Arab Republic of Egypt
Ministry of Education &
Technical Education
Central Administration
of Book Affairs

Mathematics

for Primary Stage - Year 4

first term

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2019 - 2020

Foreword

Dear students,

We are pleased to introduce this book " *Mathematics for Primary stage - Year 4* " to our children. We have done all what we can to make studying mathematics an interesting job for you. We are confident in your abilities in understanding the subject of the book, but even seeking for more.

Besides the interesting figures and drawings, we took into consideration to increase cross-curricular and real life mathematics applications, where you sense the value and importance of studying mathematics. In many situations, you will find that we ask you to use a calculator to check mathematical operations, and invite you to use the computer to conduct some operations and draw some figures and decorate them. Towards the end of every unit, you will find some activities (sometimes may be closer to puzzles), in order to enjoy studying mathematics, where you will find great, but calculated, challenges that alerts your minds and develops your tendencies.

Be careful to follow all what is written, conduct all activities and do not hesitate to question your teacher in all what you may face of any difficulties.

Remember that many of the mathematics questions which have more than one correct answer, and studying it bears values that reflect this great humanitarian effort.

May God help you and us to acheive what is good for our beloved nation Egypt.

The authors

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Large Numbers and Operations on them

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Lesson 1

Hundred Thousands

99 999 + 1 = 100 000

$$\begin{array}{r} 99999 \\ +\quad 1 \\ \hline 100000 \end{array}$$

is read as ninty nine thousand, nine hundred and ninty nine and it is the greatest 5-digit number.

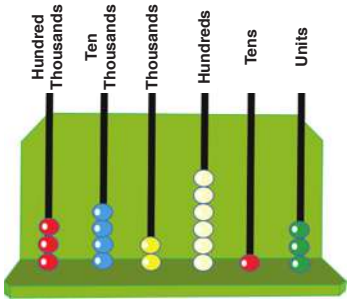
This number is read as "hundred thousand"

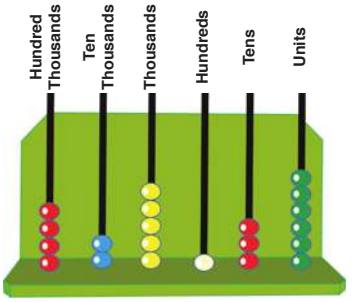
Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Units
	9	9	9	9	9
					1
1	0	0	0	0	0

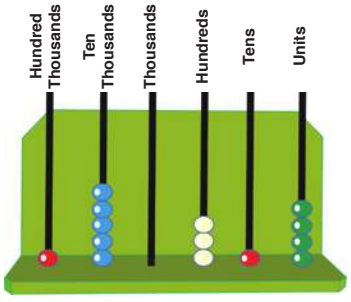
+

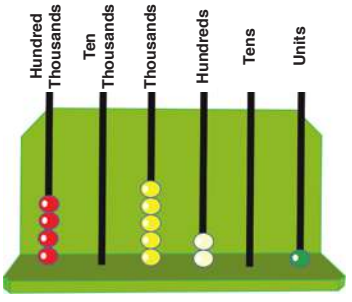
Exercise 1

1 Write the numbers.









2 Complete according to the place value of each digit.

Number	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Units
752 341						
605 618						
78 539						
58 002						

3 Underline the correct number, in digits, which express each of the following words.

a one hundred sixty thousand, seven hundred and forty .....

b one hundred thousand, three hundred and seventy-five .....

c seventy thousand, five hundred and ninty- three .....

4 Complete as the example.

Example: 147 962 = 962 + 147 000
= 2 + 60 + 900 + 7 000 + 40 000 + 100 000

a 672 384 = 384 + ...
= 4 + 80 + ...

b 126 459 = 459 + ...
= 9 + ...

c 35 608 = 608 + ...
= .....

5 Read the following numbers, then write them in words.

a 712365

b 105206

c 300418

6 Write the value of the circled digit in each of the following numbers.

a 27 351 **b** 156 348 **c** 723 608

d 543 092 **e** 230 045 **f** 467 900

7 Complete using the suitable sign < , > or = in each ☐.

a 132 045 ☐ 93 245 **b** 85 679 ☐ 302 001

c 100 074 ☐ 74 001 **d** 321 587 ☐ 321 587

e 20 864 ☐ 20 531 **f** 437 786 ☐ 437 876

8 Write the greatest and the smallest number that can be formed from the number cards in each of the following.

a 4 1 5 3 2 6

greatest .....

smallest .....

b 7 6 4 3 9 1

greatest .....

smallest .....

c 3 3 2 6 7 7

greatest .....

smallest .....

9 Arrange the following numbers in an ascending order, then in a descending order.

a 654 321 , 143 265 , 142 365 , 645 321

b 325 604 , 302 564 , 325 046 , 325 064

c 515 115 , 151 155 , 551 115 , 115 515

10 Complete in the same pattern.

a 710 654 , 720 654 , 730 654 , ... , ...

b 80 000 , 280 000 , 480 000 , ... , ...

c 100 568 , 100 578 , 100 588 , ... , ...

d 220 300 , 210 300 , 200 300 , ... , ...

11 Join the cards with equal numbers.

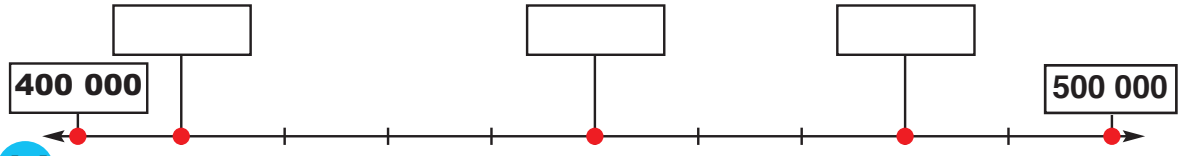
710 710		1 710 + 70 000
710 + 71 000	710 + 710 000	71 710
10 + 700 + 710 000		10 + 700 + 71 000

12 Underline the nearest number to 100 000 in each case.

a 90 000 and 109 000 **b** 101 000 and 100 900

c 200 000 and 90 000

13 Write suitable numbers inside the empty rectangles on the number line according to thier places.



14 **a** Write the greatest 6-digit number.

b Write the greatest different 6-digit number.

c Write the smallest 6-digit number.

d Write the smallest different 6-digit number.

15 **a** Write the greatest number different 6-digit number and their sum is 15.

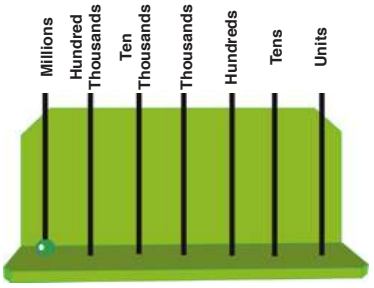
b Write the smallest different 6-digit number and their sum is 17.

c Write the greatest different 6-digit number and the sum of its units and tens digits is 7.

d Write the smallest different 6-digit number and the sum of its units and tens digits is 7.

Lesson 2

Millions

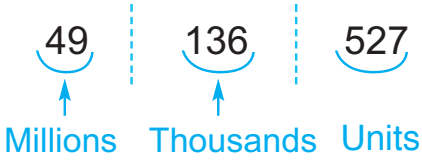


Complete the following table to find the sum of: 999 999 + 1

Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Units
	9	**9**	**9**	**9**	**9**	**9** **+ 1**

The sum is 1 000 000, and it is read as '**one million**' and can be represented on the abacus as in the figure above.

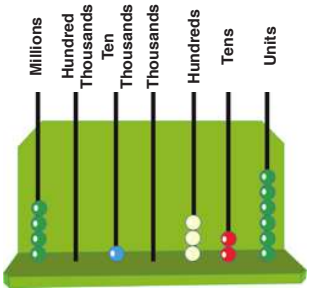
To read the number 49 136 527, we separate its digits as shown below

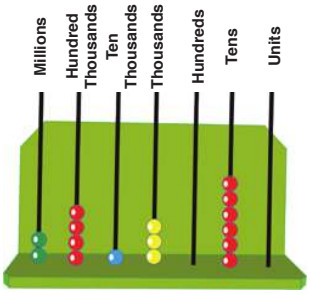


it is read from left to right as: 49 million, 136 thousand and 527

Exercise 2

1 Write the numbers.





2 Write each of the following number in digits then put it in the corresponding table according to the place value of each digit.

(a) 17 million and 450 thousand and 46

Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Units

(b) 105 million and 11

Hundred Millions	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Units

3 Write the following number in digits.

(a) One million , one hundred and fifty thousand and twenty seven.

(b) Twenty four million, thirty thousand and two hundred five.

(c) Five hundred million and six hundred thousand .

(d) Nine hundred thousand and eighty.

4 Write the following sum in digits.

a $\frac{1}{4}$ million pound ..... pounds .

b $\frac{1}{2}$ million pound ..... pounds .

c $\frac{3}{4}$ million pound ..... pounds .

5 Write the following sum in digits.

a 7435218 =7 million + 435thousand + 218.

b 4691508 = ...million + ...thousand + ...

c 734216858 = ...million + ...thousand + ...

d 168730050 = ...million + ...thousand + ...

6 Join the two cards which express the same number

1 170 650	one million, one hundred and fifty thousand, six hundred and seventy
1 150 760	one million, one hundred and seventy thousand, six hundred and fifty
1 170 560	one million, one hundred and fifty thousand, seven hundred and sixty
1 150 670	one million , one hundred and seventy thousand, five hundred and sixty

Lesson 3

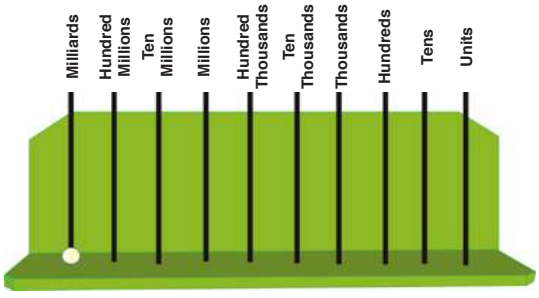
Milliards (Billions)

Complete the following table to find the sum of:
999 999 999 + 1

Milliards	Hundred Millions	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Units
	9	9	9	9	9	9	9	9	9 + 1

Milliards Millions Thousands Units

The sum is 1 000 000 000 which is the smallest 10-digit number and is read as '**milliard**', and can be represented on the abacus as in the figure opposite.



To read the number 6 408 192 357, we separate its digits as shown below

6 408 192 357

Milliards Millions Thousands Units

and it is read from left to right as: 6 Milliard, 408 million, 192 thousand and 357

Exercise 3

1 Read the following numbers, then complete.

a 8 719 645 302 ..... milliard, ... million, ... thousand and .....

b 6 539 006 475 ..... milliard, ... million, ... thousand and .....

c 2 163 900 800 ..... milliard, ... million, ... thousand and .....

d 5 180 070 506 ..... milliard, ... million, ... thousand and .....

2 Join the two cards expressing the same number.

7 000 600 900

7 million, 6 thousand and 900

7 million, 600 thousand and 900

70 600 900

7 006 900

7 milliard, 600 thousand and 900

7 000 000 + 6 000 + 900

3 **a** Which of the following numbers is the nearest to one milliard? Represent the numbers on the number line.
1 000 000 090 , 999 999 990 or 1 100 000 000

b Which of the following numbers is the nearest to two milliard?
2 000 000 020 , 299 999 999 or 1 999 999 900

4 **a** Find two 10-digit numbers with the difference between them is one milliard.

b Find two 10-digit numbers with the difference between them is one million.

c Find two 10-digit numbers with the difference between them is one thousand.

Lesson 4

Operations on Large Numbers

First: Adding and Subtracting Large Numbers

Example : A Factory produced fertilizer in year 450 thousand tons and in the next year produced 642 thousand tons .

(a) Find the sum of production in the two years .

(b) Find the amount of increase .

the solution

a

$$\begin{array}{rr} & 450000 \\ + & 642000 \\ \hline = & 1092000 \end{array}$$

b

$$\begin{array}{rr} & 642000 \\ - & 450000 \\ \hline = & 192000 \end{array}$$

Exercise 4

1 Add, then use the calculator to check your answer.

a

$$\begin{array}{rr} & 8\,752\,013 \\ + & 439\,815 \\ \hline = & \ldots\ldots\ldots\ldots \end{array}$$

b

$$\begin{array}{rr} & 2\,560\,000 \\ + & 5\,981\,812 \\ \hline = & \ldots\ldots\ldots\ldots \end{array}$$

c

$$\begin{array}{rr} & 1\,465\,789 \\ + & 5\,984\,078 \\ \hline = & \ldots\ldots\ldots\ldots \end{array}$$

d

$$\begin{array}{rr} & 2\,107305 \\ + & 5\,760119 \\ \hline = & \ldots\ldots\ldots\ldots \end{array}$$

2 Find the difference in each of the following.

a
$$\begin{array}{rr} & 2\ 256\ 912 \\ - & 1\ 145\ 810 \\ \hline = & \ldots\ldots\ldots\ldots \end{array}$$

b
$$\begin{array}{rr} & 6\ 444\ 382 \\ - & 4\ 317\ 159 \\ \hline = & \ldots\ldots\ldots\ldots \end{array}$$

c
$$\begin{array}{rr} & 9\ 000\ 100 \\ - & 8\ 087\ 089 \\ \hline = & \ldots\ldots\ldots\ldots \end{array}$$

d 9887000 −7115306 = ...

3 In the 2008-09 governomental budget and in the context of the governomental efforts to support basic commodities, 2 milliard pounds were allocated for that perpouse, 405 million pounds to maintain the prices of medicines and 750 million pounds to reduce the interest on housing loans. Find the total sum for the three items in the governomental expenditure.

Complete the solution:

	2 000 000 000 pounds	support basic commodities
	405 000 000 pounds	maintain prices of medicine
+	750 000 000 pounds	reduce interest of housing loans
=	..... pounds	governomental expenditure

4 Circle the number nearest to the correct answer, without performing the usual addition operation.

a 7 256 312 – 7 056 300 = ...
(200 million , 200 thousand , 250 thousand)

b 8 205 107 – 3 198 119 = ...
(8 milliard , 6 milliard , 5 million)

c 459 212 – 350 200 = ...
(hundred and ten thousand , hundred thousand , milliard)

d 9 575 100 – 4 275 090 = ...
(two milliard , 5 million , 850 million)

5 Circle the number nearest to the correct answer, without performing the usual subtraction operation.

a 5 260 180 + 7 985 954 = ...

(900 million . milliard . 13 million)

b 8 400 100 + 26 000 50 = ...

(11 million . 7milliard . 6milliard)

c 6 005 218 + 3 095 235 = ...

(9 million . 8and falf million . 10 million)

6 If the income from the advertisements during the African Football Cup of Nations 'Ghana 2008' for the Egyptian Channel Two was 21 million and eight hundred thousand pounds, for Nile Sports TV seven hundred thousand pounds and Youth and Sports Radio Channel five hundred and eight thousand pounds. Find the total income acheived by the three destinations from the advertisements.

7 If the budget allocated to support drinking water increased in two consecutive years from 270 250 000 pounds to 750 180 000 pounds. Find the amount of increase.

8 If the budget allocated to support medicine in two consecutive years increased from 380 million pounds to 405 million pounds to preserve the prices of medicine. Find the amount of the increase.

9 Find the number that if:

a subtracted from one milliard, the result is 758 209 312.

b added to it 7 812 159, the result will be ten million.

c 270 408 213 is subtracted from it, the result will be 18 200 999.

Second : Multiplying a Whole Number by Another

a Multiplying by a 1-digit Number

Example: Find the product of: 357 × 4 = ……

300 + 50 + 7

x 4

1200+200+28 = ...

357 x 4 = 1428

354	
x 4	
16	sixteen
+ 200	20 tens
+1200	12 hundreds
1416	

Drill 1:

Find the product of 9318 x 8

9318

8x

.....

+ 80

+.....

+.....

.....

(8+....+....+....+)x8=....+....+....+....=....

Drill 2:

Find the product as the examples.

Example 1:

(2) (6)
9 308
× 8
= 74 464

Example 2:

(1) (2) (2) (3) (3) (4)
8 354 679
× 5
= 41 773 395

a

7 354
× 4
= .....

b

83 204
× 8
= .....

c

3 605 421
× 6
= .....

Drill 3:

Mostafa bought two kinds of cloth, the price of one metre of the first kind is 97 pounds and the price of one metre of the second is 158 pounds. If Mostafa bought 4 metres of the first kind and 3 metres of the second, how many pounds did Mostafa pay?

Solution:

Price of first kind = 97 × 4 = ... pounds

Price of second kind = 158 × 3 = ... pounds

Mostafa paid = ... + ... = ... pounds

b Multiplying by a 2-digit Number

Drill 1:

Find the product as the examples.

Example 1:

$27 \times 53 = 27 \times (3 + 50)$

$= \overset{(2)}{27} \times 3 + \overset{(3)}{27} \times 50$

$= 81 + 1\,350$

$= 1\,431$

Example 2:

$$\begin{array}{r} 53 \\ \times\ 27 \\ \hline 371 \\ +\ 1060 \\ \hline = 1431 \end{array}$$

(Notice that the product is the same even with different methods, use a calculator to check your answer.)

$24 \times 43 = 24 \times (..... + 40)$

$= 24 \times 3 + ... \times .....$

$= ..... + ...$

$= .....$

$$\begin{array}{r} 43 \\ \times\ 24 \\ \hline ..... \\ +\ ..... \\ \hline = ... \end{array}$$

Drill 2:

Find the product of $4 \times 12 \times 25$

$$4 \times (12 \times 25)$$
$$= (4 \times 25) \times 12$$
$$= 100 \times 12$$
$$= 1200$$

Drill 3:

A school took the opportunity of the Cairo International Book Fair and sent delegates to buy some books for the book library. Using the part of the invoice opposite, answer the following questions.

No.	Quantity	Unit Price	Total Price
1	12	34	
2	15	42	
3	18	48	

Grand Total: ....

a What is the number of books that cost 34 pounds each and what is their total price?

b What is the number of books that cost 42 pounds each and what is their total price?

c What is the number of books that cost 48 pounds each and what is their total price?

d Find the total amount of money required from the school.

With your teacher, discuss the benefits of holding the annual Cairo International Book Fair in Egypt and its annual timing.

Exercise 5

1 Find the product for each of the following.

a 123×15 **b** $2\,784 \times 8$ **c** $5\,467 \times 84$

d $23\,278 \times 49$ **e** $475\,209 \times 23$ **f** $3\,785 \times 17$

Use the calculator to check your answer.

2 Complete using a suitable digit in each □ .

a
$$\begin{array}{r} \square 45 \\ \times \quad 7 \\ \hline = 45\square 5 \end{array}$$

b
$$\begin{array}{r} \square 35 \\ \times \quad \square 8 \\ \hline = \quad 74\square\square \\ +\square\square 700 \\ \hline \quad \square\square\square\square\square \end{array}$$

c
$$\begin{array}{r} \square 4\square 4\square 8 \\ \times \quad 75 \\ \hline = \quad 1702040 \\ +\square\square\square\square\square\square\square \\ \hline = \square\square\square\square\square\square\square \end{array}$$

3 In one of their happy occasions, a family bought 18 kilograms of meet for LE 140 a kilogram and 16 litres of juice for LE 20 a litre. How many pounds did the family pay?

4 A man wanted to build a house for his family. He bought 15 tons of building steel for LE 12500 a ton and 48 tons of cement for LE 990 a ton. How much did the man pay?

5 Choose the number nearest to the correct answer, without performing the multiplication operation.

a $25 \times 977 \times 4$ = ... (9 000 , 10 000 , 110 000)

b $40 \times 75 \times 50$ = ... (300 thousand , 200 thousand , 500 thousand)

c $100 \times 99 \times 98$ = ... (900 thousand , 800 thousand , one million)

d 125×48 = ... (five thousand , six thousand , seven thousand)

Third : Dividing a Whole Number by Another

a Dividing by a 1-digit Number

Example: Divide 568 ÷ 2

Solution:

We know that 568 = 5 hundreds + 6 tens + 8 units
= 4 hundreds + 16 tens + 8 units

Then, 568 ÷ 2 = (400 + 160 + 8) ÷ 2
= (400 ÷ 2) + (160 ÷ 2) + (8 ÷ 2)
= 200 + 80 + 4 = 284

Drill 1:

Follow the steps of the following example to carry out the division operation: 459 ÷ 3

Complete the solution:

459 = 4 hundreds + 5 tens + …… units
= 3 hundreds + 15 tens + …… units

459 ÷ 3 = (300 + 150 + ……) ÷ 3
= (300 ÷ 3) + (…… ÷ 3) + (…… ÷ ……)
= …… + …… + …… = ……

Note: You can perform the previous steps mentally and write the quotient directly as shown in the following example.

Example: Divide 742 ÷ 2

Solution: 1
7 4 2 ÷ 2 = 3 7 1
…… ……

Drill 2:

Write the quotient directly for each of the following division operations, then use the calculator to check your answer.

a 946 ÷ 2 **b** 486 ÷ 3
c 847 ÷ 7 **d** 655 ÷ 5

Dividend and Divisor

When dividing a number by another, the first number is called the **dividend** and the second is called the **divisor**.

For example, in the division operation 54 ÷ 9,
54 is the dividend and 9 is the divisor.

Quotient and Remainder

Example: We have 17 pens that need to be distributed equally among 3 children. Find the greatest number of pens that can be given to every child.

Solution: Directly is 5 pens and 2 pens are left
because $5 \times 3 = 15$ and $17 - 15 = 2$

In this example the **quotient** is 5 and the **remainder** is 2.

Then, $17 = 5 \times 3 + 2$

Complete the following table as the example.

The division operation	The dividend	The divisor	The quotient	The remainder	Relation between elements of division operation
78 ÷ 9	78	9	8	6	78 = 9 × 8 + 6
43 ÷ 2	.....	.....	21	.....	.....
77 ÷ 5	.....	5	.....	2	.....
64 ÷ 4	.....	.....	.....	0	.....

The dividend = The divisor x The quotient+ The remainder

b Dividing a Whole Number by a 2-digit Number with remainder

Example: Find the quotient of the division without remainder 3915 ÷ 15

Solution

3915 ÷ 15 = 261

```
   0 2 6 1
15 3 9 1 5
   3 0
   ---
     9 1
   - 9 0
   -----
     1 5
   - 1 5
   -----
     0 0
```

Drill 3:

a 2 430 ÷ 18 = ...

```
    135
18 2430
   18
   --
   63
 - 54
 ----
   90
 - 90
 ----
   00
```

b 1815 ÷ 15 = ...

Complete the solution

```
   121
15 1815
   15
   --
   31
```

(check your answer by using the calculator or any other method.)

Exercise 6

1 Complete using a suitable sign <, >, or = in each ☐ without performing the division operation.

a 2 538 ÷ 18 ☐ 2 538 ÷ 37

b 720 ÷ 9 ☐ (72 ÷ 9) × 10

c 100 × (2448 ÷ 24) ☐ 24480 ÷ 24

2 Find the quotient of each of the following division operations, without using the calculator.

a 3 654 ÷ 3 **b** 18 905 ÷ 5

c 350 714 ÷ 7 **d** 390 130 ÷ 13

3 Find the quotient and the remainder for each of the following.

a 2 312 ÷ 68 **b** 3423 ÷ 62 **c** 9327 ÷ 28

d 96 964 ÷ 48 **e** 70 070 ÷ 35 **f** 64 064 ÷ 16

4 Find

a The number that if divided by 69, the quotient is 2358 .

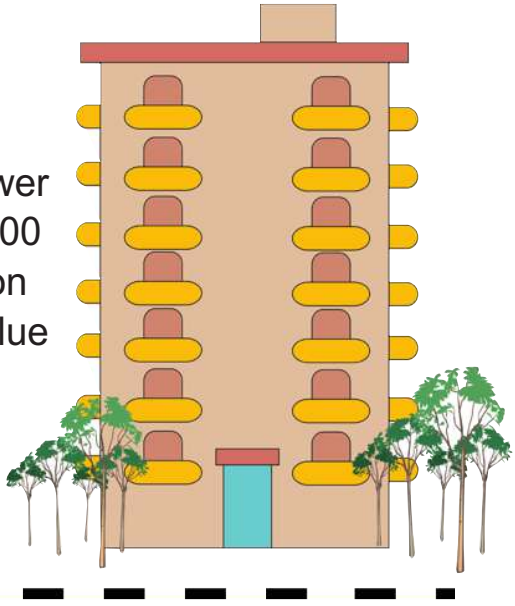
b The number that multiplied by 54, the product is 4158 .

5 The daily production of a factory producing garments from one clothing item is 738 units and from a second item is 945 units. The box used for packaging the actory production for export can hold 18 units of the first kind or 15 units of the second. Find:

a The number of boxes consumed by the factory daily.

b The daily remainder from each kind produced.

6 Adel bought a flat in a housing tower for LE 168 940. He paid LE 100 000 as a down payment and the rest on 18 equal installments. Find the value of each installment.



Unit 1 Activities

Activity 1

Numerals and Numbers

a Find the smallest number formed from 10 different digits.

b Find the greatest number formed from 10 different digits.

c Find the smallest even number formed from 10 different digits.

d Find the greatest odd number formed from 10 different digits.

e Find the smallest number formed from 10 different digits and the sum of its units and tens digit numbers equals 3.

f Find the greatest number formed from 10 different digits and the sum of its units and tens digit numbers equals 9.

Activity 2

Write three numbers each is formed from four different digits of 9, 6, 5, 4 and 0 such that:

the first is nearest to 4 000

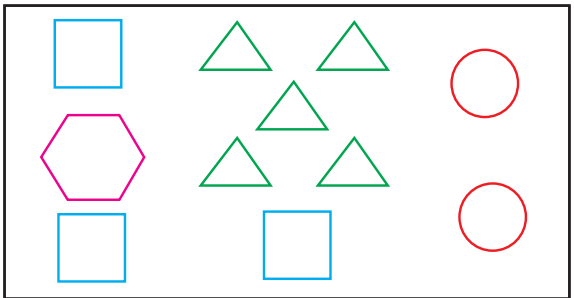
the second is nearest to 5 000

the third is nearest to 6 000

Activity 3

Notice and deduce

In the figure opposite, geometric shapes were drawn to express the number 21 003 005. Deduce the possible numerical value of each of the following shapes.

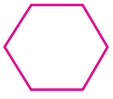


21 003 005

 = ...

 = ...

 = ...

 = ...

Activity 4

Write the following quantities of money in digits.

a $\frac{1}{4}$ milliard pound .....

b $\frac{1}{2}$ milliard pound .....

c $\frac{3}{4}$ milliard pound .....

Activity 5

Express the following numbers in terms of million.

a 2 milliard .

b $3\frac{1}{2}$ milliard .

c 10 milliard .

General Exercises on Unit 1

1 Find the result for each of the following.

a 87 562 + 5 429 = ... **b** 39 057 – 14 583 = ...

c 3 478 × 9 = ... **d** 721 014 ÷ 7 = ...

e 267 × 18 = ... **f** 62 550 ÷ 25 = ...

2 Complete.

a Write the value of the underlined digit in each of the following numbers.

3 256 812 159 , 958 214 100 , 7 100 279 312

..... , ... , ...

b Write the numbers of **a** in words.

c If 458 × 29 = 13 282, then:

i 13 282 ÷ 29 = ... **ii** 13 282 ÷ 458 = ...

iii 13 291 = ... × 29 + ...

3 Circle the number nearest to the correct answer.

a 7 815 100 + 1 475 987 = ...

(9 million , milliard , 990 million)

b 9 145 000 – 8 142 000 = ...

(3 000 , million , 200 million)

c 8 × 6 958 × 125 = ...

(7 million , 6 million , 5 million)

d (4 000 ÷ 4) × 999 = ...

(one million , one milliard , 900 thousand)

4 **a** If 756 pupils in a school are distributed equally among 18 classes, find the number of pupils in each class.

b Find the number that if multiplied by 17, the product will be 1 156.

Unit Two

Geometry

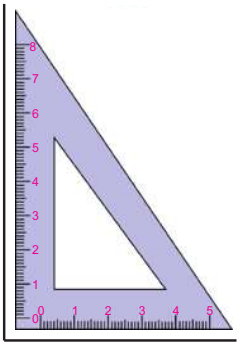
- Relation Between Two Straight Lines
- Polygons
- The Triangle
- Applications
- Unit 2 Activities
- General Exercises on Unit 2

Lesson 1

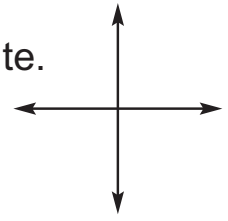
Relation between Two Straight Lines and Geometric Constructions

Drill 1:

a Use the set square, that you have in your geometric instruments, to draw a right angle, as shown in the figure opposite.



b Complete the straight lines to get the figure opposite.

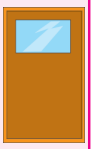


c The two straight lines that you got are called **perpendicular** straight lines.

d Measure the four angles resulted from the two straight lines at their point of intersection, you will find that the measure of each of them = ……°.
(if your measure is 90°, then your drawing is correct)

e From all previous points, we can say that:
the two perpendicular straight lines make an angle with measure ……°.

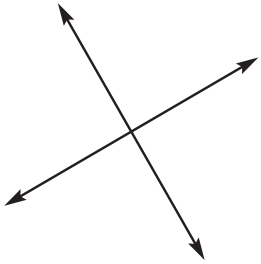
Write the greatest number of examples of perpendicular lines that you can see in your environment.

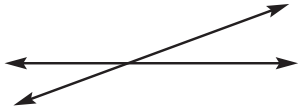
- The edges of the right angle in a set-square. 
- The vertical and horizontal edges of the door. 
- ……
- ……
- ……

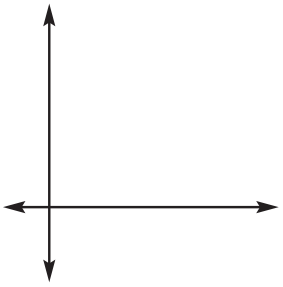
If the measure of the angle between two straight lines is not equal to 90° (acute or obtuse), then the two straight lines are **intersecting** and not perpendicular.

Drill 2:

Join each figure to the suitable statement.







Two straight lines, intersecting and not perpendicular .

Two straight lines, intersecting and perpendicular.

(you can use your geometric instruments.)

Drill 3:

a Draw two straight lines on two lines of your copybook, as shown in the figure below.

b Do you expect these straight lines to intersect if they were extended from both sides?

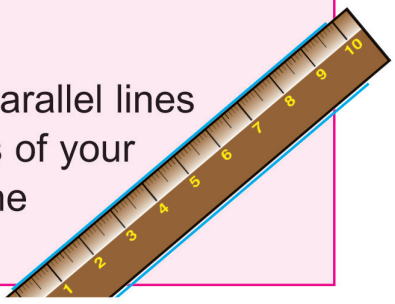
(yes ☐ , no ☐)

These two straight lines are called **parallel lines**.

Write the greatest number of examples of parallel lines that you can see arround you.

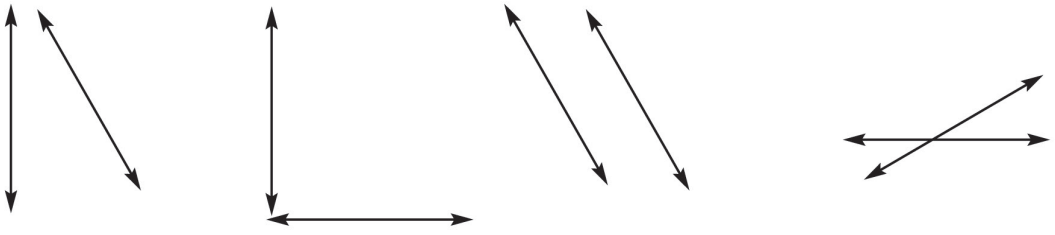
- The lines of the copy-book.
- The two edges of the ruler.
- .....
- .....
- .....
- .....
- .....

Note:
You can draw two parallel lines using the two edges of your ruler, as shown in the figure opposite.



Drill 4:

Join each figure to the suitable statement, use your geometric instruments to be sure.



1 2 3 4

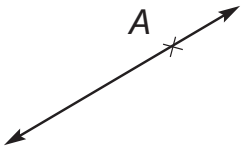
Two parallel lines

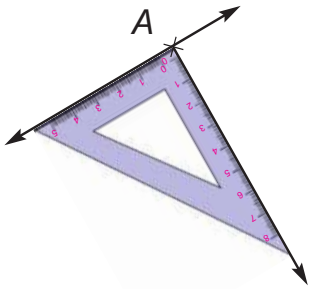
Two lines, intersecting and not perpendicular

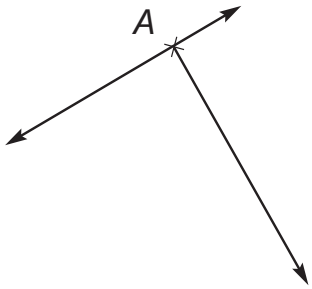
Two lines, intersecting and not perpendicular

Drill 5:

How to draw a perpendicular to a straight line from a point on it.



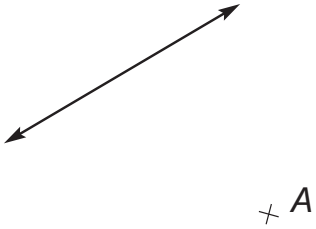


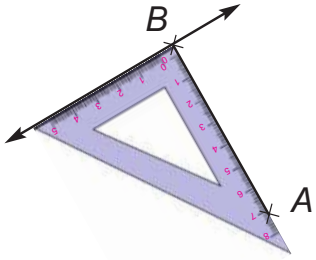


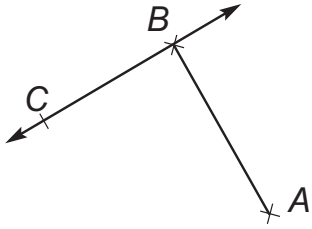
Notice and draw.

Drill 6:

How to draw a perpendicular to a straight line from a point outside it.





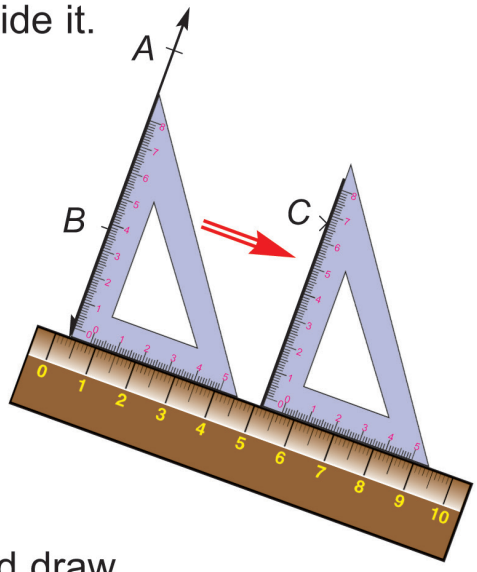


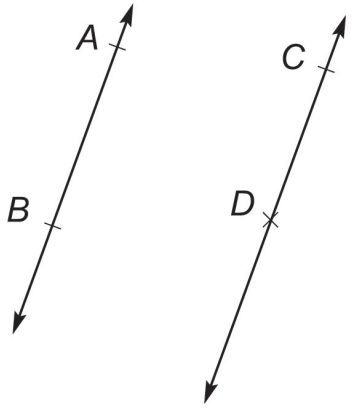
Notice and draw.

In this case, we write $\overline{AB} \perp \overleftrightarrow{BC}$.

Drill 7:

How to draw a straight line parallel to a given straight line from a point outside it.





Notice and draw.

In this case, we write $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$.

Exercise 1

1 Write the relation between each two straight lines under each figure.

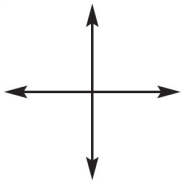


Figure 1 .....

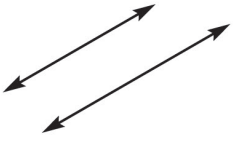


Figure 2 .....

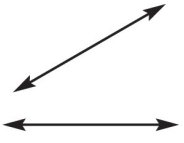
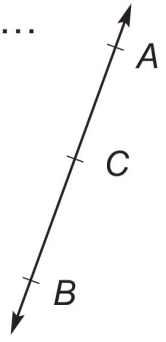


Figure 3 .....

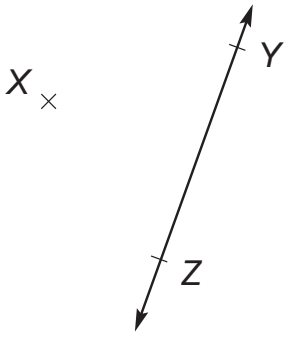
2 Draw the perpendicular $\overline{CE}$ on the given straight line $\overleftrightarrow{AB}$.

Then, complete.

m(∠BCE) = m(∠.....) = ...°.

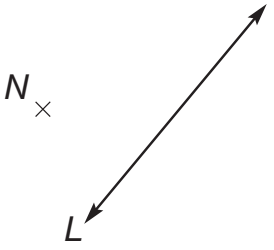


3 Draw a perpendicular from the point X on the given straight line $\overleftrightarrow{YZ}$, then complete.



If O is the point of intersection of the drawn perpendicular and the straight line $\overleftrightarrow{YZ}$, then m(∠XOY) = m(∠.....) = ...°.

4 Draw a straight line parallel to the given straight line L and passing through the point N.



5 Notice the figure opposite, then complete.

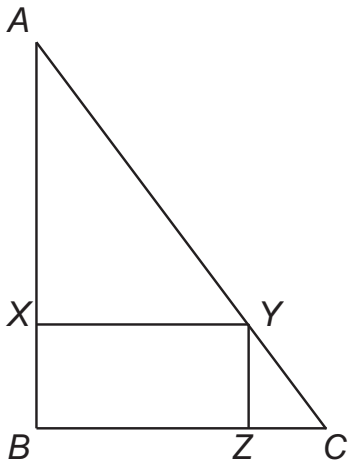
a $\overleftrightarrow{AB}$ ..... $\overleftrightarrow{BC}$ (⊥ or //)

b $\overleftrightarrow{AB}$ ..... $\overleftrightarrow{YZ}$ (⊥ or //)

c $\overleftrightarrow{XY}$ ..... $\overleftrightarrow{BC}$ (⊥ or //)

d $\overleftrightarrow{AY}$ intersects with $\overleftrightarrow{BZ}$ at the point .....

e $\overleftrightarrow{YC}$ intersects with $\overleftrightarrow{BX}$ at the point .....



Lesson 2

Polygons

Drill 1:

Notice the following polygons, then complete.

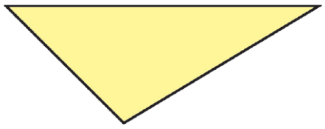


Figure 1

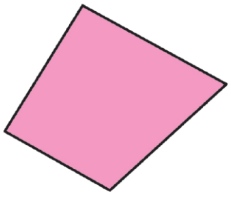


Figure 2

Figure 3

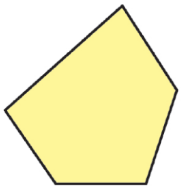


Figure 4

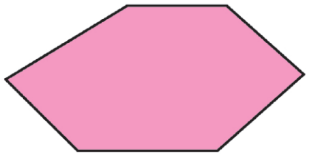


Figure 5

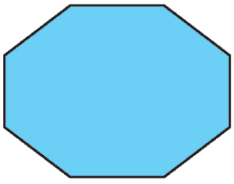


Figure 6

Figure number	The number of Sides	The number of Vertices	The number of angles
1	.....	.....	.....
2	.....	.....	.....
3	.....	.....	.....
4	.....	.....	.....
5	.....	.....	.....
6	.....	.....	.....

What do you notice?

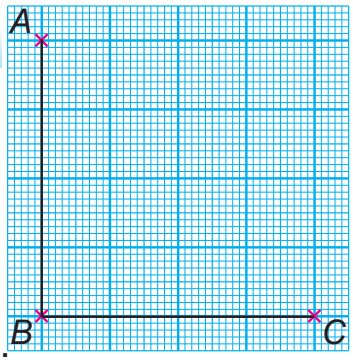
The relation between the number of sides of a polygon with respect to the number of its vertices and the number of its angles.

Notice that, for any polygon:

Number of sides ..... Number of vertices ..... Number of angles

Drill 2:

Complete drawing the square ABCD, then answer the following (consider the unit of length = 1 cm).



a AB = BC = …… = …… = …… cm

b m(∠B) = m(∠…) = m(∠…) = m(∠…) = …°.

Notice that m(∠B) can be written instead of measure (∠B) for simplicity.

c From all the above, it can be said that the square is a …… (pentagon , quadrilateral , hexagon) that has …… sides that are …… in length and …… angles that are …… in measure and the measure of each is ……° (check by drawing other squares on graph paper).

d Using your geometric instruments, check that AC = BD and for other squares that you drew on graph paper, you will find that the diagonals of the square are always equal in length.

Notice: In any quadrilateral, the **diagonal** is the line segment joining two non-consecutive vertices.

From the above, we deduce that the diagonals of the square are equal in length.

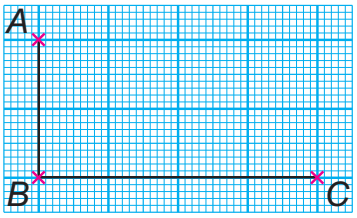
e Using the set-square, or the protractor, check that $\overline{AC} \perp \overline{BD}$ and similarly for other squares that you drew on graph paper.

From the above, we deduce that the diagonals of the square are perpendicular.

f If M is the point of intersection of $\overline{AC}$ and $\overline{BD}$, use the geometric instruments to check that MA = MB = MC = MD and similarly for other squares that you drew on graph paper.

From the above, we deduce that the diagonals of the square bisect each other.

Drill 3:



Complete drawing the rectangle ABCD, then answer the following (consider the unit of length = 1 cm).

a AB = …… = …… = …… cm and BC = …… = …… = …… cm

i.e. In the rectangle, every two opposite sides are …… in length.

b m(∠B) = m(∠…) = m(∠…) = m(∠…) = …°.

i.e. In the rectangle, all angles are …… in measure and the measure of each is ……°.

c From all the above, it can be said that the rectangle is a …… that has …… sides and every two opposite sides are …… in length and …… angles that are …… in measure and the measure of each is ……° (check by drawing other rectangles on graph paper).

d Use the geometric instruments to identify the relation between $\overline{AC}$ and $\overline{BD}$ and similarly for other rectangles that you drew on graph paper.

i.e. In the rectangle, the diagonals are …… in length.

e Using the set-square, or the protractor, check that $\overline{AC}$ and $\overline{BD}$ are not perpendicular and similarly for other rectangles (not squares) that you drew on graph paper.

i.e. The diagonals of the rectangle are not perpendicular.

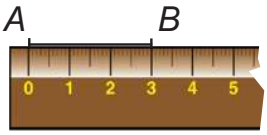
f If N is the point of intersection of $\overline{AC}$ and $\overline{BD}$, use the geometric instruments to check that NA = NC and NB = ND and similarly for other rectangles that you drew on graph paper.

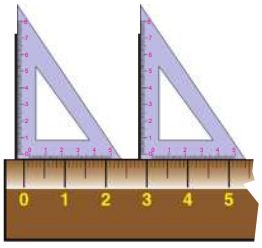
i.e. The diagonals of the rectangle bisect each other.

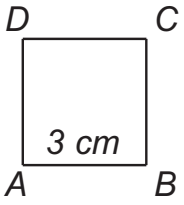
Drill 4:

Without using graph paper or squared paper, can you draw a square, given its side length?

Required: Draw the square ABCD whose side length 3 cm long.





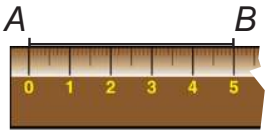


Notice and draw.

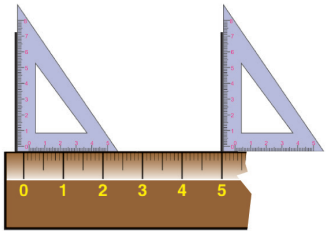
Drill 5:

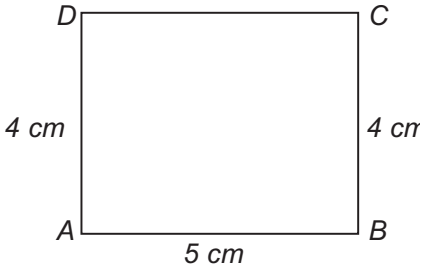
Without using graph paper or squared paper, can you draw a rectangle, given its dimentions?

Draw the rectangle ABCD in which AB = 5 cm and BC = 4 cm.



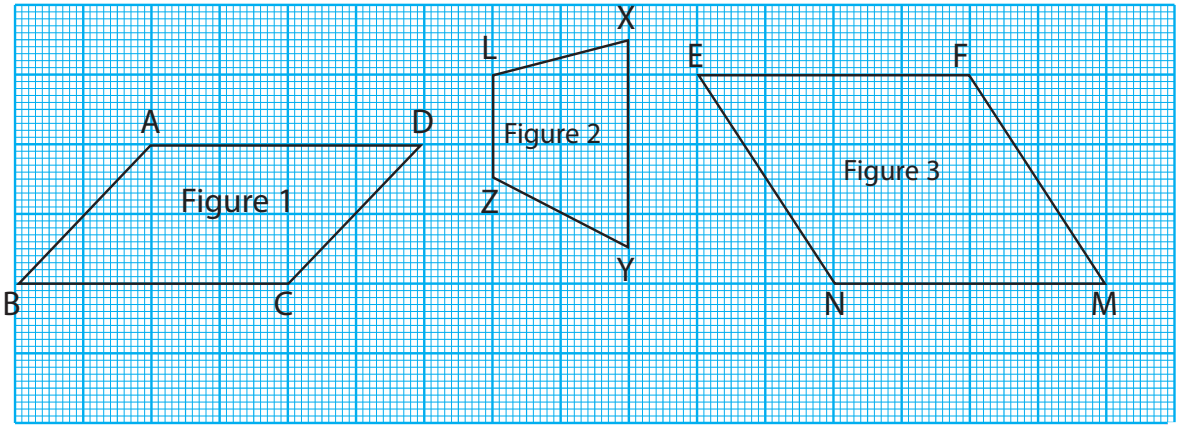
Notice and draw.





Drill 6:

Notice, then answer the following questions (use your geometric instruments).



a Is figure **1** a **rhombus**? ..... Why? .....
Because AB ≠ .....

b In figure **1**, $\overline{AB}$ // ..... and $\overline{AD}$ // .....
i.e. Each two opposite sides are .....
- The figure is called a **parallelogram**.

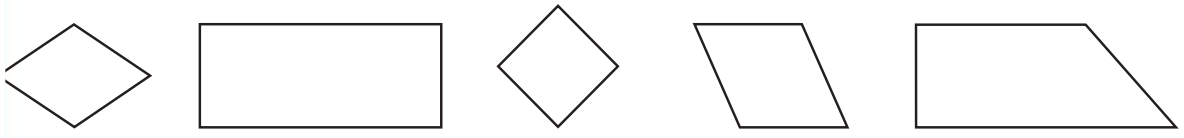
c Is figure **2** a parallelogram? ..... Why? .....
Because XY // ....., but XL is not parallel to .....
- This figure is called a **trapezium**.

d Is figure **3** a parallelogram? ..... Why? .....
Because MN // ..... and MF // .....

e In figure **3**, MN = NE = ... = ...
i.e. Figure **3** is a **quadrilateral** and its sides are ..... in length.
- This figure whose four sides are equal in length is called a rhombus.

Drill 7:

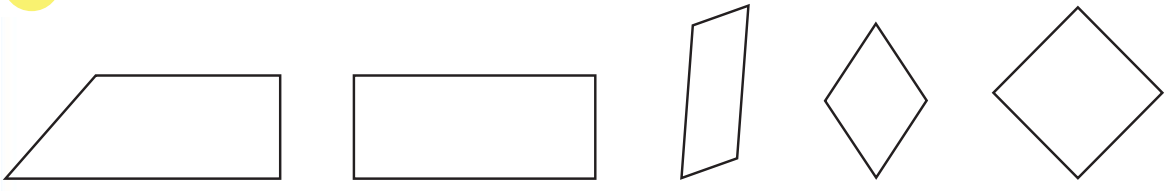
Join each figure to the suitable name.



Rectangle **Rhombus** **Parallelogram** **Trapezium** **Square** **Triangle**

Exercise 2

1 Join each figure to the suitable name.



Rectangle **Trapezium** **Triangle** **Rhombus** **Square** **Parallelogram**

2 Put (✔) for the correct statement and (✗) for the incorrect one and correct the wrong statement.

a The angles of a rectangle are right. ( )

b The sides of a square are equal in length. ( )

c The opposite sides of a parallelogram are parallel. ( )

d The measure of any angle of the square = 45°. ( )

e Any of the four angles formed from the intersection of two straight lines is a right angle. ( )

f Any angle of the four angles formed from the intersection of two perpendicular straight lines is a right angle. ( )

g Two parallel straight lines are two non-intersecting straight lines. ( )

h Two perpendicular straight lines on the same straight line are intersecting straight lines. ( )

i The two diagonals of the square are perpendicular. ( )

3 Draw the square ABCD with side length 4 cm, then complete.

a $\overline{AB}$ = …… = …… = …… = …… cm.

b $\overline{AB}$ // …… and $\overline{BC}$ // ……

c $\overline{AB} \perp$ ……, $\overline{CD} \perp$ …… and $\overline{BD} \perp$ ……

4 Draw the rectangle XYZL in which its two dimensions are 5 cm and 2 cm, then complete.

a $\overline{XY}$ = …… = …… cm and YZ = …… = …… cm.

b $\overline{XY}$ // …… and $\overline{XY} \perp$ ……

c $\overline{YZ}$ // …… and $\overline{YZ} \perp$ ……

5 Complete the following. In the quadrilateral:

a Each two opposite sides are parallel in ……, ……, …… and ……

b Each two opposite sides are equal in length in ……, ……, …… and ……

c The four sides are equal in length in …… and ……

d The four angles are right in …… and ……

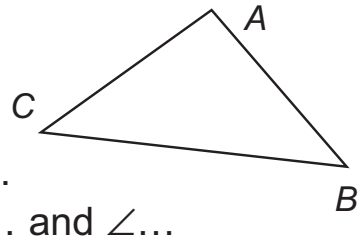
e The two diagonals in …… and …… are equal and bisect ……

Lesson 3

The Triangle

Drill 1:

Notice the figure opposite, then complete.



a The sides of the triangle ABC are $\overline{AB}$, …… and ……

b The vertices of the triangle are A, … and …

c The angles of the triangle ABC are ∠A, ∠… and ∠…

d The triangle is …… (a polygon , an open curve), it has … sides and … angles.

Identifying the Type of the Triangle According to the Measure of its Angles

Drill 2:

Notice the following triangles, then complete.

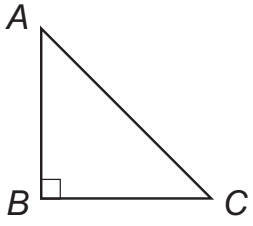


Figure 1

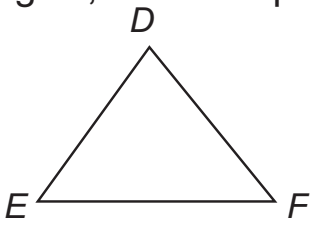


Figure 2

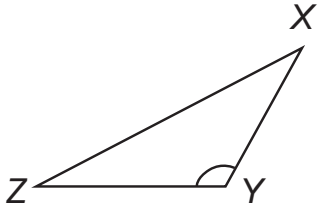


Figure 3

a In ΔABC, ∠…… is a right angle, for that the triangle is called a **right-angled** triangle.

Question: Can you draw a triangle with two right angles?

b In ΔDEF, its three angles are ……, for that the triangle is called an **acute-angled triangle**.

c In ΔXYZ, ∠…… is an obtuse angle, for that the triangle is called an **obtuse-angled triangle**.

Question: Can you draw a triangle with two obtuse angles?

Identifying the Type of the Triangle According to the Length of its Sides

Drill 3:

Notice the following triangles, then complete.

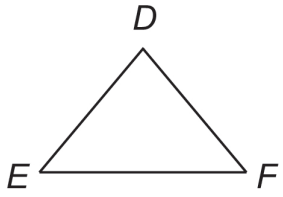


Figure 1

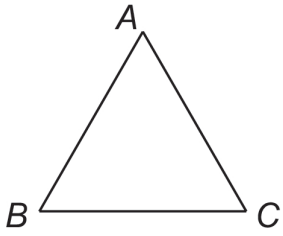


Figure 2

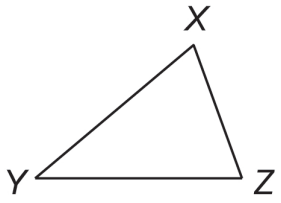


Figure 3

a In figure 1, use the compasses to check that DE = DF. This triangle is called an **isosceles triangle**.

b In figure 2, use the compasses to check that AB = BC = CA.

i.e. the three sides of the triangle are ..... in length. This triangle is called an **equilateral triangle**.

Questions Is the equilateral triangle isosceles? .....
Is the isosceles triangle equilateral? .....

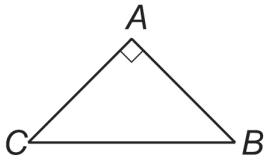
c In figure 3, use the compasses to check that the three sides of the triangle are different in length. This triangle is called a **scalene triangle**.

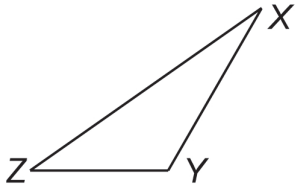
i.e xy ≠ yz ≠ zx

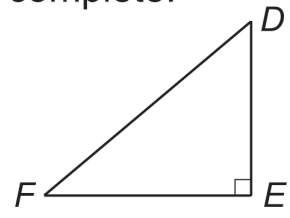
≠ denotes not equal

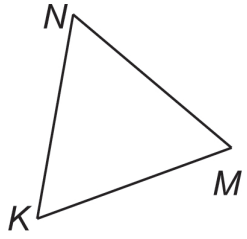
Drill 4:

Notice the following triangles, then complete.









a What is the type of the ΔABC according to its:
side lengths? ..... angles measures? .....

b What is the type of the ΔXYZ according to its:
side lengths? ..... angles measures? .....

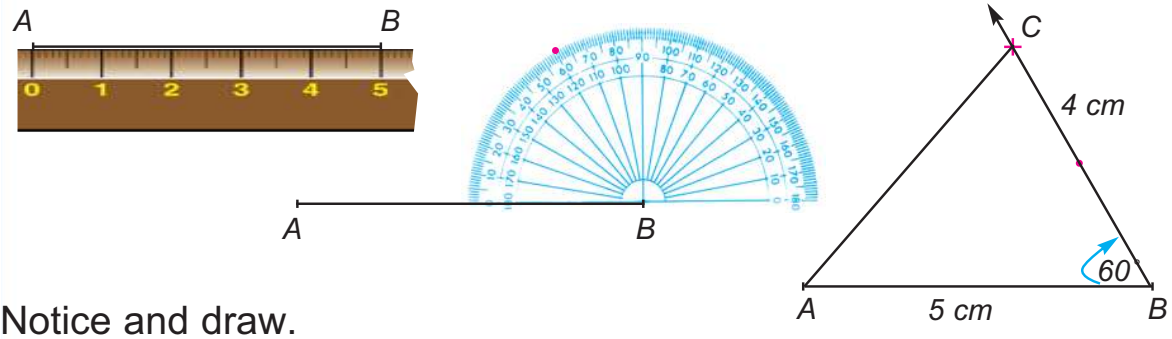
c What is the type of the ΔDEF according to its:
side lengths? ..... angles measures? .....

d What is the type of the ΔNKM according to its:
side lengths? ..... angles measures? .....

Drawing a Triangle given the Length of two Sides and the Measure of the Included Angle

Drill 5:

Draw ΔABC in which AB = 5 cm,
BC = 4 cm and m(∠B) = 60°.



Notice and draw.

Practice (1) :

Draw ΔXYZ in which XY = 7 cm, YZ = 5 cm and m(∠Y) = 40°.

Practice (2) :

Draw ΔDEF in which ∠D is right, DE = 3 cm and EF = 4 cm.
Measure the length of $\overline{DF}$, then answer the following questions.

a Calculate the perimeter of ΔDEF, given that the perimeter of any polygon = the sum of its side lengths.

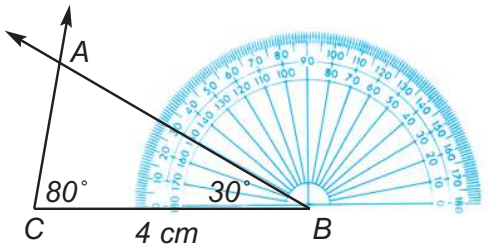
b What is the type of the triangle, according to the measures of its angles? .....
(acute-angled , obtuse-angled or right-angled)

c What is the type of the triangle, according to the length of its sides? .....
(isosceles , equilateral or scalene)

Drawing a Triangle Given the Measure of Two Angles and the Length of One Side

Drill 6:

Draw ΔABC in which BC = 4 cm, m(∠B) = 30° and m(∠C) = 80°.



Notice and draw.

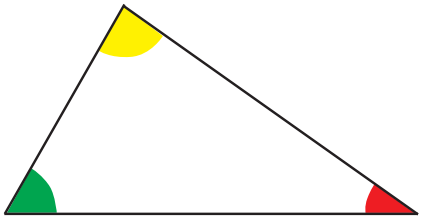
The Sum of Measures of the Angles of the Triangle

Drill 7:

a Draw any triangle on a piece of cardboard paper.

b Colour the angles of the triangle at its vertices in red, green and yellow as shown in the figure opposite.

c Use the scissors to cut the three angles and fix them on a piece of paper as shown in the figure.



Notice: The three angles together formed a straight angle and we know that the measure of the straight angle is 180°. Then, we deduce that:

The sum of measures of the interior angles of any triangle = 180°.

Drill 8:

Draw the triangle ABC in which ∠B is a right angle, m(∠C) = 60° and BC = 4 cm. Measure ∠A, then check that the sum of measures of angles of a triangle is 180°.

Drill 9:

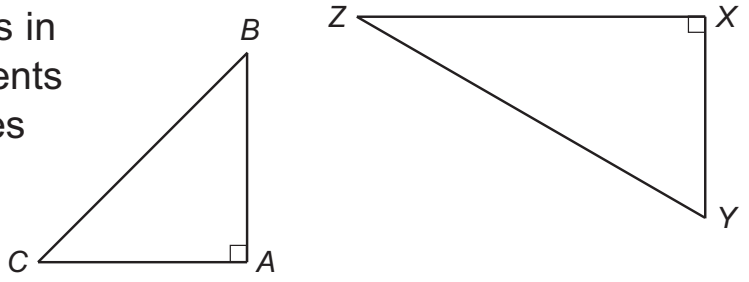
Draw ΔXYZ in which = XY = 7cm, m(∠X) = 100°, and m(∠Y) = 50°. Measure (∠Z), then answer:

a What is the sum of the measures of angles of ΔXYZ? ……°

b What is the type of the triangle XYZ according to the measures of its angles? ……

Drill 10:

Use the two set-squares in your geometric instruments box to draw two triangles as shown in the figure opposite, then answer:



a Measure the angles of each triangle, then complete.

i The sum of the measures of angles of ΔABC equals ……° + ……° + ……° = ……°

ii The sum of the measures of angles of ΔXYZ equals ……° + ……° + ……° = ……°

b What is the type of ΔABC according to its side lengths? …… (scalene , equilateral , isosceles)

c What is the type of ΔXYZ according to its side lengths? …… (scalene , equilateral , isosceles)

Exercies 3

1 Put (✔) for the correct statement and (✗) for the incorrect one and correct the wrong statement.

a There can be two right angles in one triangle. ( )

b There can be three acute angles in one triangle. ( )

c There can be a right angle and an obtuse angle in one triangle. ( )

d The measure of the straight angle = the sum of the measures of the angles of a triangle. ( )

2 Draw ΔLMN in which MN = 6 cm, m(∠M) = 40° and m(∠N) = 70°.

a Without using the protractor, find m (∠L).

b What is the type of the triangle according to the measures of its angles?

c What is the type of the triangle according to its side lengths? (measure the lengths of the sides)

3 Draw ΔXYZ in which XY = 5 cm, m(∠X) = m(∠Y) = 45°.

a Without using the protractor find m(∠Z).

b What is the type of the triangle according to the measures of its angles?

c What is the type of the triangle according to its side lengths? (measure the lengths of its sides)

4 Draw ΔABC in which AC = 7 cm, m(∠A) = 45°, and m(∠C) = 75°.

a Calculate, mentally, m(∠B), then check your answer using the protractor.

b What is the type of the triangle according to the measures of its angles?

c What is the type of the triangle according to its side lengths? (measure the lengths of the sides)

5 Draw ΔDEF in which DE = 5 cm, EF = 6 cm and m(∠B) = 80°.

a What is the sum of the measures of the two angles ∠FDE and ∠DFE?

b use the protractor to find m(∠DFE).

c Calculate m(∠FDE). (without measuring)

d What is the type of ΔDEF according to the measures of its angles and its side lengths?

Unit 2 Activities

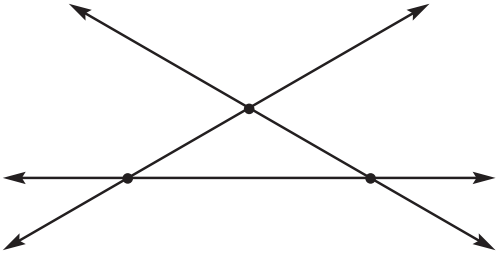
Activity 1

In the multimedia lab in your school and with the aid of your teacher, use the computer to draw the following geometric figures.

a Rectangle
b Square
c Triangle
d Other ornamental figures

Activity 2

In the figure opposite, three straight lines intersect at three points.



a What is the greatest number of intersection points can you get using four straight lines?
b What is the greatest number of intersection points can you get using six straight lines?
c What is the greatest number of intersection points can you get using six straight lines, if four of them are parallel?
d What is the greatest number of intersection points can you get using ten straight lines, if seven of them are parallel?

General Exercises on Unit 2

1 Put (✔) for the correct statement and (✗) for the incorrect one and correct the wrong statement.

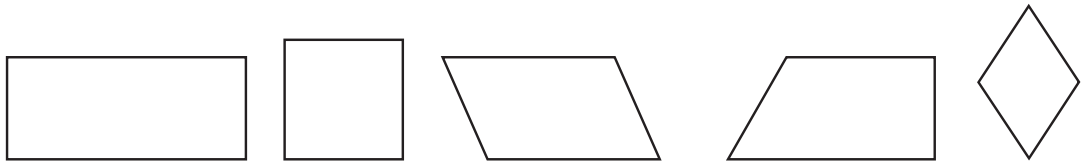
a If ABC is a triangle in which m(∠B) = 98°, then it is possible to be a right-angled triangle. ( )

b If XYZ is a triangle in which m(∠X) = 100° and m(∠Y) = 58°, then m(∠Z) = 30°. ( )

c The rhombus is a quadrilateral in which all sides are equal in length. ( )

d It is possible to draw a triangle given the measures of each of its angles. ( )

2 Join each figure to the suitable name.



Parallelogram **Rhombus** **Rectangle** **Square** **Trapezium**

3 Write only one difference between each of the following.

a The square and the rectangle.

b The triangle and the circle.

c The rhombus and the parallelogram.

d The square and the cube.

4 Draw The triangle ABC in which AB = 3 cm, BC = 4 cm and m(∠B) = 90°. Measure the length of $\overline{AC}$, then complete the rectangle ABCD and answer.

a Calculate the perimeter of each of the rectangle ABCD and the triangle ABC.

b What is the type of the triangle ABC according to:

i its side lengths. **ii** the measure of its angles.

5 In the opposite figure ABCD is a parallelogram complete

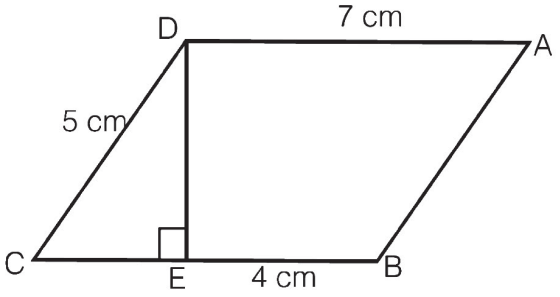
$\overline{DE} \perp$ .....

$\overline{AB} \parallel$ .....

The shape ABED is .....

the perimeter of ABED is .....

the perimeter of Δ DEC is .....



Unit Three

Multiples, Factors and Divisibility

- Multiples
- Divisibility
- Factors and Prime Numbers
- Common Factors (H.C.F.)
- Common Multiples (L.C.M.)
- Unit 3 Activities
- General Exercises on Unit 3

Lesson 1

Multiples

Drill 1:

a Complete the following table.

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

b Opposite is a set of consecutive numbers arranged in a table. Complete colouring using the same pattern.

0	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20

c Complete.
The numbers written in the coloured squares are 0, 2, 4, ... and they are the results of multiplication by .....

These numbers are called the multiples of the number 2

Note: **1** The units digit of each of these numbers is 0, 2, 4, 6 or 8.

2 Multiples of 2 are the even numbers that you studied before.

Generally:
If a number is multiplied by 2, then the product is a multiple of the number 2

Example: $17 \times 2 = 34$, hence 34 is a multiple of the number 2

Drill 2:

a Complete the following table.

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

b Opposite is a set of consecutive numbers arranged in a table. Complete colouring using the same pattern.

0	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

c Complete.

The numbers written in the coloured squares are 0, 3, 6, ... and they are the results of multiplication by .....

These numbers are called the multiples of the number 3

Generally:

If a number is multiplied by 3, then the product is a multiple of the number 3

Example: $21 \times 3 = 63$, hence 63 is a multiple of the number 3

d Complete.

The number 30 is a multiple of 3 because 30 = ... × 3

The number 24 is a multiple of ... because 24 = ... × 3

Drill 3:

a Complete the following table.

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

b Opposite is a set of consecutive numbers arranged in a table. Complete colouring using the same pattern.

0	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

c Complete.
The numbers written in the coloured squares are 0, 5, 10, …… and they are the results of multiplication by ……

These numbers are called the multiples of the number 5

Generally:
If a number is multiplied by 5, then the product is a multiple of the number 5

Example: $32 \times 5 = 160$, hence 160 is a multiple of the number 5

Note: For the multiples of the number 5, the units digit of each of these numbers is 0 or 5

d Complete.
$17 \times 5 =$ …, then the number … is a multiple of the number 5
$42 \times 5 =$ …, then the number … is a multiple of the number 5

Drill 4:

The table below contains numbers from 0 to 49.

0	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

a Put a yellow point in the cells having a multiple of the number 2.
Put a red point in the cells having a multiple of the number 3.
Put a blue point in the cells having a multiple of the number 5.

b Complete. The numbers in the cells having yellow and red points are .....
each of these numbers is a multiple of ..... and ..... at the same time and is also considered a multiple of .....

c Complete. The numbers in the cells having yellow points only are .....
each of these numbers is a multiple of ..... and it is not a multiple of ..... or .....

d Complete. The numbers in the cells having yellow and blue points are .....
each of these numbers is a multiple of ..... and ..... at the same time and is also considered a multiple of .....

e Complete. The numbers in the cells having blue points only are .....
each of these numbers is a multiple of ..... and is not a multiple of ..... or .....

Exercise 1

1 Underline each number of the following that is a multiple of the number 2: 17 , 5 , 26 , 4 , 13 , 2 , 20

2 Underline each number of the following that is a multiple of the number 3: 4 , 15 , 21 , 3 , 10 , 12 , 22

3 Underline each number of the following that is a multiple of the number 5: 23 , 15 , 40 , 51 , 5 , 8 , 20

4 Write all the multiples of the number 3 between 10 and 20.

5 Write all the multiples of the number 5 between 14 and 44.

6 Write all the multiples of the number 2 that are less than 10.

7 Write all the multiples of the number 3 that are less than 20.

8 Write all the multiples of the number 5 that are less than 30.

9 Complete.

12 = 3 × ..... hence the number 12 is a multiple of .....
and also considered a multiple of .....

28 = 7 × ..... hence the number 28 is a multiple of .....
and also considered a multiple of .....

45 = 5 × ..... hence the number 45 is a multiple of .....
and also considered a multiple of .....

10 Write the multiples of the two numbers 2 and 5 that are less than 50.

11 Write the multiples of the two numbers 2 and 3 that are less than 30.

12 Join each number to its multiples.

2 **3** **5**

7 , 8 , 11 , 12 , 15 , 21 , 30

13 **a** Write a number greater than 20 that is a multiple of the two numbers 2 and 4 and also a multiple of their product 8.

b Write a number greater than 20 that is a multiple of the two numbers 2 and 4 and not a multiple of their product 8.

14 Complete with the multiples of the number 10 as the example.

Example: 50 < 57 < 60

a ..... < 24 < .....
b ..... < 11 < .....
c ..... < 43 < .....
d ..... < 76 < .....
e ..... < 69 < .....
f ..... < 95 < .....

15 Complete with the multiples of the number 5 as the example.

Example: 20 < 23 < 25

a ..... < 17 < .....
b ..... < 8 < .....
c ..... < 32 < .....
d ..... < 66 < .....
e ..... < 81 < .....
f ..... < 94 < .....

16 If the number of pupils in a class is a multiple of the two numbers 2 and 3 that is included between 30 and 40. How many pupils are there in the class?

17 An alarm clock rings regularly every two hours, while another one rings every 3 hours. If the two alarms ring together at 12 o'clock, at what time will they ring together after that?

17×5 = ..., then the number ... is a multiple of the number 5

42×5 = ..., then the number ... is a multiple of the number 5

Lesson 2

Divisibility

First: The Meaning of Divisibility

Alaa and Yasmine baught a bag of sweets to distribute it equally among them. Complete.

- If the bag contains 5 pieces of sweets, then every one will take 2 pieces, and …… piece will be left.
- If the bag contains 6 pieces of sweets, then every one will take …… pieces, and nothing will be left in the bag.

i.e. When dividing 5 ÷ 2, the quotient is 2 and the remainder is 1
When dividing 6 ÷ 2, the quotient is 3 and the remainder is zero

It is said that: in the first case, the number 5 is not divisible by 2.
in the second case, the number 6 is divisible by 2.

Generally: The number that is divisibe by another, if the remainder of the division operation is zero.

Drill 1:

Complete.

a In dividing 7 ÷ 3, the quotient is …… and the remainder is ……, hence 7 is …… by 3.

b In dividing 20 ÷ 4, the quotient is …… and the remainder is ……, hence 20 is …… by 4.

Second: Multiples and divisibilty

We know that 35 is a multiple of the number 5, because if we multilpy 7 by 5 the product will be 35 ($5 \times 7 = 35$). To express this meaning in another way that 35 is considered a multiple of the number 5 because if we divide 35 ÷ 5 the quotient will be a whole number 7 and the remainder will be zero. So, it is said that multiples of the number 5 are divisible by 5 and multiples of the number 7 are divisible by 7.

Generally: All multiples of a number are divisible by this number.

Drill 2:

Complete as in the example.

Example: $3 \times 4 = 12$, then 12 is a multiple of each of the two numbers 3 and 4 and 12 is divisible by each of 3 and 4.

a 7×9 = ……, then …… is the multiple of each of …… and …… and …… is divisible by each of …… and ……

b 5×11 = ……, then …… is the multiple of each of … and …… and …… is divisible by each of …… and ……

c 3×7 = ……, then …… is the multiple of each of …… and …… and …… is divisible by each of …… and ……

Drill 3:

Complete as in the example.

Example: 15 is not divisible by 2 because when we divide 15 ÷ 2, the remainder is 1, hence 15 is not a multiple of the number 2.

a 35 is not divisible by 3 because when we divide 35 ÷ ……, the remainder is ……, hence 35 is not a multiple of ……

b 28 is not divisible by 8 because when we divide …… ÷ 8, the remainder is ……, hence 28 is …… of 8.

c 72 is …… by 9 because when we divide …… ÷ ……, the remainder is ……, hence 72 is …… of 9.

Generally:

1. A number is divisible by 2, if its units digit is 0 or any other even number.
2. A number is divisible by 5, if its units digit is 0 or 5.
3. A number is divisible by 3, if the sum of its digits is divisible by 3.

Exercise 2

1 Complete.

a 35 ÷ 6 = ... and the remainder is .....

b A number is divisible by 2 if its units digit is .....

c A number is divisible by 5 if its units digit is .....

d 34 ÷ 3 = ... and the remainder is ....., then 34 is ..... by 3.

2 Circle the numbers that are divisible by 2.
15 , 18 , 102 , 5224 , 6143

3 Circle the numbers that are divisible by 5.
125 , 3123 , 1460 , 2327 , 4265

4 Circle the numbers that are divisible by 3.
33 , 1256 , 73 410 , 1278

5 Write three numbers that are divisible by 2 and 5.

6 Write three numbers that are divisible by 3 and 5.

7 Write three numbers that are divisible by 2, 3 and 5.

Lesson 3

Factors and Prime Numbers

First: Factors of the Number

We know that we can write a number in the form of the product of two, or more, numbers.

- With respect to the number 6, we can write it as:
  $6 = 1 \times 6$ or $6 = 2 \times 3$, then the numbers 1, 2, 3 and 6 are called the factors of the number 6.
- With respect to the number 35, we can write it as:
  $35 = 1 \times 35$ or $35 = 5 \times 7$, then the numbers 1, 5, 7 and 35 are called the factors of the number 35.

Complete. With respect to the number 12, we can write it as:
$12 = 1 \times \ldots\ldots$, $12 = 2 \times \ldots\ldots$ or $12 = 3 \times \ldots\ldots$, then the factors of the number 12 are ……

Note: The process of writing the number in the form of the product of two or more numbers is called **factorization** of the number into **factors**.

Drill 1:

Complete factorizing each of the following numbers into factors and write the factors of each.

a $18 = 1 \times \ldots = 2 \times \ldots = 3 \times \ldots$, then the factors of the number 18 are ……

b $42 = 1 \times \ldots\ldots = 2 \times \ldots\ldots = 3 \times \ldots\ldots = 6 \times \ldots\ldots$, then the factors of the number 42 are ……

c $24 = 1 \times \ldots\ldots = 2 \times \ldots\ldots = 3 \times \ldots\ldots = 4 \times \ldots\ldots$, then the factors of the number 24 are ……

d $120 = 1 \times \ldots\ldots = 2 \times \ldots\ldots = 3 \times \ldots\ldots = 4 \times \ldots\ldots = 5 \times \ldots\ldots = 10 \times \ldots\ldots$, then the factors of the number 120 are ……

Second: Prime Numbers

Drill 2:

Find the factors of each of the numbers: 4 , 7 , 10 , 11 , 15 , 17. Complete the solution.

a 4 = 1 × … = 2 × …, then the factors of the number 4 are ……

b 7 = 1 × …, then the factors of the number 7 are ……

c 10 = 1 × … = 2 × …, then the factors of the number 10 are …

d 11 = 1 × ……, then the factors of the number 11 are ……

e 15 = 1 × … = 3 × …, then the factors of the number 15 are …

f 17 = 1 × ……, then the factors of the number 17 are ……

From the above, the numbers 4, 10 and 15 have more than two factors while the numbers 7, 11 and 17 have only two factors (one and the number) and they are called **Prime numbers**.

Generally:
The number that has only two factors is called a prime number.

i.e. The prime number is divisible by itself and the whole one.

Note: The whole one is not a prime number.

Drill 3:

Discuss, which of the following numbers is considered a prime number and which is not: 27, 5, 22, 13 and 19 , then complete.

a With respect to 27:
It is possible to write 27 = 1 × …… = 3 × ……, then 27 has other factors than 1 and 27. So, it is not considered a ……

b With respect to the number 5:
It is impossible to write it in the form of the product of two numbers except in the form of 5 = 1 × … or 5 = 5 × …, then the factors of the number 5 are only … and … So, it is a ……

c With respect to the number 22:
It is possible to write 22 = 1 × …… = 2 × ……, then the number 22 is a …… because it has ……

d With respect to the number 13:
It is impossible to find two numbers, the product of which is 13 except … and …, then ……

e With respect to 19:
……
……
……

Third: Factorizing the Number (non-prime) to its Prime Factors

We saw that factorizing a number to its prime factors, means writing this number in the form of a product of two or more numbers.

Example: Factorize the number 315 to its prime Factors .

Solution

we divide the number by the prime numbers 2,3,5,7,..... according to the divisibility of this number by these prime numbers .

315	3
105	3
35	5
7	7
1	

$315 = 3 \times 3 \times 5 \times 7$

Drill 4:

Factorize each of the following numbers to its prime factors.
15 , 12 , 9 , 26 and 36

Exercise 3

1 Find the factors of each of the following numbers.
14 , 38 , 26 , 75

2 Complete.

a A prime number has two factors that are …… and ……

b 16 = 1 × …… = 2 × …… = 4 × ……, then the factors of the number 16 are ……

c 1 is not considered a prime number because ……

d 3 is considered a factor of the numbers …… and ……

3 State which of the following is a prime number.
2 , 7 , 25 , 29 , 34 , 57

4 Factorise each of the following numbers to its prime factors.
12 , 18 , 23 , 36

5 Find the number whose prime factors are 2, 2 and 3 .

6 Find the number whose prime factors are 2, 5 and 7 .

Lesson 4

Common Factors for Two or more Numbers and Highest Common Factor (H.C.F.)

Drill 1:

Complete.

Factors of the number 30 are 1 , 2 , 3 , 5 , 6 , 10 , … , …

Factors of the number 40 are 1 , 2 , 4 , 5 , 8 , 10 , … , …

Numbers that are factors of the number 30 and at the same time factors of the number 40 are 1 , …… , …… , ……

These numbers are called **common factors** for the two numbers.

The highest of these common factors is ……

So, it is said that 10 is the **highest common factor** for the two numbers 30 and 40 and is symbolized as **H.C.F.**

Generally:

The highest common factor (H.C.F.) for a set of numbers is the highest number that all the numbers are divisible by.

Example (1) : Find the H. C. F for the numbers 30 , 40

Solution

30	2
15	3
5	5
1	

40	2
20	2
10	2
5	5
1	

$30 = 2 \times 3 \times 5$

$40 = 2 \times \quad \times 5 \times 2 \times 2$

H.C.F. $= 2 \times 5 = 10$

Drill 2:

Find the H.C.F. for the numbers 9 , 12 and 15.

Complete the solution.

$9 = 3 \times$ ……

$12 = 3 \times$ …… $\times$ ……

$15 = 3 \times$ ……

H.C.F. for the numbers 9 , 12 and 15 = ……

Exercise 4

1 Find three common factors for 8 and 16.

2 Find three common factors for 12 and 28.

3 Facorize each of the two numbers 6 and 15 to their prime factors, then find the H.C.F. for them.

4 Complete the following table as the example.

	Division operation	Quotient	Remainder	Divisibility
Example	65 ÷ 4	16	1	65 is not divisible by 4
	57 ÷ 7			
	21 ÷ 3			
	75 ÷ 9			

5 **a** Find all the factors for each of the numbers 16 and 20.
b Find the common factors for the numbers 16 and 20.
c Find the H.C.F. for the numbers 16 and 20.

6 Find the H.C.F. for each of the following sets of numbers.
a 20 and 30
b 35 and 49
c 12 and 16
d 24, 40 and 56
e 15, 18 and 21
f 6, 7 and 8

7 If the H.C.F. for two numbers is 7, then what are the two numbers? Give three possible answers.

Lesson 5

Common Multiples for Two or more Numbers and Lowest Common Multiples (L.C.M.)

We know that each of the numbers 6, 12, 18, … is a **multiple** for both numbers 2 and 3. So, it is said that each of these numbers is a **common multiple** for the numbers 2 and 3.
Similarly, the number 15 is a multiple for both numbers 3 and 5. So, it is a common multiple for the numbers 3 and 5. Also 30, 45, 60, … are common multiples for the numbers 3 and 5.

Drill 1:

a Complete till you reach the number 70.
The multiples of the number 5 (up to 70) are 0, 5, ……, 70
The multiples of the number 7 (up to 70) are 0, 7, ……, 70

b Underline the common multiples for the numbers 5 and 7.

c Are all these common multiples also multiples for the product of 5×7 (i.e. multiples for the number 35)?

Drill 2:

a Complete till you reach the number 24.
The multiples of the number 2 (up to 24) are 0, 2, ……, 24
The multiples of the number 4 (up to 24) are 0, 4, ……, 24

b Underline the common multiples for the numbers 2 and 4.

c Are all these common multiples also multiples for the product of 2×4 (i.e. multiples for the number 8)?

Drill 3:

a Complete till you reach the number 60.
The multiples of the number 2 (up to 60) are 0, 2, ……
The multiples of the number 3 (up to 60) are 0, 3, ……
The multiples of the number 5 (up to 60) are 0, 5, ……

b Underline the common multiples for the numbers 2, 3 and 5.

c What is the smallest common multiple (other than zero) for the numbers 2, 3 and 5? (This number is called the lowest common multiple for the numbers 2, 3 and 5)

The lowest common multiple for a set of numbers is the smallest number (other than zero) that is divisible by each of these numbers, then it is a multiple for each of these numbers individually and is abbriviated as L.C.M.

Example: Find the L.C.M. for 4 , 12 and 15.

Complete the solution.

Multiples for the number 4 are 0, 4, 8, ...

Multiples for the number 12 are 0, 12, ...

Multiples for the number 15 are 0, 15, ...

The lowest common multiple for the numbers 4 , 12 and 15 (other than zero) is .....

Then, the L.C.M. for the numbers 4 , 12 and 15 is .....

Another solution using factorization to the prime factors.

$4 = 2 \times 2$

$12 = 2 \times 2 \times 3$

$15 = 3 \times 5$

L.C.M. $\rightarrow 2 \times 2 \times 3 \times 5 = 60$

Then, L.C.M. for the numbers 4 , 12 and 15 is 60.

Exercise 5

1 Write three multiples for the number 7.

2 Write three common multiples for the numbers 6 and 10.

3 Write three common multiples for the numbers 2, 7 and 10.

4 Find all the common multiples between 50 and 100 for the numbers:

a 3 and 5 **b** 4 and 6 **c** 2, 7 and 8

5 **a** Write the multiples for the number 3 up to 63.
b Write the multiples for the number 7 up to 63.
c Write all the common multiples for the numbers 3 and 7 up to 63.
d Write the L.C.M. for the numbers 3 and 7.

6 **a** Write the multiples for the number 2 up to 60.
b Write the multiples for the number 3 up to 30.
c Write the multiples for the number 5 up to 30.
d Write all the common multiples for the numbers 2, 3 and 5 up to 30.
e Write the L.C.M. for the numbers 2, 3 and 5.

7 **a** Factorize each of the numbers 8 and 18 to its prime factors.
b Find the L.C.M. for the numbers 8 and 18.

8 Find the L.C.M. for each of the following sets of numbers.
a 2, 3 and 4 **b** 3, 4 and 5 **c** 2, 6 and 7 **d** 3, 6 and 7

9 If you know that the lowest common multiple for two numbers is 24, what are the two numbers (give more than one answer).

10 Find the L.C.M. for the numbers $(5 \times 7 \times 13)$ and $(2 \times 5 \times 11)$.

11 Find the L.C.M. for the numbers $(2 \times 3 \times 5 \times 7)$ and $(3 \times 3 \times 7)$.

Unit 3 Activities

Activity 1

Find: **a** the common multiple of all numbers.
b the common factor of all numbers.

Activity 2

First: Complete the following table.

1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10							
3	6	9	12								
4	8	12									
5	10										
6											
7											
8											
9											
10											
11											
12											

Second: Using the table above, complete the following.

a The number 108 is divisible by …… and ……
b The number …… is divisible by 11 and 12.
c The number 54 is considered a common multiple for the two numbers …… and ……
d Multiples of the number 12 that are less than 150 are ……
e The number 11 is considered one of the factors of the numbers ……

General Exercises on Unit 3

1 Join each number from group **a** with the suitable phrase from group **b**.

a 15 24 28 39

b divisible by 7 | divisible by 3 | divisible by 13 | divisible by 5

2 Put (✔) for the correct statement and (✗) for the incorrect one and correct the wrong statement.

a The number 63 is divisible by 6. ( )
b The number 17 is a prime number. ( )
c 0 and 7 are multiples of the number 7. ( )
d The H.C.F. for the two numbers 8 and 24 is 4. ( )
e The L.C.M. for the two numbers 8 and 24 is 8. ( )

3 Complete.

a The multiples of the number 6 which are between 20 and 40 are .....
b The factors of the number 35 are .....

4 Find:

a the H.C.F. for the numbers 24 and 36.
b the L.C.M. for the numbers 7 and 9.

Unit Four

Measurement

- The Length
- The Area
- Unit 4 Activities
- General Exercises on Unit 4

Lesson 1

The Length

You know that the centimetre (cm) and metre (m) are units used for measuring length.

The metre (m) = 100 centimetres (cm)

Drill 1:

Complete.

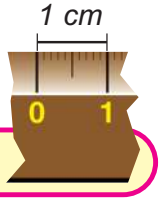
a The metre …… the centimetre (< , > or =)

b 3 metres = …… centimetres

c 4 metres = …… centimetres

d …… metres = 700 centimetres

e …… metres = 300 centimetres



The centimetre (cm) = 10 millimetres (mm)

Drill 2:

complete.

a 3 centimetres = …… mm

b 2 cm = …… mm

c …… cm = 40 mm

d …… cm = 60 mm

e …… m = 400 cm = …… mm

f Arrange the units of length ascendingly (cm , m , mm)

…… , …… , ……

Drill 3:

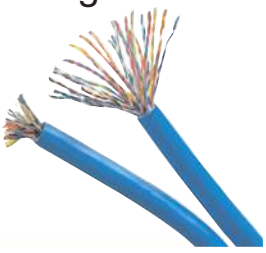
Choose the suitable unit to measure each of the following.

a Thickness of an electric wire. (mm , cm , m)

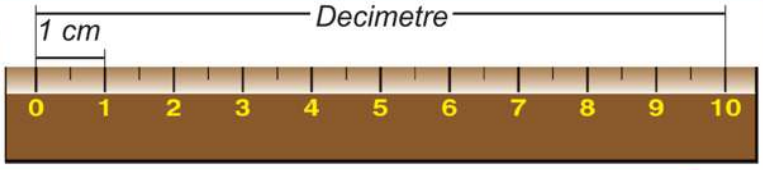
b Length of the classroom. (mm , cm , m)

c Length of the playground. (mm , cm , m)

d The height of a lamppost. (mm , cm , m)



Drill 4:



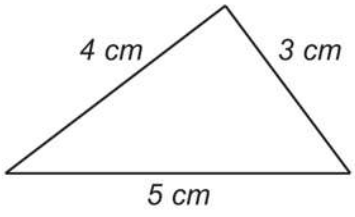
The dectimetre (dm) = 10 centimetres (cm)

Complete the following.

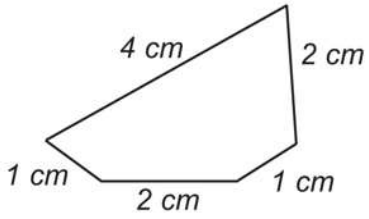
a 5 dm = ... cm
b 4 dm = ... cm
c 3 dm = ... cm = ... mm
d ... dm = 70 cm = ... mm
e ... dm = ... cm = 600 mm
f ... dm = ... cm = 200 mm

Drill 5:

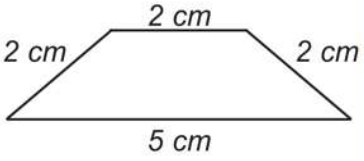
You know that, the perimeter of a polygon equals the sum of its side lengths, notice the following figures then complete.



Perimeter of the triangle = ... cm



Perimeter of the polygon = ... cm



Perimeter of the polygon = ... cm

Drill 6:

Notice the following figures, then complete (consider the unit of length = 1 cm).

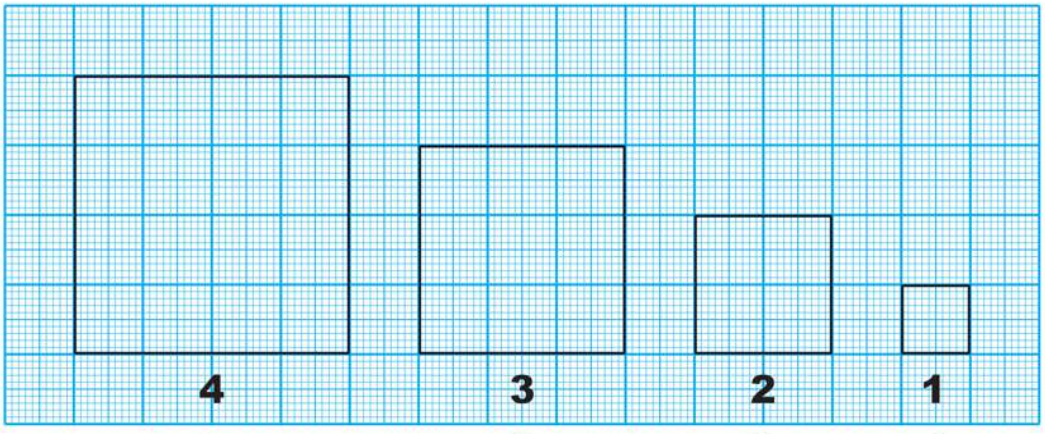


Figure number	Figure name	Side length	Sum of side lengths (Perimeter)
1	Square	1 cm	1 + 1 + 1 + 1 = 1 × 4 = 4 cm
2	.....	... cm	... + ... + ... + ... = ... × ... = ... cm
3	.....	... cm	... + ... + ... + ... = ... × ... = ... cm
4	.....	... cm	... + ... + ... + ... = ... × ... = ... cm

From the previous we deduce that:

perimeter of a square = side length × .....

Drill 7:

Use the relation between the perimeter of the square and its side length to complete.

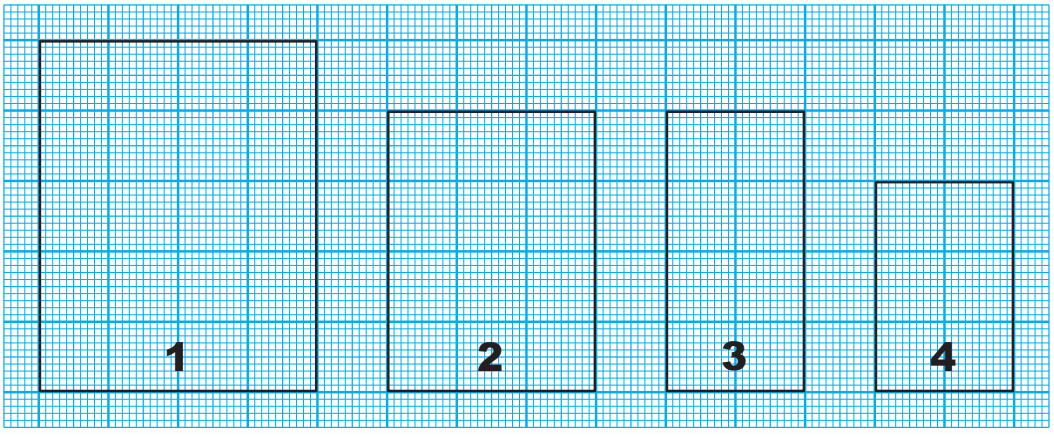
a Perimeter of a square of side length 9 cm = ... × ... = ... cm

b Perimeter of a square-shaped piece of land of side length 10 m = ... = ...

c Perimeter of a square-shaped piece of paper of side length 2 dm = ... = ... dm = ... cm

Drill 8:

Notice the following rectangles, then complete (consider the unit of length = 1 cm).



Rectangle number	Length	Width	Sum of side lengths (Perimeter)
1	5	4	5 + 5 + 4 + 4 = 5 × 2 + 4 × 2 = (5 + 4) × 2 =18 cm
2	4	.....	4 + 4 + ... + ... = 4 × 2 + ... × 2 = (4 + ...) × 2 =... cm
3	.....	2	... + ... + 2 + 2 = ... × 2 + 2 × 2 = (... + 2) × 2 =... cm
4	.....	.....	... + ... + ... + ... = ... × 2 + ... × 2 = (... + ...) × 2 =... cm

From the previous we deduce that:

The perimeter of a rectangle = (..... + width) × .....

Drill 9:

Complete.

a The perimeter of a rectangle whose length is 7 cm and width 3 cm = (..... + ...) × ..... = ... cm

b The perimeter of a rectangle whose dimensions 6 m and 3 m = (..... + ...) × ..... = ... metre

Example: Calculate the perimeter of a rectangle of dimensions 3 dm and 50 cm.

Solution: 3 dm = 30 cm, then the perimeter of the rectangle equals (30 + ...) × ..... = ... cm

Note: To calculate the perimeter of a figure whose dimensions are in different units, you have to make the dimensions in the same unit.

Drill 10:

The kilometre (km) = 1000 meters (m)

Complete. **a** 3 km = ... m **b** 9000 m = ... km

c 8 km = ... m = ... dm **d** 4 km = ... m = ... cm

Drill 11:

A rectangular-shaped piece of land with dimensions 3 km and 2 km, it is needed to be surrounded by a wire fence. The cost of one metre of wire fence equals 8 pounds what is the total cost of the fence?

Solution:

Perimeter of land = (... + ...) × 2 = ... km = ... m

Cost of fence = ... × ..... = ... pounds

Exercise 1

1 Put (✔) for the correct statement and (✗) for the incorrect one and correct the wrong statement.

a The perimeter of the square = side length + 4. ( )

b The perimeter of a rectangle = (length + width) + 2. ( )

c The decimetre > the metre. ( )

d The millimetre < the centimetre. ( )

e If the dimensions of a rectangle are 3 cm and 5 cm, then half its perimeter equals 8 cm. ( )

2 Arrange the units of length in ascending order.
centimetre , decimetre , millimetre , kilometre , metre

3 Choose the suitable unit to measure each of the following.

a The distance between Cairo and Alexandria. (mm, dm, km)

b The height of a building. (mm, dm, m)

c The height of a man. (km, cm, mm)

d The length of an ant. (km, mm, m)

4 Choose the closest answer.

a The length of a taxi = ... (2 km, 20 m, 200 cm)

b The length of my pen = ... ($\frac{1}{2}$ km, 15 dm, 15 cm)

c The height of my brother = ... (3 m, 160 cm, 160 mm)

d My mother bought a piece of cloth of length = ...
(3 km, 3 m, 3 cm, 3 mm)

e In my house, there is a squared room of side length = ...
(5 m, 5 cm, 5 mm, 5 km)

5 Calculate the perimeter of each of the following.

a A square of side length 3 dm.

b A rectangle whose length is 12 cm and width 5 cm.

c A rectangle whose length is 3 dm and width 25 cm.

d A rectangle whose dimensions are 2 m and 150 cm.

6 Calculate, in centimetres, the side length of a square whose perimeter is 4 dm.

7 The perimeter of a rectangle is 86 cm, and its length is 23 cm. Find its width: **a** in centimetres. **b** in decimetres.

8 The sum of the perimeters of two squares is 100 dm. If the side length of one of them is 8 dm, find the side length of the other square.

a in decimetres **b** in centimetres

9 It is wanted to make a frame to a rectangle-shaped picture whose dimensions are 400 cm and 500 cm. If the cost of one metre of the frame is 3 pounds, what is the cost of the frame?

10 The width of a rectangle-shaped piece of land equals $\frac{1}{3}$ of its length. Calculate its perimeter if its width equals 15 metres.

11 Calculate the perimeter of each of the following.

a A rectangle-shaped room whose dimensions are 4 m and 3 m.

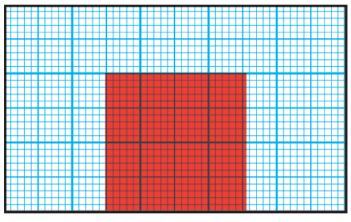
b A rectangle-shaped picture frame whose dimensions are 5 dm and 20 cm.

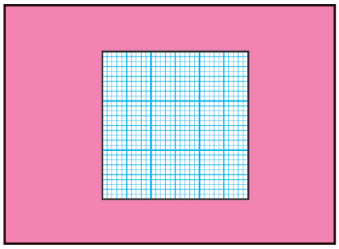
c A rectangle-shaped bed sheet whose dimensions are 2 m and 150 cm.

d A rectangle-shaped room door whose length is 18 dm, and width 1 metre.

e A square-shaped window of side length 15 dm.

12 Notice the drawn figure, imagine that you cut the red part, calculate the perimeter of the remaining part (consider that the side length of the small square is 1m).



13 

The figure represents a rectangular piece of land, its dimensions are 70 m and 50 m and a squared playground, its side is 30 m long is constructed inside it. If the shaded part is surrounded by a wire from inside and outside, find the length of the wire in each case.

Lesson 2

The Area

Preface

Areas of the figures like squares, rectangles, triangles, … etc, are measured by units of area, In this lesson, you will know some of these units.

Drill 1:

Notice the following figures, each figure is divided into equal parts, **units of area**.

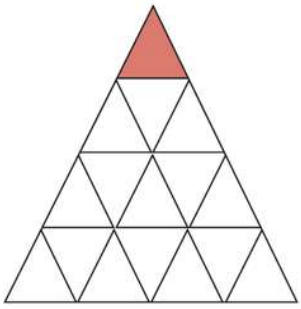


Figure 1

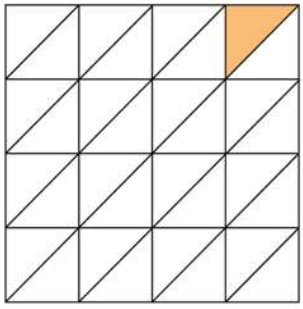


Figure 2

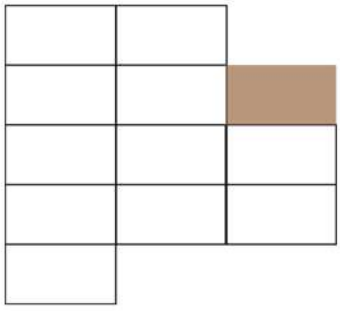


Figure 3

Complete the following table:

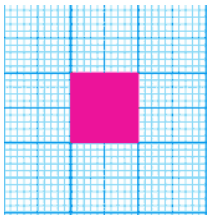
Figure number	Number of equal parts (area of figure)
1	.....
2	.....
3	.....

Question Can you determine, which of the previous figures is greater in area? why?

To compare the areas of some figures, you have to calculate the area of each using the same unit. So, we are in need of standard units, One of these units is the **square centimetre** and its symbol is **cm²**. Then, what is the square centimetre?

Drill 2:

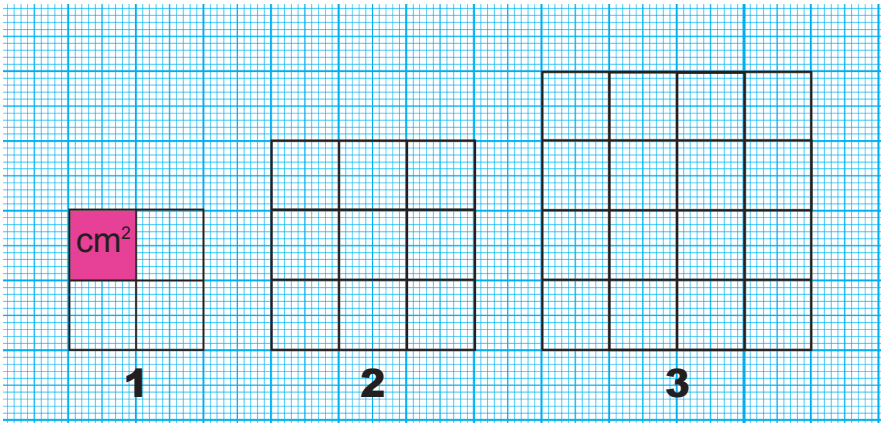
Notice the shaded figure opposite to recognize the square centimetre **cm²**, then complete.



cm^2 is the area of a square of side length ……

Drill 3:

Notice the following squares and count the square centimetres which form each square (number of small squares), then complete as the example.



	Square number	Number of small squares (cm^2)	Side length of square	Notes
Example	**1**	4 cm^2	2 cm	$4 = 2 \times 2$
	2			
	3			

Given that the area of the square = Number of the small squares (cm^2), then complete:

a Area of square **1** = 4 cm^2 = 2 cm × 2 cm

b Area of square **2** = … cm^2 = … cm × … cm

c Area of square **3** = …… = … cm × … cm

From the previous, we deduce that:

Area of the square = side length × ……

Drill 4:

Using the previous relations, complete.

a Area of square of side length 9 cm = …… × …… = …… cm^2

b Area of square of side length 2 cm = …… × …… = ……

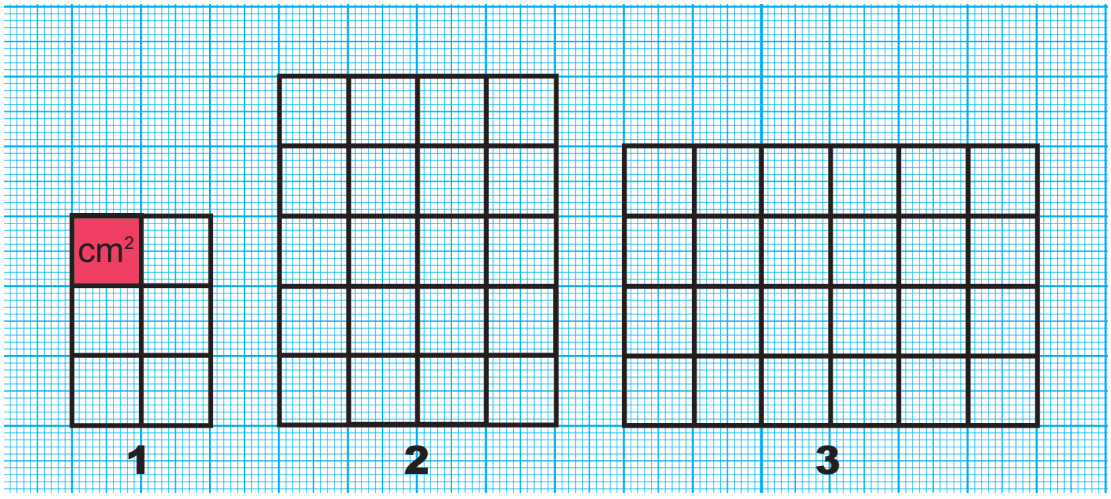
c Perimeter of a square is 24 cm

Side length of the square = …… ÷ 4 = …… cm (Why?)

Area of the square = …… × …… = ……

Drill 5:

Notice the following rectangles and calculate the number of square centimetres (small squares) in each figure, then complete.



	Rectangle number	Number of square centimetres (area)	Rectangle length	Rectangle width	length × width
Example	1	6 cm^2	3 cm	2 cm	3 cm × 2 cm = 6 cm^2
	2	……	……	……	…… × …… = ……
	3	……	……	……	…… × …… = ……

From the previous, we deduce that:

Area of the rectangle = …… × ……

Drill 6:

Use the previous relation between the area of the rectangle and its dimensions, then complete.

a Area of rectangle whose length is 9 cm and width 6 cm equals …… cm × …… cm = …… cm^2.

b Area of rectangle whose dimensions are 3 cm and 8 cm equals …… × …… = ……

c The perimeter of a rectangle is 18 cm and its width 3 cm
length + width = $\frac{1}{2}$ perimeter = …… cm
We know that width = 3 cm, then length = … – … = …… cm
Then, area of rectangle = …… × …… = …… cm^2.

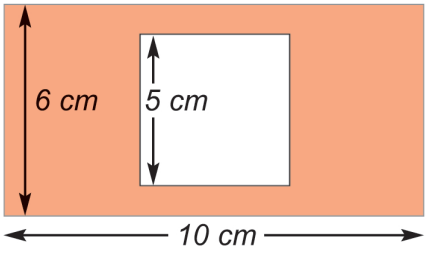
d The length of a rectangle is 12 cm, which is twice its width.
width of rectangle = $\frac{1}{2}$ length = …… cm
Then, area of the rectangle = …… × …… = …… cm^2.

Drill 7:

The figure opposite represents a rectangle whose dimensions are 10 cm and 6 cm with a square of side length 5 cm inside it.
Calculate:

1 the area of the shaded part.

2 the perimeter of the shaded part.



Drill 8:

We knew that the square centimetre (cm^2) is the area of a square of side length 1 cm. Use the same pattern to write mathematical statements to show the meaning of the following units of area.

a the square metre (m^2) is the area of a square of side length ……. (m^2 = 1 m × 1 m)

b The square kilometre (km^2) is the area of …… whose side length …… (km^2 = …… × ……)

c The square decimetre (dm^2) is …… (dm^2 = …… × ……)

Drill 9:

Use the relations you got in the previous drill, and complete.

a $m^2 = 1\ m \times 1\ m = 100\ cm \times 100\ cm = 10\ 000\ cm^2$

b $km^2 =$ ..... km × ..... km = ... m × ..... m = ... m^2

c $dm^2 =$ ..... dm × ..... dm = ... cm × ..... cm = ... cm^2

From the previous, we deduce that:

The square decimetre = 100 cm^2
The square metre = 100 dm^2 = 10 000 cm^2
the square kilometre = 1 000 000 m^2

Drill 10:

Choose the suitable unit to measure each of the following.

a Area of the floor of the room. (km^2 , dm^2 , cm^2 , m^2)

b Area of the agricultural land in Egypt. (km^2 , dm^2 , cm^2 , m^2)

c Area of the surface of a book page. (km^2 , cm^2 , m^2)

d Area of the playground of your school. (km^2 , cm^2 , m^2 , dm^2)

e Area of the eastern desert. (km^2 , cm^2 , dm^2)

Drill 11:

Choose the closest answer.

a Area of the flat which I live in is .....
(75 km^2 , 75 cm^2 , 75 m^2 , 75 dm^2)

b Area of the classroom in our school is .....
(24 m^2 , 24 cm^2 , 24 km^2)

c A pupil in Primary 4 used his geometric instruments to draw a rectangle whose area is .....
(12 m^2 , 12 dm^2 , 12 cm^2)

d Area of the tile used in tilling our house is .....
(25 dm^2 , 25 cm^2 , 25 m^2)

Exercise 2

Area of the square = side length × side length
Area of the rectangle = length × width

$1\ m^2 = 100\ 00\ cm^2$
$1\ km^2 = 1000\ 000\ m^2$
$1\ dm^2 = 100\ cm^2$

1 Put (✔) for the correct statement and (✗) for the incorrect one and correct the wrong statement.

a The square metre (m^2) is a unit of measurement used to measure the perimeters of figures. ( )

b The decimeter (dm) is a unit of measurement used to measure the areas of the figures. ( )

c The millimetres (mm) is a unit of measurement used to measure the lengths of the things. ( )

d Area of square = side length × 4 ( )

e Area of rectangle whose length is 2 dm and width 5 cm is 100 cm^2. ( )

f Area of a square-shaped piece of land of side length 3 km is 9 million m^2. ( )

2 Complete.

a 3 cm = …… mm

b 5 dm = …… cm

c 2 km = …… m

d 2 m = …… cm

e 50 mm = …… cm

f 850 cm = …… dm

g 4 200 mm = …… dm

h 8 000 cm = …… m

i 6 000 m = …… km

j 3 km = …… m

3 Complete.

a $3\ m^2$ = …… dm^2

b $7\ m^2$ = …… cm^2

c $\frac{1}{2}\ km^2$ = …… m^2

d $27\ m^2$ = ... dm^2

e $90\ 000\ cm^2$ = …… m^2

f $6\ 000\ 000\ m^2$ = …… km^2

4 Complete using a suitable sign <, >, or = in each ☐.

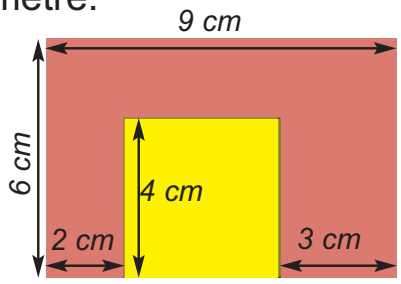
a 3 km ☐ 300 m **b** 8 dm ☐ 80 cm

c 5 000 mm ☐ 5 metres **d** 7 km ☐ 75 000 cm

e Area of square of side length 8 cm ☐ Area of rectangle whose dimensions are 9 cm and 8 cm.

f Area of rectangle whose dimensions are 3 dm and 7 cm ☐ Area of square of side length half a metre.

5 The figure opposite is a rectangle whose dimensions are 9 cm and 6 cm. A square of side length 4 cm is cut from it. Calculate:



a the area of the remaining part by two different methods.

b the perimeter of the remaining part.

6 The length of a rectangle is 20 cm its width. If its perimeter is 64 cm, find its area in cm^2.

7 The perimeter of a square is 28 cm, find its area.

8 If the sum of the perimeters of two squares is 48 cm, and the side length of one of them is 7 cm. Find:

a the side length of the second square.

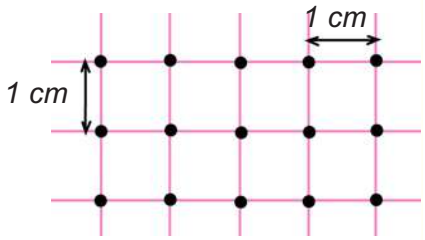
b the sum of their areas.

9 A rectangle-shaped hall whose dimensions are 8 m and 6 m. How many tiles are needed to tile this hall, given that the side length of the required square-shaped tiles is 20 cm?

Unit 4 Activities

Activity 1

In the figure opposite, 15 dots are arranged in the form of a lattice such that the horizontal and vertical distances between every two adjacent dots, vertically or horizontally, are equal.



Consider that the distance between every two adjacent points is 1 cm, then answer the following questions.

a How many squares can be drawn such that the vertices of each coinside with these dots, and its area equals:

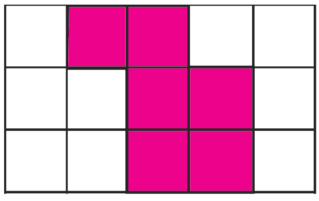
i 1 cm^2 **ii** 2 cm^2 **iii** 4 cm^2

b How many rectangles can be drawn such that the vertices of each coinside with these dots, and its perimeter equals:

i 6 cm **ii** 8 cm **iii** 10 cm

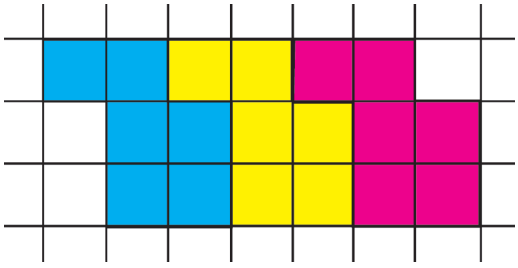
Activity 2

Notice and deduce.



a Find the area of the coloured part and also its perimeter (consider that the side length of the small square is 1 cm).

b If the previous figure is drawn three times, you will get the figure below. What is the area of this new figure? What is its perimeter?



c If you imagine that we drew the original figure 20 times using the same previous way (on a large paper), what is the area of the resulted figure? What is its perimeter?

General Exercises on Unit 4

1 Complete using a suitable sign <, >, or = in each ☐.

a 6 metres ☐ 650 cm **b** 10 dm ☐ 1 metre

c $\frac{1}{2}$ km^2 ☐ 25 000 m^2 **d** 81dm^2 ☐ 6 400 cm^2

2 Choose the suitable unit of measurement for each of the following life situations.

a Measuring the heights of the pupils.
(square centimetre , millimetre , centimetre , kilometre)

b Calculating areas of the walls in a house.
(m , cm^2 , km^2 , m^2)

c Calculating the perimeter of a piece of land allocated for building a new city in facing the problem of over-population.
(m , km^2 , km , cm^2)

d Calculating the distance between the earth and the moon.
(cm , m , km , km^2)

3 Complete.

a The condition of congruency of two squares is ……

b Area of rectangle = …… and perimeter of square = ……

c If the dimensions of a rectangle are 8 cm and 5 cm, then its area = ……

d If the perimeter of a square = 24 cm, then its area = ……

4 The dimensions of a rectangle are 90 cm and 40 cm. If the area of the rectangle equals the area of a square find the perimeter of the square in decimeters.

Model tests for the first term
Model test (1)

Firstly: Choose the correct answer

1) $\frac{1}{4}$ million pound = ... pounds.

(2 500 or 25 000 or 250 000 or 500 000)

2) The value of the digit 7 in the number 27351 is .....

(7 or 70 or 7 000 or 70 000)

3) The milliard is the Smallest number that formed from ..... digits.

(7 or 8 or 9 or 10)

4) 505 m^2 ..... $\frac{1}{2}$ km^2 (> or < or = or ≤)

5) The H.C.F for the two numbers 2 and 4 is ..... (2 or 4 or 6 or 8)

6) The L.C.M of the two numbers 3 and 6 is ..... (3 or 6 or 9 or 18)

7) The number ..... is divisible by 2 , 3 and 5. (6 or 10 or 15 or 30)

8) Three millions, three thousands and three = ...

(3 030 003 or 303 003 or 3 003 003 or 3 003 300)

9) The Smallest prime number is ..... (0 or 1 or 2 or 3)

10) One million and a hundred thousand ..... 1 000 100.

(> or < or =)

11) The sum of the measures of the interior angles of a triangle = ... °

(90 or 120 or 180 or 360)

12) The two diagonals are equal in length in each of .....

(the square and the rhombus or the square and rectangle or the rectangle and the parallelogram).

13) The Perimeter of a square of side length 4 cm ..... the perimeter of a rectangle whose dimensions are 5 cm, 3 cm. (< or > or =)

14) 99 999 + 1 ..... (99 990 or 999 900 or 100 000 or 1 000 000)

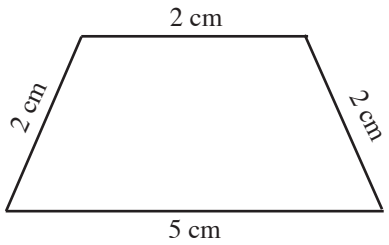
Secondly: Complete

15) The number whose prime factors are 2 , 5 and 7 is .....

16) 50 × 600 = ...

17) If the perimeter of a square is 36 cm, then its side length is ..... cm.

18) The perimeter of the opposite figure = ... cm.

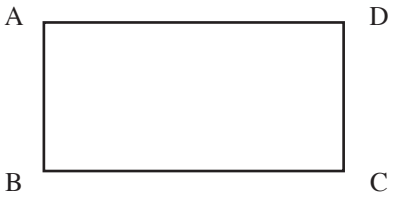


19) The L.C.M of 5 , 10 = ...

20) 25 × 7 × 4 = ...

21) In the opposite figure ABCD is a rectangle , then.

$\overline{AB}$ ..... $\overline{BC}$ (// , ⊥)



22) IN Δ ABC, if m (∠A) = 60 ° , m (∠B)=30 ° , then m (∠C)= .....

Thirdly:

23) Calculate the H.C.F for the two numbers 24 , 40 .

.....

.....

.....

.....

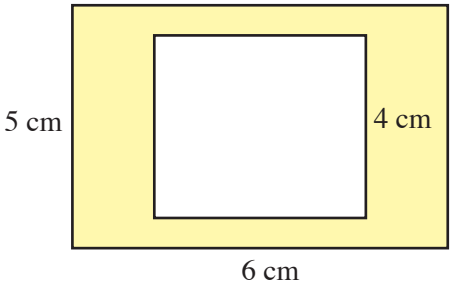
24) A hotel contains 180 rooms divided equally among a number of floors, each floor contains 15 rooms. How many floors are there in this hotel?

The number of floors = ... = ...

25) Draw the triangle ABC in which AB = 5 cm, m (∠A) = 40° , m (∠B) = 50°.

25) Draw the triangle ABC in which AB = 5 cm, m ($\angle$ A) = 40° , m ($\angle$ B) = 50°. Calculate m ($\angle$ C). What is the type of the triangle ABC with respect to the measures of its angles.

26) The opposite figure represents a rectangle whose dimensions are 6 cm , 5 cm with a square of side length 4 cm inside it.
Find the area of the shaded part.



Model (2)

Firstly: Choose the correct answer

1) $\frac{1}{4}$ million pound is written in digits as ..... pound

(250 or 2 500 or 25 000 or 250 000)

2) The place value of the digit 3 in the number 736 542 is .....

(thousands or ten thousands or hundred thousands or millions).

3) The perimeter of a square is 32 cm, then its area = ... cm^2 .

(8 or 16 or 40 or 64)

4) The prime number just comes after to the following number 17 is .....

(18 or 19 or 20 or 23)

5) 660 ÷ 5 ..... 660 ÷ 4 (< or > or =)

6) 7 m^2 ..... 7000 cm^2 (> or < or = or ≥)

7) The number 12 is the L.C.M for 3 , ... (4 or 9 or 15 or 36)

8) The triangle whose side lengths 6 , 4 , 6 cm is .....

(scalene triangle or isosceles triangle or equilateral triangle)

9) 71 million, 425 thousand, 12 written as

(71 124 350 or 71 425 012 or 71 043 512 or 71 435 120)

10) The nearest number of the result of 7 815 100 + 1 475 987 = ...

(9 million or milliard or 900 thousand or 990 million)

11) The sum of the measures of the interior angles of a triangles is ..... °

(90 or 120 or 180 or 160)

12) The number ..... is divisible by 2 , 3 . (10 or 14 or 18 or 21)

13) 25 × 7 × 4 = ... (53 or 70 or 179 or 700)

14) The H.C.F for 8 and 12 is ..... (4 or 8 or 24 or 96)

Secondly: Complete

15) The quadrilateral in which only two sides are parallel is called .....

16) 15 dm = ... cm.

17) 2 565 178 - one million = ...

18) 90 000 cm^2 = ... m^2.

19) If the Perimeter of a triangle is 16 cm, the lengths of two sides of it are 4 cm, 7 cm , then the length of the third side = ... cm

20) ..... is the common multiple for all numbers.

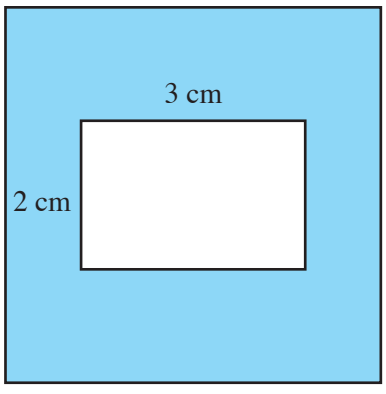
21) The Highest common factor of the two numbers 3 , 6 is .....

22) 70 × 20 = 14 × .....

Thirdly: Find the result of each of the following

23) Reda bought a P.C for L.E 3500, he paid L.E 500 in cache, and then he paid the rest in 25 equal installments. Find the value of each installment.
The rest = ...
The value of each installment = ...

24) In the opposite figure : find the area of the shaded part, the outer shape is square of side length 5 cm and the inner shape is a rectangle of dimensions 3 cm and 2 cm.



25) Draw Δ XYZ in which XY = 5 , m ($\angle$ X) = m ($\angle$ Y) = 45°.

a) calculate m ($\angle$ Z) (without measuring).

b) what is the typt of Δ XYZ according to the measures of its angles.

26) Calculate H.C.F, L.C.M of 12, 24.

Model (3)

Firstly: Choose the correct answer

1) 150 thousand = ...

(150 tens or 15 thousands or 1500 hundred or 1 500 000)

2) The digit which represents million in number 78 201 654 is .....

(2 or 6 or 8 or 7)

3) The number which its factors 2, 2 , 3 ☐ the number which its factors 2 , 3 , 3

(< or > or =)

4) The measure of any angle of the square = ... °

(30 or 60 or 45 or 90)

5) The smallest prime number is .....

(zero or 1 or 2 or 3)

6) If the perimeter of an equilateral triangle = 12 cm, then the length of its side = ... cm. (3 or 4 or 5 or 6)

7) 6 254 117 = 254 117 + ...

(6 000 or 60 000 or 600 000 or 6 000 000)

8) The diagonals of a rhombus are .....

(equal in length and not perpendicular - perpendicular but not equal in length - equal in length and perpendicular)

9) The number which is nearest to the result of 3 910 051 + 5 200 402 is .....

(9 thousands or 900 thousands or 9 millions or milliard)

10) The value of the digit 3 in the number 736 542 is .....

(thousand or ten thousands or hundred thousands)

11) 54 is a number that is divisible by ..... (4 or 6 or 7 or 8)

12) The common multiple for the numbers 8 , 16 is .....

(8 or 16 or 32 or 24)

13) 7070 ÷ 35 = ... (11 or 22 or 220 or 202)

14) The side length of a square of area 36 cm^2 ☐ the side length of a square of perimeter 20 cm. (< or > or =)

Secondly: Complete

15) 32 million, 8 thousand, 15 is written in digits as .....

16) $3\frac{1}{2}$ km = ... m.

17) The factors of 50 are .....

18) The sum of the measures of the interior angles of a triangle = ... °

Find the result of each of the following

19) $8 \times 765 \times 125$ = ...

20) L.C.M of the two numbers 2,4 is .....

21) If the dimensims of a rectangle are 5 cm, 3 cm, then its .....
Perimeter = ... cm .

22) An equilateral triangle, the lengths of two sides of it are 6 cm, 6 cm, then the length of the third side = ... cm.

Thirdly:

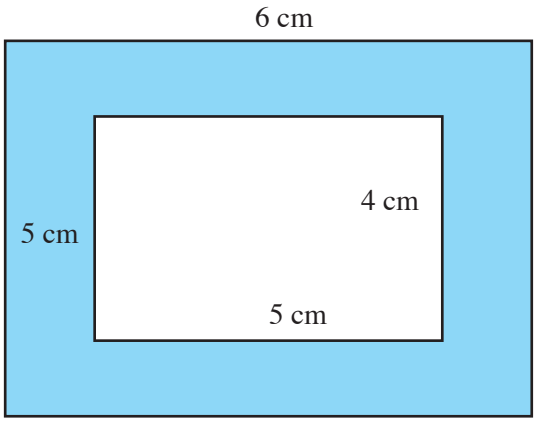
23) H.C.F for the numbers 18,16 = ...

24) Arrange the following numbers in an ascending order :
861 542 , 681 542 , 156 842 , 865 421 , 685 421
..... , ... , ... , ... , ...

25) Draw ΔABC in which AB = 7 cm , m ($\angle A$) = 45° , m ($\angle B$) = 75° , find m ($\angle C$). Write the type the triangle according to the measures of its angles.

26) In the opposite figure :

Find the area of shaded part.



Modet lest for the Special needs for the fourth primary

(First Term)

Answer the following questions :

Choose the correct answer :

1) $\frac{1}{2}$ of a day = ... hours (4 , 6 , 12)

2) 3 millions, 57 thousands, 9 is written ..... (357 009 , 3 057 009 , 3 579)

3) The H.C.F for the two numbers 2 and 4 is ..... (2 , 4 , 8)

4) The L.C.M for the two numbers 3 , 6 is ..... (3 , 6 , 18)

5) The number 105 is divisible by 5 and ..... (2 , 3 , 4)

6) The Sum of the measures of the interior angles of a triangle = ... °
(90 , 108 , 180)

7) The Perimeter of a square of side length 5 cm ..... the perimeter of an equilateral triangle of side length 5 cm. (> , < , =)

8) ABC is a triangle, m (∠ A) = 100°, this triangle is .....
(an obtuse angled triangle , a right angled triangle , an acute angled triangle)

9) 40 000 ÷ 40 = ... (100 , 1 000 , 10 000)

10) 1 m^2 = ... dm^2 . (10 , 100 , 10 000)

Complete each of the following using the given answers.

(1 001 211 , 5 , rhombus , 4 , rectangle , 988 895) :

11) 587 692 + 401 203 = ...

12) 9 806 735 - 8 805 524 = ...

13) The prime number just before 7 is .....

14) The diagonals are equal in length in .....

15) ..... × 25 = 100

Join from the column (A) to the suitable from the column (B) :

Column (A)	Column (B)
16) The value of the digit in the number 351 639 in ..... ◆	◆ 100 000
17) 5 000 ÷ 10 = ... ◆	◆ 500
18) 99 999 + 1 = ... ◆	◆ 50 000
19) The number whose prime factors 2 , 3 , 5 is ..... ◆	◆ 10
20) A rectangle whose dimensions 2 , 3 cm, its Perimcter = ... cm ◆	◆ 30

تم الطبع بالشروق الحديثة ـ القاهرة
بالمواصفات الفنية الآتية

عدد الصفحات بدون الغلاف : ١٠٤ صفحة
عدد الملازم بدون الغلاف : ٦,٥ ملزمة
المقـــــاس : $\frac{1}{8}$ ٥٧ × ٨٢ سم
نـــوع الـــورق : لا يقل الداخلى عن ٨٠ جرام والغلاف ٢٠٠ جرام
ألـــوان الطبـــع : ٤ لون للداخلى والغلاف
رقـــم الكتـــاب : ١٥٠٥/١٠/١٥/١١/٤/٣٩

الشروق
الحديثة للطباعة والتغليف
القاهرة : ٨ شارع سيبويه المصرى ـ ت : ٢٤٠٢٣٣٩٩ ـ فاكس : ٢٤٠٢٧٥٦٧ (٠٢)
مدينة العبور ـ المنطقة الصناعية