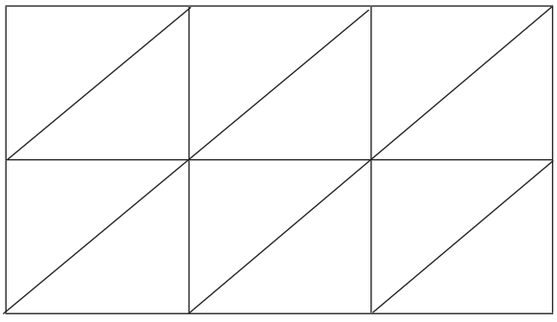
(d) 142 X 18



(e) 325 X 48



(f) 923 X 14



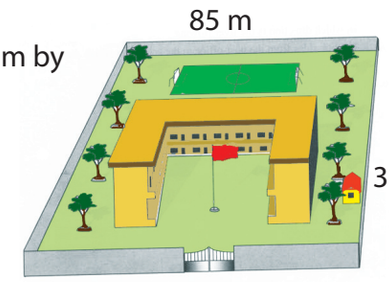
7. A factory uses 645 kilowatt of electricity daily. How much electricity does the factory use in 24 days?

8. A car manufacturer uses 234 screws to make a car. If he manufactures 65 cars, how many screws are needed?

9. In a school of 396 pupils, each contributes Rs 85 for an outing. How much money is collected in all?

10. Hans grows 124 rows of cabbages. There are 30 cabbages in each row. How many cabbages are there altogether?

11. The rectangular school compound has dimensions 315 m by 85 m. Find the area of the school compound.



Division

In this section, we work out problems involving division by a 2-digit number.

Example 1:

336 cans of soft drink are to be packed in boxes of 24. How many such boxes are obtained?

We divide 336 by 24, i.e., 336 ÷ 24.

14

~~5~~[1]6 (dividing by 4)

3 3 6 (dividing by 6)

~~24~~ (dividing by 6)

~~4~~ (dividing by 4)

1

Alternatively, we can proceed as follows.

We know that 24 x 10 = 240.

Thus 240 cans will fill 10 boxes.

Number of cans left = 336 – 240 = 96.

How many boxes will be required to pack the remaining 96 bottles?

1 box = 24 cans

2 boxes = 24 x 2 = 48 cans

3 boxes = 24 x 3 = 72 cans

4 boxes = 24 x 4 = 96 cans

Thus, we need 4 more boxes.

Therefore, the total number of boxes required = 10 + 4 = 14.

336 ÷ 24 = 14

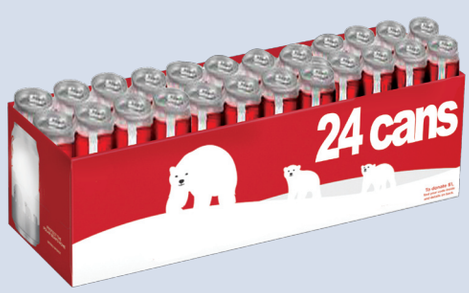
336

- 240 ← 10 boxes

96

- 96 ← 4 boxes

0 14 boxes



Division

Division by repeated subtraction

Eample 2: Consider 2232 ÷ 72

We know that 72 x 10 = 720.

2232

_ 720 ← 10 times

1512

_ 720 ← 10 times

792

_ 720 ← 10 times

72

_ 72 ← 1 times

0

31 times

or

31

~~6 2~~

~~3 7 2~~

~~2 2^{4} 3 2~~

~~7 2~~

~~1 2~~

~~2~~

1

Thus 2232 ÷ 72 = 31.

1. Work out

(a) 75 ÷ 15 =

(b) 96 ÷ 16 =

(c) 169 ÷ 13 =

2. Work out

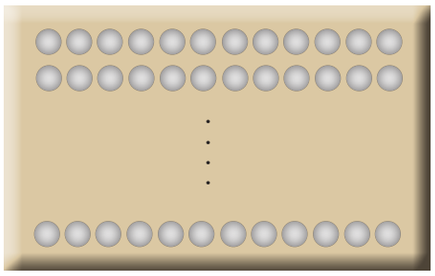
(a) 1161 ÷ 43 =

(b) 1600 ÷ 25 =

(c) 1022 ÷ 73 =

(d) 1614 ÷ 56 =

3. A carpenter drills 216 holes in a rectangular array in a board. There are 12 holes in each row. How many rows are there in all?



4. One dollar ($) can be exchanged for Rs 28. How many dollars can be obtained for Rs 1260?

5. Jodish buys a CD player on hire purchase for Rs 2352. She pays Rs 98 as monthly instalment. How many months does she take to settle the account?

6. A poultry farm sells eggs in packs of 24. Everyday the farm produces 1560 eggs. How many packs are produced daily?

Multiplication by multiples of 10

Knowledge of multiplication by multiples of 10 is very useful in performing mental arithmetic.

Example 1

(a) $6 \times 10 = 60$

(b) $6 \times 20 = 6 \times 2 \times 10$

$= 12 \times 10 = 120$

(c) $6 \times 80 = 6 \times 8 \times 10$

$= 48 \times 10 = 480$

Example 2

(a) $6 \times 100 = 600$

(b) $6 \times 200 = 6 \times 2 \times 100$

$= 12 \times 100 = 1200$

(c) $6 \times 800 = 6 \times 8 \times 100$

$= 48 \times 100 = 4800$

Example 3

(a) $6 \times 1000 = 6000$

(b) $6 \times 2000 = 6 \times 2 \times 1000$

$= 12\,000$

(c) $6 \times 8000 = 6 \times 8 \times 1000$

$= 48\,000$

Perform the multiplications in exercises 1 - 5 mentally.

1.

(a) 4×10

(b) 7×10

(c) 9×10

2.

(a) 3×40

(b) 7×30

(c) 9×70

3.

(a) 3×100

(b) 5×100

(c) 9×100

4.

(a) 4×300

(b) 7×500

(c) 8×800

5.

(a) 3×5000

(b) 7×6000

(c) 9×9000

Note

$4 \times 25 = 100$

$8 \times 125 = 1000$

$40 \times 25 = 1000$

Multiplication by 9 and 99

To multiply a number by 9, we can first multiply it by 10 and then subtract it from the result.

Example 1: 24×9

$24 \times 10 = 240$

$240 - 24 = 216$

Example 2: 37×9

$37 \times 10 = 370$

$370 - 37 = 333$

Similarly, to multiply a number by 99, we can first multiply it by 100 and then subtract it from the result.

Example 3: 5×99

$5 \times 100 = 500$

$500 - 5 = 495$

Example 4: 24×99

$24 \times 100 = 2400$

$2400 - 24 = 2376$

Example 5: 36×99

$36 \times 100 = 3600$

$3600 - 36 = 3564$

Work out exercises 1, 2 and 3 using the method given in the explanation box.

1.

(a) 13×9

(b) 27×9

(c) 43×9

2.

(a) 5×99

(b) 6×99

(c) 8×99

3.

(a) 15×99

(b) 26×99

(c) 30×99

Multiplication by splitting

We can multiply numbers by splitting them in terms of units and tens.

Example 1

$14 \times 6 = (10 \times 6) + (4 \times 6)$

$= 60 + 24 = 84$

Example 2

$76 \times 9 = (70 \times 9) + (6 \times 9)$

$= 630 + 54$

$= 684$

Example 3

$27 \times 50 = (27 \times 5) \times 10$

Now, $27 \times 5 = (20 \times 5) + (7 \times 5)$

$= 100 + 35 = 135$

$135 \times 10 = 1350$

Example 4

$34 \times 70 = (34 \times 7) \times 10$

Now, $34 \times 7 = (30 \times 7) + (4 \times 7)$

$= 210 + 28 = 238$

$238 \times 10 = 2380$

Work out exercises 1 and 2 by splittting.

1.

(a) 14 X 7

(b) 16×5

(c) 19×8

(d) 23×6

(e) 32×4

(f) 56×6

2.

(a) 16×20

(b) 23×40

(c) 36×50

(d) 44×30

(e) 56×40

(f) 77×60

Divisibility tests

1. A number is divisible by 2 if it ends in 0, 2, 4, 6, 8.

Example:

(a) 248 is divisible by 2.

(b) 247 is not divisible by 2.

2. A number is divisible by 3 if its sum of digits is divisible by 3.

Example:

(a) 471 is divisible by 3 since 4 + 7 + 1 = 12 and 12 is divisible by 3.

(b) 143 is not divisible by 3 since 1 + 4 + 3 = 8 and 8 is not divisible by 3.

3. A number is divisible by 4 if its last two digits is divisible by 4

Example:

(a) 512 is divisible by 4 since 12 is divisible by 4.

(b) 431 is not divisible by 4 since 31 is not divisible by 4.

4. A number is divisible by 5 if it ends in 0 or 5.

Example:

(a) 225 is divisible by 5 as it ends in 5.

(b) 420 is divisible by 5 as it ends in 0.

(c) 338 is not divisible by 5 as it neither ends in 0 nor 5.

UNIT 2

1. Which of the following numbers are divisible by 2?

635, 776, 999, 540

2. Which of the following numbers are divisible by 3?

124, 225, 972, 443

3. Which of the following numbers are divisible by 4?

220, 543, 777, 988

4. Which of the following numbers are divisible by 5?

255, 673, 600, 567

5. Circle the leap year.

1984, 2006, 2008, 2010, 2012

6. Write down a 3-digit number that is divisible by

(a) 2 : _____

(b) 3 : _____

(c) 4 : _____

(d) 5 : _____

Continuous assessment

1. Work out

(a) 30 X 10 =

(b) 15 X 100 =

(c) 245 X 4 =

(d) 46 X 32 =

(e) 513 X 15 =

(f) 725 X 14 =

2. Work out

(a) 66 ÷ 3 =

(b) 144 ÷ 6 =

(c) 7000 ÷ 100 =

(d) 10000 ÷ 1000 =

(e) 221 ÷ 13 =

(f) 552 ÷ 24 =

3. Find the factors of

(a) 35 =

(b) 76 =

(c) 84 =

(d) 108 =

4. Find the multiples of 4 between 10 and 50.

5. Find the multiples of 7 between 60 and 100.

6. Write down the missing terms in the following sequences.

(a) 3, 6, 9, _____, _____, _____

(b) 1, 4, 9, _____, _____, _____

(c) 59, 57, 55, _____, _____, _____

(d) 512, 508, 504, _____, _____, _____

7. Write down the prime numbers between 20 and 40.

UNIT 2

Profiling

Numbers	Good	Satisfactory	Needs improvement
1. Perform Multiplication			
2. Perform Division			
3. Solve word problems			
4. Write factors and multiples			
5. Identify Composite & Prime numbers			
6. Complete number patterns & sequences			
7. Perform mental arithmetic operations			

Student's Progress

Teacher's comments

_____

_____

_____

_____

_____

_____

Signature of parent: _____ Date: _____

UNIT 3

By the end of the unit, you should be able to:

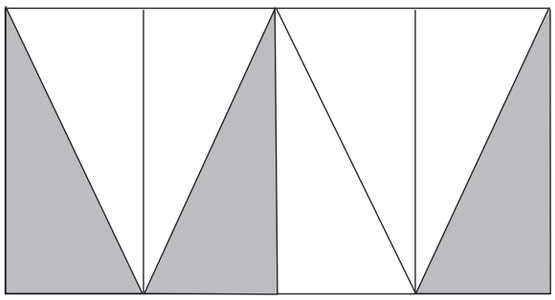
- perform operations involving fractions.
- perform operations involving decimal fractions.
- solve word problems involving fractions and decimal fractions.

UNIT 3

We shall first review the basic concepts of fraction discussed in Year 1.

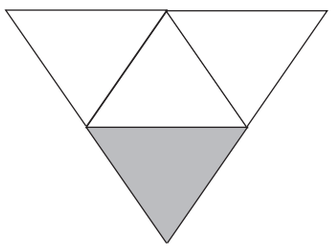
1. Write down the fraction shaded.

(a)



Fraction shaded: _____

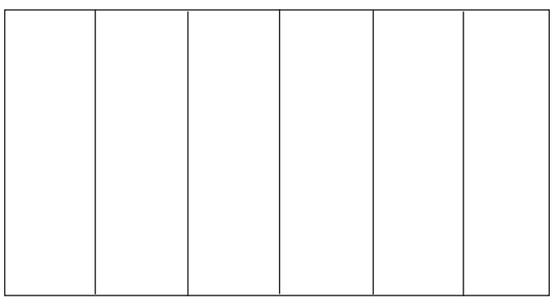
(b)



Fraction shaded: _____

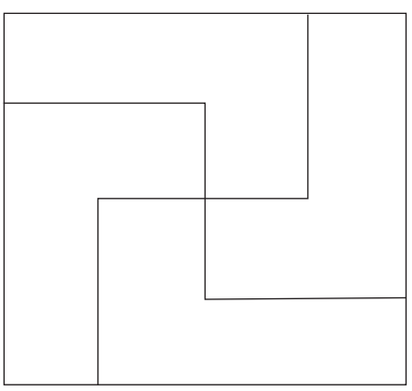
2. Shade the given fraction in each figure below.

(a)



$\frac{2}{3}$

(b)



$\frac{3}{4}$

Equivalent Fractions

3. Write the missing number.

(a) $\frac{1}{2} = \frac{\square}{12}$ (b) $\frac{1}{8} = \frac{4}{\square}$ (c) $\frac{\square}{4} = \frac{15}{20}$

(d) $\frac{14}{16} = \frac{\square}{8}$ (e) $\frac{3}{7} = \frac{\square}{56}$ (f) $\frac{6}{\square} = \frac{42}{77}$

4. Arrange in ascending order.

(a) $\frac{4}{13}, \frac{8}{13}, \frac{12}{13}, \frac{7}{13}$

_____

(b) $\frac{1}{2}, \frac{1}{8}, \frac{1}{4}, \frac{1}{16}$

_____

(c) $\frac{2}{3}, \frac{5}{9}, \frac{1}{2}, \frac{13}{18}$

_____

5. Arrange in descending order.

(a) $\frac{3}{11}, \frac{9}{11}, \frac{6}{11}, \frac{10}{11}$

_____

(b) $\frac{5}{8}, \frac{1}{2}, \frac{13}{16}, \frac{3}{4}$

_____

(c) $\frac{1}{4}, \frac{1}{6}, \frac{1}{3}, \frac{1}{8}$

_____

6. Work out:

(a) $\frac{7}{16} + \frac{5}{8} + \frac{3}{8}$

(b) $\frac{5}{12} + \frac{2}{9} + \frac{7}{36}$

(c) $3\frac{2}{5} + 2\frac{3}{10}$

(d) $6\frac{2}{3} + 2\frac{3}{4}$

7. Work out:

(a) $\frac{3}{4} - \frac{1}{2}$

(b) $\frac{3}{4} - \frac{7}{16}$

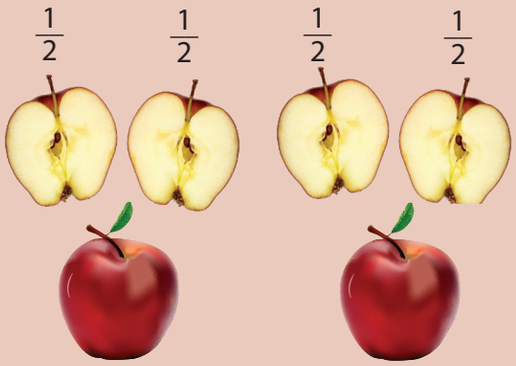
(c) $7\frac{1}{3} - 4\frac{1}{2}$

(d) $6\frac{5}{12} - 2\frac{1}{3}$

Multiplication involving fractions

Example 1

John has four friends. He wants to give ½ of an apple to each of them. How many apples does he need?



$1 \quad + \quad 1 \quad = \quad 2$

He needs: $4 \times \frac{1}{2} = \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2}$

$= \quad 1 \quad + \quad 1 = 2$

Using a shorter method:

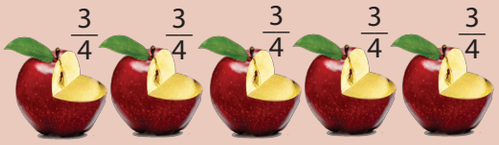
$$4 \times \frac{1}{2} = \frac{4}{1} \times \frac{1}{2}$$

$$= \frac{4 \times 1}{1 \times 2} = \frac{4}{2} = 2.$$

He needs 2 apples.

Example 2

John has five friends. He wants to give $\frac{3}{4}$ of an apple to each of them. How many apples does he need?



$\frac{3}{4} + \frac{3}{4} + \frac{3}{4} + \frac{3}{4} + \frac{3}{4}$

$1\frac{1}{2} \quad + \quad 1\frac{1}{2} \quad + \quad \frac{3}{4}$

$3 \quad + \quad \frac{3}{4} \quad = \quad 3\frac{3}{4}$

Using a shorter method:

$$5 \times \frac{3}{4} = \frac{5}{1} \times \frac{3}{4} = \frac{15}{4} = 3\frac{3}{4}.$$

8. Work out:

(a) $8 \times \frac{1}{4}$

(b) $10 \times \frac{1}{5}$

(c) $14 \times \frac{1}{7}$

(d) $25 \times \frac{3}{5}$

(e) $\frac{3}{4} \times 8$

(f) $\frac{2}{3} \times 12$

(g) $\frac{4}{5} \times 6$

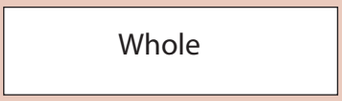
(h) $\frac{3}{7} \times 8$

Multiplication of two fractions

We know how to multiply two whole numbers. Let us now find out how to multiply a fraction by a fraction.

Example 1: Suppose Hugo has $\frac{1}{3}$ of a candy bar and he gives $\frac{1}{2}$ of it to Elsa. What fraction of the whole does Elsa's share represent?

We have to take $\frac{1}{2}$ of $\frac{1}{3}$. First consider one whole.



Hugo has $\frac{1}{3}$ of one whole as shown in the diagram.

We have to take $\frac{1}{2}$ of the shaded part. So, we divide it into two equal parts and shade one part.

The double shaded part represents $\frac{1}{2}$ of $\frac{1}{3}$.

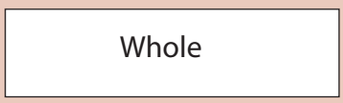
The double shaded part is also $\frac{1}{6}$ of the whole.

Thus $\frac{1}{2}$ of $\frac{1}{3}$ $= \frac{1}{6}$

or $\frac{1}{2} \times \frac{1}{3} = \frac{1 \times 1}{2 \times 3} = \frac{1}{6}$

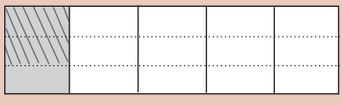
Example 2: Similarly, we can interpret $\frac{2}{3} \times \frac{1}{5}$ as $\frac{2}{3}$ of $\frac{1}{5}$

We have to take $\frac{2}{3}$ of $\frac{1}{5}$. First consider one whole.



Consider $\frac{1}{5}$ of one whole as shown in the diagram.

We have to take $\frac{2}{3}$ of the shaded part. We divide it into three equal parts and shade two parts.



The double shaded part represents $\frac{2}{3}$ of $\frac{1}{5}$.

The double shaded part is also $\frac{2}{15}$ of the whole.

Thus $\frac{2}{3}$ of $\frac{1}{5}$ $= \frac{2}{15}$

or $\frac{2}{3} \times \frac{1}{5} = \frac{2 \times 1}{3 \times 5} = \frac{2}{15}$

Therefore to multiply two fractions:
(i) we multiply the numerators
(ii) we multiply the denominators

9. Work out the fraction multiplication using rectangular representation as in the explanation box.

(a) $\frac{1}{2} \times \frac{1}{4}$

(b) $\frac{2}{3} \times \frac{1}{7}$

10. Work out the fraction multiplication.

(a) $\frac{7}{15} \times \frac{1}{3}$

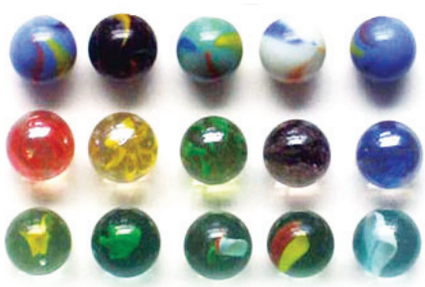
(b) $\frac{4}{9} \times \frac{2}{7}$

(c) $\frac{5}{12} \times \frac{3}{10}$

(d) $\frac{5}{6} \times \frac{2}{5}$

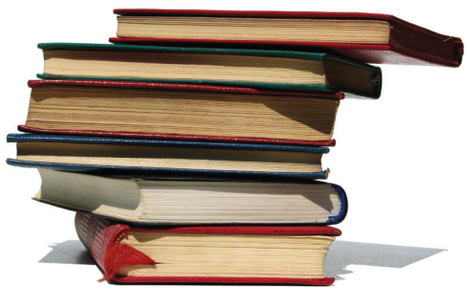
11. Nishal has 15 marbles . He loses $\frac{2}{5}$ of them.

How many marbles are left?



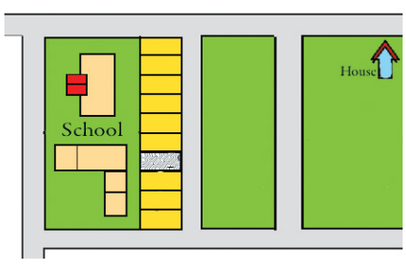
12. James has Rs 200. He spends $\frac{3}{5}$ of it on books.

How much money is left?



13. Jane lives 2100 metres away from school. She walks $\frac{2}{7}$ of the distance and travels the rest by bus.

What distance does she travel by bus?



14. Rajeev has Rs 240. He spends $\frac{3}{8}$ of it on books and $\frac{1}{3}$ of it on a pen. How much money is left?

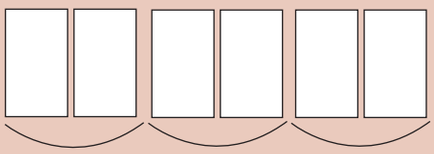
UNIT 3

Division involving fractions

Let us find out how to perform division involving fractions.

Example 1: Consider $6 \div 2$

How many sets of 2 are there in 6 wholes?



Number of sets of 2 = 3.

$$6 \div 2 = 3.$$

We also know that $6 \times \frac{1}{2} = 3.$

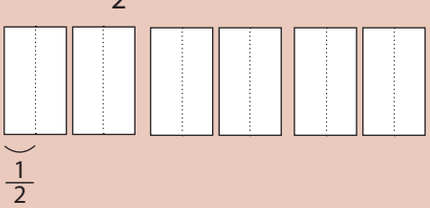
Thus, $6 \div 2$ is equivalent to $6 \times \frac{1}{2}$

or

$$6 \div \frac{2}{1} = 6 \times \frac{1}{2}$$

Example 2 : Consider $6 \div \frac{1}{2}$

How many halves ($\frac{1}{2}$) are there in 6 wholes?



Number of halves = 12

$$6 \div \frac{1}{2} = 12.$$

We also know that $6 \times 2 = 12.$

Thus, $6 \div \frac{1}{2}$ is equivalent to 6×2

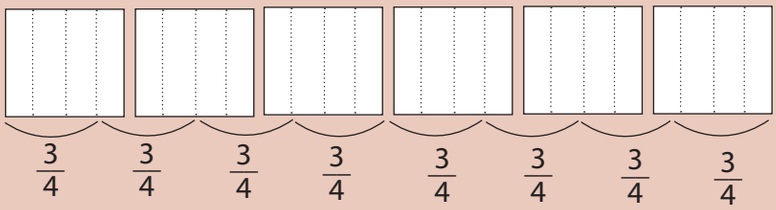
or

$$6 \div \frac{1}{2} = 6 \times \frac{2}{1}$$

Example 3: Consider $6 \div \frac{3}{4}$

How many three quarters ($\frac{3}{4}$) are there in 6 wholes?

We divide the 6 wholes into quarters and make groups of three as shown in the diagram.



Number of three quarters ($\frac{3}{4}$) in 6 wholes = 8

$$6 \div \frac{3}{4} = 8$$

Number of quarters in 6 wholes = $6 \times 4 = 24$ (see above diagram)

Number of groups of 3 in 24 quarters = $24 \div 3$

$= 8$

Thus, $6 \div \frac{3}{4} = \frac{6 \times 4}{3} = \frac{24}{3} = 8$

or

$$6 \div \frac{3}{4} = 6 \times \frac{4}{3}$$

From examples 1,2 and 3, we observe that to divide a number by a **fraction**, we flip the numerator and denomenator of the fraction and change the division sign to the multiplication sign.

Examples

1. $8 \div \frac{4}{5} = 8 \times \frac{5}{4} = \frac{8}{1} \times \frac{5}{4} = \frac{40}{4} = 10$

2. $1\frac{3}{4} \div \frac{1}{2} = \frac{7}{4} \div \frac{1}{2} = \frac{7}{4} \times \frac{2}{1} = \frac{7}{2}$

3. $\frac{5}{12} \div \frac{10}{6} = \frac{5}{12} \times \frac{6}{10}$

We may simplify the numerators and denominators before multiplying as shown below.

$$\frac{\overset{1}{\cancel{5}}}{\underset{2}{\cancel{12}}} \times \frac{\overset{1}{\cancel{6}}}{\underset{2}{\cancel{10}}} = \frac{1}{4}$$

15. Work out:

(a) $\frac{1}{4} \div 2$

(b) $\frac{3}{8} \div 5$

(c) $\frac{4}{7} \div 6$

(d) $1\frac{4}{7} \div 6$

(e) $2\frac{1}{5} \div 3$

16. Work out:

(a) $\frac{5}{12} \div \frac{10}{4}$

(b) $\frac{3}{4} \div \frac{9}{8}$

(c) $\frac{5}{24} \div \frac{20}{28}$

(d) $1\frac{3}{4} \div \frac{7}{4}$

(e) $2\frac{16}{25} \div \frac{33}{50}$

(f) $\frac{1}{10} \div \frac{9}{10}$

17. A shopkeeper packs 60 kg of milk powder into $\frac{3}{4}$ kg bags. How many bags does he obtain?

18. Asha buys 3 metres of ribbon. She needs $\frac{3}{10}$ of a metre to decorate one dress. How many dresses can she decorate with the 3 metres of ribbon?

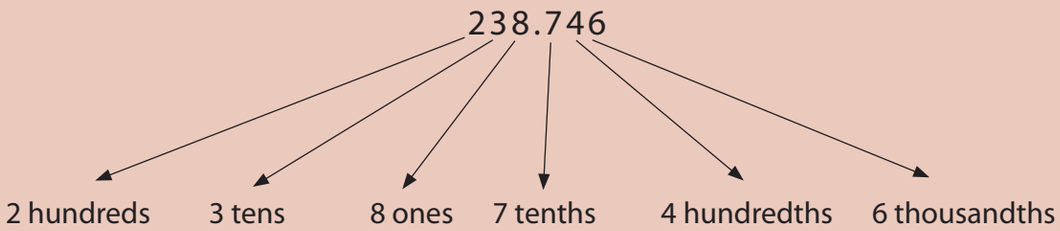
19. $5\frac{2}{5}$ kg of elaiti are to be packed in small plastic bags of $\frac{1}{20}$ kg. How many small plastic bags will be needed?

20. $10\frac{4}{5}$ kg of spices are packed in small bags of $\frac{3}{10}$ kg. How many small bags can be made?

DECIMAL FRACTIONS

In year I, you were introduced to the concept of decimals as well as addition and subtraction. In this unit, we illustrate further the idea of decimal places and multiplication and division of decimals.

Recall that each digit in a decimal number has a place value. For example:



1. Give the place value of 5 in each of the following:

(a) 5.01 _____

(b) 0.5 _____

(c) 0.85 _____

(d) 0.045 _____

2. Complete the sequence

(a) 2.38, 2.39, 2.40 ,_____ ,_____ ,_____ , 2.44.

(b) 3.58, 3.59,_____ ,_____ ,_____ , 3.63.

(c) 0.8, 0.9,_____ ,_____ ,_____ , 1.3, 1,4.

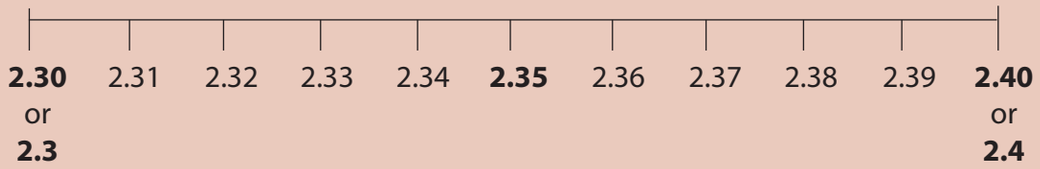
3. Arrange the following decimals in ascending order:

(a) 0.8, 0.9, 0.2, 0.5, 0.7 _____

(b) 0.71, 0.82, 0.44, 0.58 _____

Rounding decimals

Often, we have to round decimals to make calculation easier. Consider the decimals between 2.3 and 2.4.



Observe that 2.35 is exactly in between 2.30 and 2.40.

The decimal numbers 2.31, 2.32, 2.33 and 2.34 are closer to 2.3 than 2.4. We can approximate 2.31, 2.32, 2.33 and 2.34 to 2.3.

The decimal numbers 2.36, 2.37, 2.38 and 2.39 are closer to 2.4 than 2.3. We can approximate 2.36, 2.37, 2.38 and 2.39 to 2.4.

By convention, we approximate the middle number 2.35 to 2.4.

Study the table to observe how numbers with two decimal places are rounded to one decimal place.

2 decimal places	1 decimal place
2.30	2.3
2.31	2.3
2.32	2.3
2.33	2.3
2.34	2.3
2.35	2.4
2.36	2.4
2.37	2.4
2.38	2.4
2.39	2.4
2.40	2.4

4. Complete the following table:

2 decimal places	1 decimal place
4.50	
4.51	
4.52	
4.53	
4.54	
4.55	
4.56	
4.57	
4.58	
4.59	
4.60	

5. Write the following numbers to 1 decimal place.

(a) 9.53

(b) 3.47

(c) 1.38

(d) 7.25

(e) 16.79

(f) 100.26

(g) 97.55

(h) 99.96

Rounding to two decimal places

We use a similar procedure to convert numbers with 3 decimal places (3 d.p) to 2 decimal places (2 d.p). Study the table below to observe the conversion.

	3 d.p	2 d.p
Observe that the digit in the 3rd decimal place is less than 5.	2.460	2.46
	2.461	2.46
	2.462	2.46
	2.463	2.46
	2.464	2.46
Observe that the digit in the 3rd decimal place is equal to 5.	2.465	2.47
Observe that the digit in the 3rd decimal place is greater than 5.	2.466	2.47
	2.467	2.47
	2.468	2.47
	2.469	2.47
	2.470	2.47

When the digit in the third decimal place is greater or equal to 5, we increase the number in the second decimal place by one.

The same procedure is used to round a given number to any number of decimal places.

Example:

1.2847 has 4 decimal places.

1.2847 = 1.285 (to 3 d.p)

1.2847 = 1.28 (to 2 d.p)

1.2847 = 1.3 (to 1 d.p)

6. (a) Write the number shown by the balance to 2 d.p.

Answer: _____

(b) Write the number shown in the calculator to 6 d.p.

Answer: _____

(c) Write the number shown in the glucometer to 1 d.p.

Answer: _____

(d) Write the number shown by the balance to 3 d.p.

Answer: _____

Multiplication of decimal fractions by whole numbers

Study the following examples.

Example 1: 0.5 x 3

= 0.5 + 0.5 + 0.5

= 1.5

Or 0.5 x 3 = ½ x 3

$= \frac{3}{2}$

= 1 ½ = 1.5

Example 2: 0.25 x 5

= 0.25 + 0.25 + 0.25 + 0.25 + 0.25

= 1.25

Or 0.25 x 5

= ¼ x 5

$= \frac{5}{4}$

=1 ¼ = 1.25

7. Evaluate:

(a) 1.5 x 5 =

(b) 2.25 x 4 =

(c) 3.75 x 4 =

Multiplication of decimal fractions by 10, 100 and 1000

Study the following examples.

Example 1

0.5 x 10

$\frac{5}{\cancel{10}} \times \cancel{10} = 5$

Example 2

0.36 x 100

$\frac{36}{\cancel{100}} \times \cancel{100} = 36$

Example 3

0.225 x 1000

$\frac{225}{\cancel{1000}} \times \cancel{1000} = 225$

We observe that when we multiply a decimal fraction by 10, 100 and 1000, we move the decimal point to the right by 1, 2 and 3 places respectively.

0.5 x 10	5
0.36 x 100	36
0.225 x 1000	225

8. Evaluate:

(a) 0.7 x 10 =

(b) 0.51 x 100 =

(c) 0.768 x 1000 =

(d) 0.26 x 10 =

(e) 0.075 x 100 =

Multiplication of decimal fractions by multiples of 10, 100 and 1000

Study the following examples.

Example 1: **0.6 x 20**

$0.6 \times 20 = 0.6 \times 10 \times 2$

$= \frac{6}{\cancel{10}} \times \cancel{10} \times 2$

$= 6 \times 2$

$= 12$

or

$0.6 \times 20 = \frac{6}{1\cancel{0}} \times 2\cancel{0}$

$= 6 \times 2$

$= 12$

Example 2: **0.63 x 200**

$0.63 \times 200 = 0.63 \times 100 \times 2$

$= \frac{63}{\cancel{100}} \times \cancel{100} \times 2$

$= 63 \times 2$

$= 126$

or

$0.63 \times 200 = \frac{63}{\cancel{100}} \times \overset{2}{\cancel{200}}$

$= 63 \times 2$

$= 126$

Example 3: **0.527 x 3000**

$0.527 \times 3000 = 0.527 \times 1000 \times 3$

$= \frac{527}{\cancel{1000}} \times \cancel{1000} \times 3$

$= 527 \times 3$

$= 1581$

or

$0.527 \times 3000 = \frac{527}{\cancel{1000}} \times \overset{3}{\cancel{3000}}$

$= 527 \times 3$

$= 1581$

Example 4: **0.47 x 5000**

$0.47 \times 5000 = 0.47 \times 1000 \times 5$

$= \frac{47}{\cancel{100}} \times 10\cancel{00} \times 5$

$= 470 \times 5$

$= 2350$

or

$0.47 \times 5000 = \frac{47}{\cancel{100}} \times 50\cancel{00}$

$= 47 \times 50$

$= 2350$

9. Work out:

(a) 0.9 x 30 =

(b) 0.25 x 200 =

(c) 0.74 x 300 =

(d) 0.013 x 4000 =

(e) 0.87 x 700 =

(f) 0.04 x 500 =

(g) 0.03 x 6000 =

Multiplication of a decimal by a decimal

Example 1: **0.2 x 0.3**

$$\frac{2}{10} \times \frac{3}{10} = \frac{6}{100}$$

$$= 0.06$$

Example 2: **1.2 x 0.6**

$$\frac{12}{10} \times \frac{6}{10} = \frac{72}{100}$$

$$= 0.72$$

Example 3: **0.25 x 0.5**

$$\frac{25}{100} \times \frac{5}{10} = \frac{125}{1000}$$

$$= 0.125$$

10. Evaluate:

(a) 0.9 x 0.2 =

(b) 2.3 x 0.4 =

(c) 1.2 x 0.8 =

(d) 9.3 x 0.5 =

(e) 2.1 x 0.3 =

Another method for multiplication of decimals

Example 1: **2.4 x 3.7**

	2	0.4
3	3 x 2 = 6	3 x 0.4 = 1.2
0.7	0.7 x 2 = 1.4	0.7 x 0.4 = 0.28

$$\begin{array}{r} 6 \\ +\ 1.4 \\ \hline 7.4 \end{array} \qquad \begin{array}{r} 1.2 \\ +\ 0.28 \\ \hline 1.48 \end{array}$$

$$\begin{array}{r} 7.4 \\ +\ 1.48 \\ \hline 8.88 \end{array}$$

2.4 x 3.7 = 8.88

Example 2: **4.35 x 6.8**

	4	0.3	0.05
6	6 x 4 = 24	6 x 0.3 = 1.8	6 x 0.05 = 0.30
0.8	0.8 x 4 = 3.2	0.8 x 0.3 = 0.24	0.8 x 0.05 = 0.04

$$\begin{array}{r} 24 \\ +\ 3.2 \\ \hline 27.2 \end{array} \qquad \begin{array}{r} {}^{1}1.8 \\ +\ 0.24 \\ \hline 2.04 \end{array} \qquad \begin{array}{r} 0.30 \\ +\ 0.04 \\ \hline 0.34 \end{array}$$

$$\begin{array}{r} 27.2 \\ +\ 2.04 \\ \quad 0.34 \\ \hline 29.58 \end{array}$$

4.35 x 6.8 = 29.58

11. Work out:

(a) 2.3 x 1.2 =

(b) 5.27 x 2.3 =

(c) 8.47 x 6.8 =

12. A jug can hold 0.75 litre of juice. How much juice can 15 such jugs hold?

13. 48 cardboards each of thickness 0.5 cm are packed together. Find the thickness of the pack.

14. A candy bar costs Rs 2.35. Find the cost of 27 such candy bars.

15. A high speed car covers 4.7 km with 1 litre of petrol. Find the distance covered by the car with 9.85 litres of petrol.

Division of a decimal by a whole number

Now, let us consider the division of decimals.

A shopkeeper has 1.5 kg of spices. She wants to divide it into 5 equal packets.

How much spice does one packet hold?

1.5 kg

She has to divide 1.5 by 5.

$1.5 \div 5$

$= 1\frac{1}{2} \div 5$

$= \frac{3}{2} \div 5$

$= \frac{3}{2} \times \frac{1}{5}$

$= \frac{3}{10}$

$= 0.3$

Each packet holds **0.3 kg** of spices.

Verify your answer:

$0.3 \times 5 = 1.5.$

More examples

***Example 1*:** **0.6 ÷ 2** $= \frac{6}{10} \div 2$ or $\frac{0.3}{2\overline{)0.6}} = 0.3$ or $2\overline{)0.6}$ 0.3

$= \frac{\overset{3}{\cancel{6}}}{10} \times \frac{1}{\cancel{2}_{1}} = \frac{3}{10}$

$=$ **0.3**

Example 2: **2.85 ÷ 3** $= \frac{285}{100} \div 3$ or $3\overline{)2.\overset{2}{8}\overset{1}{5}}$ 0.95

$= \frac{\overset{9}{\cancel{285}}^{\overset{1}{5}}}{100} \times \frac{1}{\cancel{3}_{1}} = \frac{95}{100}$

$=$ **0.95**

Example 3: **3.205 ÷ 5** $= 3.205 \div 5$ or $\frac{0.641}{\overset{3}{\cancel{3}}.\overset{2}{2}05} = 0.641$

$= \frac{641}{\cancel{3}\overset{2}{2}05} \times \frac{1}{\cancel{5}_{1}} = \frac{641}{1000}$

$=$ **0.641**

16. Work out:

(a) $2.4 \div 4$ =

(b) $0.15 \div 3$ =

(c) $8.56 \div 8$ =

(d) $3.402 \div 9$ =

(e) $6.025 \div 5$ =

17. 0.2 m of a PVC pipe is cut into 5 equal pieces. What is the length of each piece in metre?

Division of a decimal by a decimal

To perform division involving decimals, we convert the divisor to a whole number.

Example 1: $2.8 \div 1.4 = \frac{2.8}{1.4}$

To convert the denominator (1.4) to a whole number, we multiply it by 10. Similarly, we multiply the numerator by 10.

$$\frac{2.8}{1.4} = \frac{2.8 \times 10}{1.4 \times 10} = \frac{28}{14}$$

$$= \frac{4}{2} \text{ (after dividing numerator and denomenator by 7)}$$

$$= 2 \text{ (after dividing numerator and denomenator by 2)}$$

Example 2: $3.36 \div 2.24 = \frac{3.36}{2.24}$

To convert the denominator (2.24) to a whole number, we multiply it by 100. Similarly, we multiply the numerator by 100.

$$\frac{3.36}{2.24} = \frac{3.36 \times 100}{2.24 \times 100} = \frac{336}{224}$$

$$\frac{336}{224} = \frac{84}{56} \text{ (after dividing numerator and denomenator by 4)}$$

$$= \frac{12}{8} \text{ (after dividing numerator and denomenator by 7)}$$

$$= \frac{3}{2} = 1.5 \text{ (after dividing numerator and denomenator by 4)}$$

$3.36 \div 2.24 = 1.5$.

18. Work out:

(a) $0.75 \div 0.15 =$

(b) $8.4 \div 0.24 =$

(c) $1.25 \div 0.25 =$

(d) $3.08 \div 0.11 =$

(e) $3.36 \div 0.14 =$

(f) $13.5 \div 0.18 =$

Continuous assessment

1. Arrange in ascending order.

(a) $\frac{5}{17}$, $\frac{7}{17}$, $\frac{11}{17}$, $\frac{3}{17}$

_____

(b) $\frac{1}{3}$, $\frac{5}{6}$, $\frac{7}{12}$, $\frac{11}{12}$

_____

2. Arrange in descending order.

(a) $\frac{2}{19}$, $\frac{3}{19}$, $\frac{7}{19}$, $\frac{10}{19}$

_____

(b) $\frac{3}{5}$, $\frac{2}{5}$, $\frac{4}{5}$, $\frac{1}{10}$

_____

3. Work out:

(a) $\frac{2}{9} \times \frac{5}{7} =$

(b) $7\frac{2}{9} \times \frac{4}{15} =$

(c) $\frac{8}{21} \div \frac{4}{7} =$

(d) $2\frac{3}{8} \div 9\frac{1}{4} =$

4. Wainda gives $\frac{1}{5}$ of a cake to Raju and $\frac{3}{10}$ of it to Jules. What fraction of the whole cake is given to Raju and Jules?

5. The sum of two fractions is $\frac{7}{20}$. One of the fractions is $\frac{1}{10}$. Find the other fraction.

6. Work out.

(a)
$$\begin{array}{r} 3.14 \\ \times\ 0.5 \\ \hline \\ \hline \end{array}$$

(b)
$$\begin{array}{r} 2.14 \\ \times\ 1.5 \\ \hline \\ \hline \end{array}$$

(c)
$$\begin{array}{r} 1.23 \\ \times\ 2.4 \\ \hline \\ \hline \end{array}$$

7. Work out:

(a) $4.2 \div 6$

(b) $4.48 \div 3.2$

8. Round the decimals to the required decimal place.

(a) 4.32 : _____ (1 d.p)

(b) 2.76 : _____ (1 d.p)

(c) 3.465 : _____ (2 d.p)

Fractions and Decimals	Good	Satisfactory	Needs improvement
1. Multiplication of fractions			
2. Division of fractions			
3. Rounding of decimals			
4. Multiplication of decimals			
5. Division of decimals			
6. Word problems			

Student's Progress

Teacher's comments

_____

_____

_____

_____

_____

_____

Signature of parent: _____ Date: _____