Supplementary Study Materials for Underperforming Schools (Validated)

Quantitative Aptitude Class 6

March 2021

NOT FOR SALE

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GENERAL TEACHER'S GUIDE

Dear Teacher

Quantitate Aptitude is a subject that tests the mental ability of pupils to interpret Patterns, Shapes, Figures, Letters and Codes and how critically they can think in applying these in their everyday activities.

This piece of work is prepared by the Teaching Service Commission (TSC) for the primary school pupils of class 6. The notes are useful for learners who will be attempting the National Primary School Examination (NPSE) and the aim is to improve learning achievement for weak or underperforming schools at the NPSE nationwide.

The syllabus has been broken down into a total of thirty (30) units in this booklet and every unit is preceded by a Teacher's Guide which clearly explains the techniques used in the samples/examples in the given content.

As a teacher of this subject, you are required to:

- Be very practical in explaining the examples, making sure every pupil actively involved in the activities.
- Make sure that the samples/examples are clearly explained to the pupils by using the "Think Tank" method i.e., allow pupils to make their own contribution.
- Pursue the exercises and self-assessments provided in every unit, to see how adequately learners are able to understand every activity taught.
- Use Teaching Aids such as Charts, Diagrams, Drawings and other local materials that may be necessary to facilitate the teaching and learning process.

Thank you so much for carefully following this guide.

INTRODUCTION

QAUNTITATIVE APPITITUDE:

It is the aspect of mathematics that tests the natural and mental ability to interpret patterns with shapes, figures, letters and signs.

Almost all the units in this piece of work are designed to be taught in a single period of either 35 or 40 minutes as the case may be, except for those that may contain multiple samples which may require an extra period in order to allow the pupils to learn in bites.

AIMS AND OBJECTIVES

This piece of work was done to:

I. Equipped Teachers and pupils with the materials needed for teaching and learning Quantitative Aptitude

II. Enable pupils tackle questions successfully in Quantitative Aptitude.

III. Enable teachers and pupils interpret shapes, diagram, number patterns and codes breaking.

UNIT 1:

LETTER AND NUMBER CODE REPRESENTATION

TEACHER'S GUIDE

The teacher must bear in mind that he should align the letters of the word with the digits of the given number, this will enable pupils to form words from numbers and from numbers to words.

LEARNING OUT COME

Pupils will be able to align letters of a given word to digits of a given number to form words froma given code.

A group of letters can form a word, which corresponds to a certain group of numbers. For example, the word TREMENDOUS represent the number 123456789. Always align the word to the set of numbers as shown below

T R E M E N D O U S

1 2 3 4 3 5 6 7 8 9

After doing so, it becomes easier to answer any question asked.

1. Which words are represented by the number 12339, 97856, and 6751?

Ans: The words are TREES, SOUND and DON'T receptively

Exercise 1 **NPSE 1999-August**

The number **8413507926** is represented by the word **JOURNALIST**. Use this information to answer question 1 to 2

1. Which word does the number 8462 represents?

(A) JUST (B) JOIN (C) JAIL (D) JOTS (E) JARS

2. Which number represents the word **RUST**?

A) 3152 B) 3126 C) 3462 D) 3096 E) 3062

The number **951736824** is represented by the word **MARKETING**.

Use this information to answer the questions that follows.

3. Which number is represented by the word anger?

A) 95471 B) 92435 C) 52481 D) 52431 E) 51431

4. Which number is represented by the word RIME?

A) 1582 B) 1863 C) 1893 D) 6893 E) 9823

(**NPSE 2016 Q 1 & 2**)

The word **TRANSPARENCY** is represented by the numbers **861475163429.**

Use this information to answer questions that follows.

5. What word does the number 51687 represent?

A) PARYS B) PARTS C) PERTS D) PANTS E) PARTE

6. What word does the number 7816 represent?

A) SPAR B) STEP C) STAP D) STAR E) SPER (**NPSE 2017 Q 4 & 5**)

7. The number represents the word NECTAR.

A) 431816 B) 432826

A) The word **REPLACEMENT** is represented by the number 83941236357. Use this information to answer questions that follows (**NPSE 2019)**

8. The number 736943 represents the word.

A) AMPERE B) MANTLE (C) PALACE D) TEMPER E) TEMPLE

A) MANTIS B) MANTLE C) MENACE D) MENTAL E) MANTRA

9. The number which represents the word PLANE is

A) 91534 B) 94135 C) 94153 D) 94315 E) 95431

10. The CAMEL is represented by the number

A) 21364 B) 21634 C) 21643 D) 32164 E) 36412

11. The word represented by the number **35781523** is

A) ENTRANCE B) EMINENCE C) ENTREATY D) TEMPLATE E) TENEMENT

UNIT 2

SETS (VENN DIAGRAMS)

TEACHER'S GUIDE

Teacher to clearly distinguish between geometrical shapes like triangle, rectangle, circle and identify the elements in each set.

LEARNING OUTCOMES

Pupils can be able to identify elements of different sets.

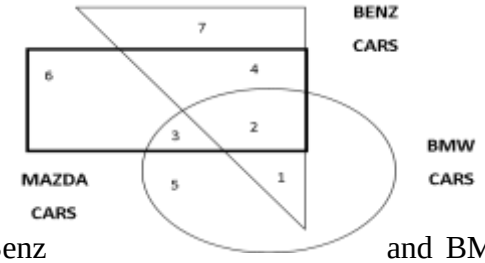
A set is a collection of objects put together. Examples of a set: set of even numbers, set of odd numbers, a set of football players or basketball player etc.

Two or more sets can be drawn together in a Venn diagram. Study the diagram below carefully and use it to answer question 7 to 10

The triangle represents pupils who like **BENZ** cars

The rectangle represents pupils who like **BMW** cars

The circle represents pupils who like MAZDA car



1. Which number(s) represent (s) pupils who like Benz and BMW cars only?

A) 1 only B 1, 2 C 1, 5 D **7** E 4

2. Which number represents pupils who like Mazda cars?

A) **6324** B) 6314 C) 6325 D) 6374 E) 6354

3. Which number represents pupils who like Mazda cars only?

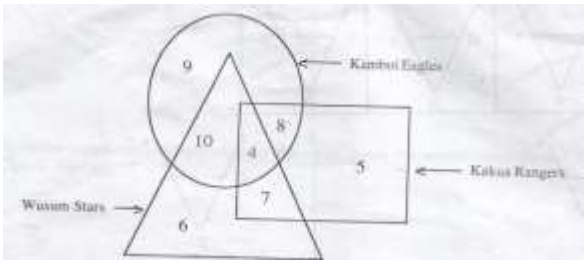
A) 2 B) 4 C) 5 **D) 6** E) 7

4. Which numbers represent pupils who like BENZ and MAZDA CARS only?

A) 2 B) 3 **C) 4** D) 5 E) 6

Exercise1

The diagram below represents people that support three different team in Sierra Leone football association (SLFA) premier league tournament.



Use it to answer the following questions **(NPSE 2019)**

1. How many people supported Kakua Rangers only?

A) 5 B) 6 C) 7 D) 8 E) 9

2. How many people supported Kambio Eagle only?

A) 4 B) 5 C) 6 D) 8 E) 9

3. How many people supported Wusum Stars and Kambio Eagle only?

A) 6 B) 7 C) 8 D) 9 E) 10

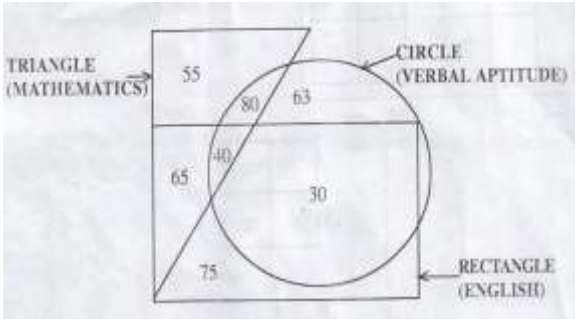
Exercise 2

The figure represented the number of pupils who play different games at a school

CIRCLE: Pupils who play BASKETBALL

RECTANGLE: pupils who play FOOBALL

TRIANGLE: Pupils who play VOLLEYBALL



1. How many pupils play volleyball only?

A)65 B) 55 C) 65 D) 80 E) 40

2. How many pupils play basketball and football only?

A)30 B) 63 C) 80 D) 40 E) 65

UNIT 3

GAMES AND PUZZLES

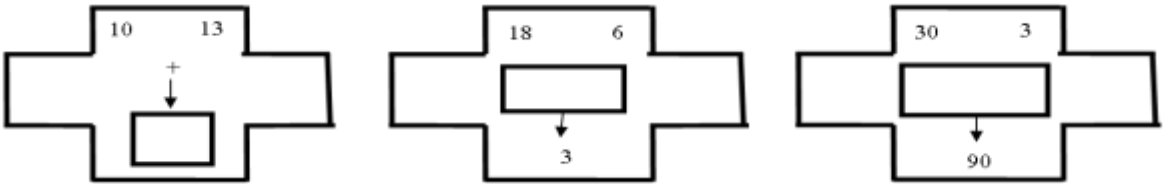
TEACHER'S GUIDE

Teacher must be aware of the operations in all diagrams. The operations used in the first, second and third diagrams are addition, multiplication and division. This might not be the same for other examples.

LEARNING OUTCOMES

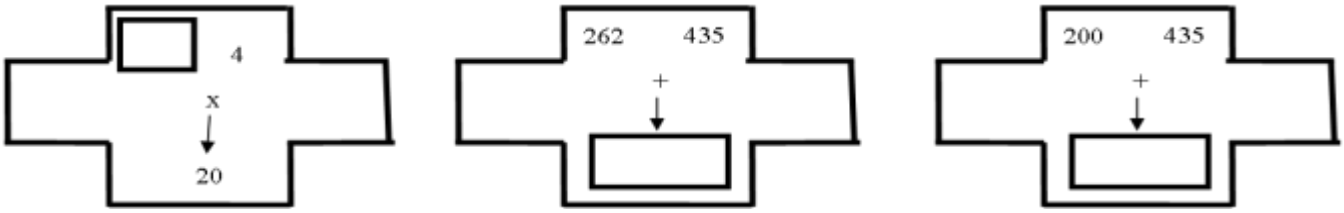
Pupils can be able to play simple games that involves the four operations.

From the sample below, the first puzzle can be adding 10 + 13 to get 23 which is the required answer for box – the second box - requires ÷ because 18 ÷ 6 is equal to 3. The third puzzle is solving by putting x because 30 x 3 = 90

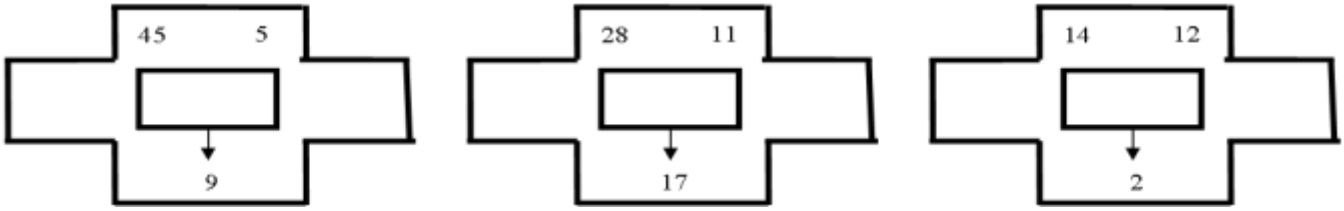


Exercise 1

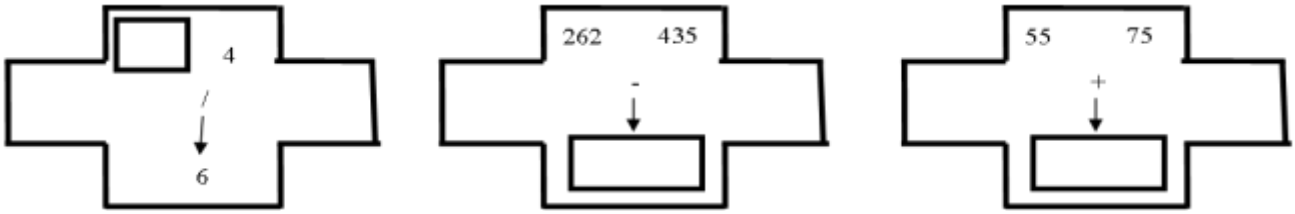
Q1



Q2



Q3



UNIY 4 **NUMBER CODES WITH GEOMETRIC SHAPES**

ADDITION AND MULTIPLICATION

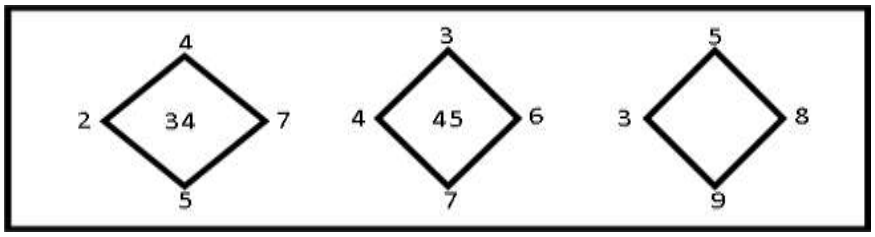
TEACHER'S GUIDE

Teacher to note that in this operation, to get the number at the center, multiply the numbers at opposite vertices and add the two results.

LEARNING OUTCOMES

Pupils can be able to find product and factors of numbers.

Geometric shapes like squares, circles, triangles etc, may be drawn with number codes inserted in them. Your duty is to study it carefully in all angles and try to interpret it correctly.



The numbers are arranged thus:

2 x 7 = 14

4 x 5 = 20. 20 + 14 = 34

Second: 4 x 6 = 24, 3 x 7 = 21

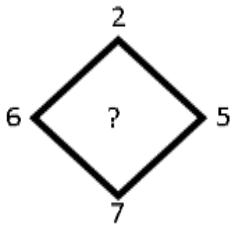
Then 24 + 21 = 45

Third: 3 x 8 = 245 x 9 = 45. Then 24 + 45 = 69.

Now answer these questions

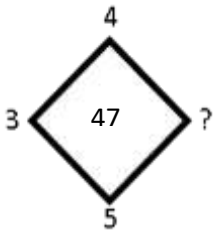
Exercise 1

Q1)



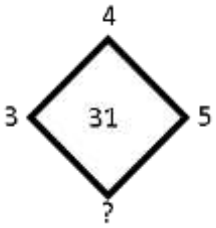
A) 57 B) 37 C) 47 D) 30 E) 44

Q2)



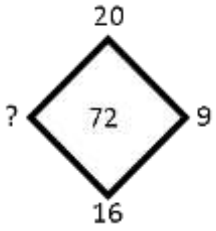
A) 9 B) 27 C) 20 D) 12 E

Q3)



A) 5 B) 6 C) 4 D) 9 E) 10

Q4)



A) 12 B) 7 C) 8 D) 4 E) 3

UNIT 5

Relation of sets of number involving addition

TEACHERS GUIDE

The operation is to add a constant difference to one term to get the next.

LEARNING OUTCOME

Pupils can identify set relations involving numbers.

INTRODUCTION

When given two or more set of numbers, we can find the similarities or connections between different sets of numbers provided. Quantitative relation of sets of numbers can take different forms.

In this unit we will learn about the relation of sets of numbers involving addition

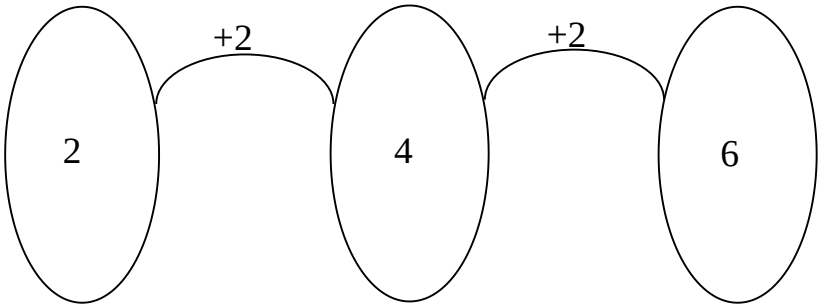
Any given set of numbers either have a relation or not.

We are going to look at some numbers to determine whether they are related or not by addition.

Ex.1 Now look at '2 and 4 and 6' by addition? Are they related? If they are related, what is the relation?

Are these numbers related?

Yes, these numbers are called even numbers and they go up by adding each time. They are also in the two times tables.

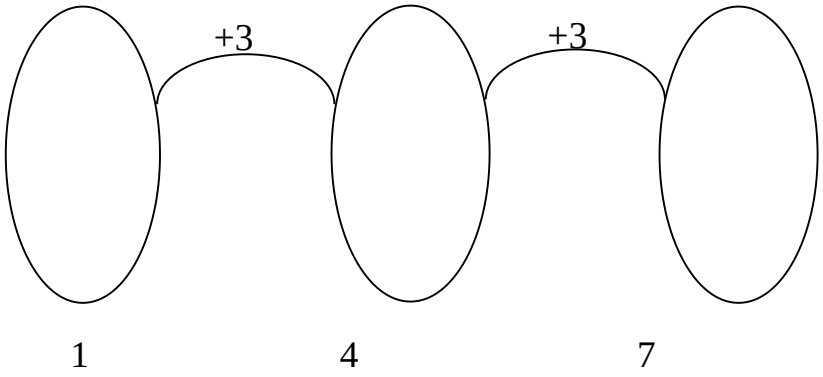


Ex.2. Write 1, 4 and 7

What is the relation between these three numbers?

1 4 7

These numbers go up by adding 3 to get to the next number.



Exeample

A= 1, 2, 3; B= 3, 5, 7; C= 4, 7, 10

Which sets (A, B or C) contain numbers that are related?

Let us work through each set.

In set A, what number will you add to 1 give you 2?

The answer is 1. So, let us add throughout set A: '1+1=2, 2+1=3: numbers are related by adding 1.

In set B, what number will you add to 3 to give you 5?

The answer is 2.

B: 3+2=5, 5+2=7', therefore, numbers in set B are related by the adding 2 to get the next term.

In set C, what number will you add to 4 to give you 7?

The answer is 3. So, set C: 4+3=7, 7+3=10', therefore, numbers in Set C (4, 7 and 10) are related by adding three to get the next term.

The examples we just worked out show that some sets of numbers are related by addition. Ex. A, B and C are related by addition.

Now use the examples above to answer the following questions below:

Exercise 1

Question. Write down the relationships between these set of numbers

1. A= 10, 20, 30, …… , …..……..
2. B= 4, 7, 10, …… , …….
3. C= 13, 16, 19, ……. , …….
4. D= 1, 2, 3; ……. , …….
5. E= 3, 5, 7; ……. , …….

6) Find the next two terms.

a. A= 4, 9 and 14, …….. …….
b. B= 2, 5 and 8 …….. …….
c. C= 45, 50 and 55 …….. …….

UNIT 6

RELATIONS OF SETS OF NUMBERS INVOLVING SUBTRACTION

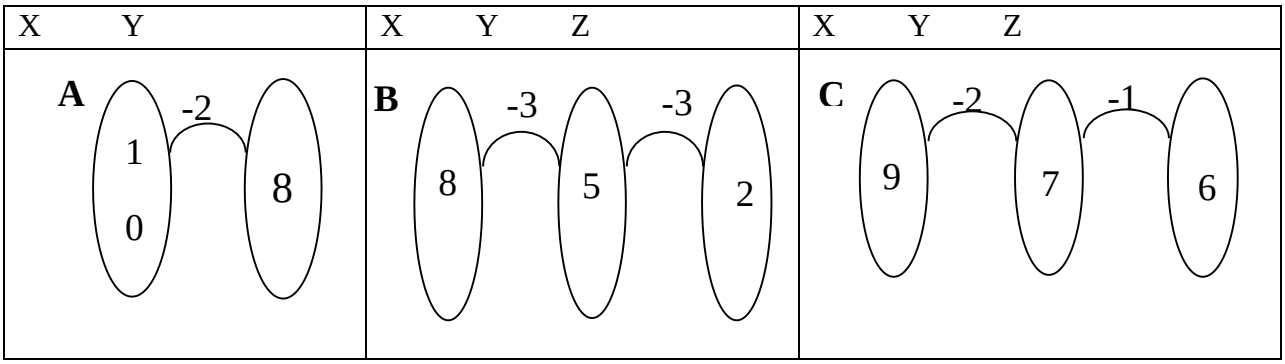
TEACHER'S GUIDE

Teacher to carefully review the operations before the lesson. The operation involved is subtracting a constant number from one term to get to the next term.

LEARNING OUTCOMES

By the end of the lesson, pupils will be able to identify the relation of sets of numbers involving subtraction.

Consider the following operations: Find out If they are related, how are they related?



There is a relation between the numbers in set **A;** the relation between 10 and 8 is the subtraction of 2.

Considering set 'B', it can be agreed that there is a relation between the set of numbers. (the relation between '8 and 5' and '5 and 2' is the subtraction of 3, as shown in the diagram)

In set C, the numbers are **not** related with a constant number by subtraction.

The example we just worked out show that while some set of numbers are related by subtraction (A and B), others are not related by subtraction (C).

Examples:

a. A= 30, 20, 10
b. B= 12, 8, 4
c. C= 9, 6, 3

How are the numbers in set A to C related?

Answer: the set A's numbers are related by the subtraction of 10 and

set C's numbers are related by the subtraction of 3,

How the numbers in set B related?

(Answer: Set B's numbers are related by subtraction of four (4).

Exercise 1

Find the relation by subtraction between the following numbers.

a. A = 14, 9, 4 (Answer: Subtraction of 5)
b. B = 12, 8, 4 (Answer: subtraction of 4)
c. C = 23, 20, 17 (Answer: Subtraction of 3)

Closing

1. Are the following sets related or unrelated by subtraction? Raised your hand to answer.
   a. 15, 10, 5 (Answer: related)
   b. 6, 4, 2 (Answer: related)

2. 144, 132, ?, 108, 96
   A. 102 b. 105 c. 115 d. 120 e. 130

UNIT 7:

RELATIONS OF SETS OF NUMBERS INVOLVING MULTIPLICATION

TEACHER'S GUIDE

The operation is to multiply one term by a constant number to get to the next term.

LEARNING OUTCOMES:

Pupil can be able to identify the relation between a set of numbers involving Multiplication.

Introduction

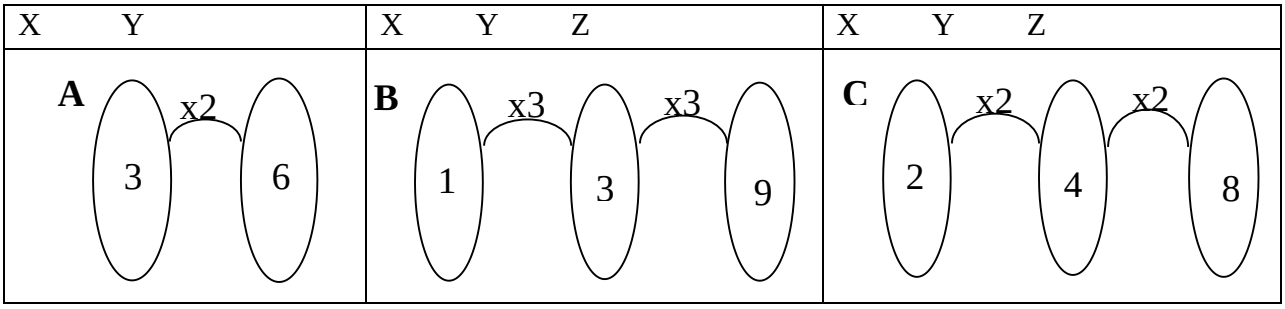
Look at this set of numbers:

1, 2, 4, 8, ☐ ☐

In this set of numbers common multiplier is 2. So, you multiple each term by 2 to get the net term. Therefore, to get the net term after last number 8 you multiple 8 x 2 = 16 and also multiple 16 x 2 = 32.

Study the diagram below and determine whether the number in each set are related or not by multiplication.

If they are related, how are they related?



There is a relation between the numbers in set **A: 3** x 2 = 6.

Considering set **B**: 1 x3 = 3, 3 x = 9, Yes, they are related by multiplying by 3

In set **C** the numbers are **related** by multiplying each term by 2 to next to the number.

Examples:

a. A= 1, 4, 16
b. B= 1, 3, 9
c. C= 3, 6, 12

Group these sets of numbers into those that are related by subtraction and those unrelated by multiplication.

Note: Teacher

Walk around the room, check pupils work and allow discussion with them and assist where necessary.

How are the numbers in set A and C related? Raise your hand to answer. (Answer: the set A's numbers are related by multiplying through with 4 and set C's numbers are related by multiplying through with 2).

How are the numbers in set B related?

numbers in set B related by multiplying by 3

(Answer: we multiplied 1 by 3to give us 3, then we multiplied 3 by 3, to gives us 9.

Exercise 1

1. Find the relation by multiplying between the following numbers: and then find the next 2 terms.
    a. A = 4, 8, 16, ……., ……
    b. B = 2, 10, 50……., ……
    c.
    d. C = 6, 12, 24……., ……

UNIT 8:

RELATIONS OF SETS OF NUMBERS INVOLVING DIVISION

TEACHER'S GUIDE

Teacher to understand that each term is divided by a constant number to get to the next term.

LEARNING OUTCOMES

Pupils can be able to identify the relationship between set of numbers involving division.

Look at this sequence:

48, 24, 12, ____ ____

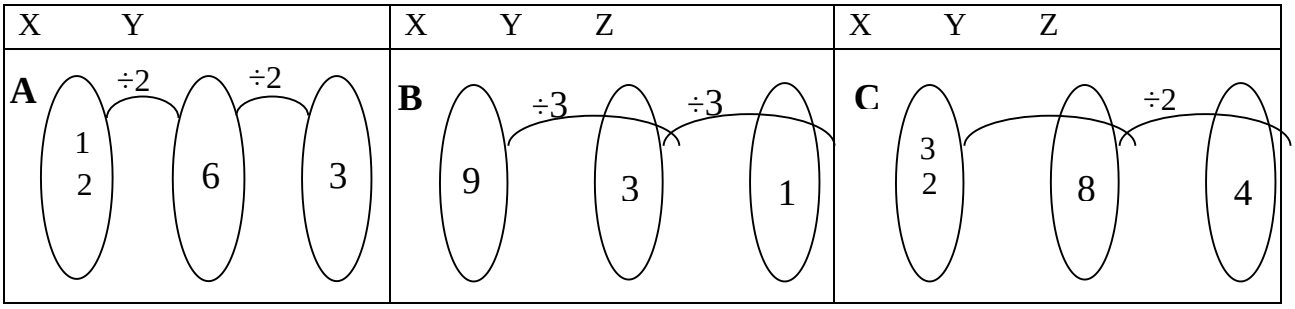
Introduction

Any given set of numbers either has a relation or doesn't have a relation.

We are going to look at some numbers to determine whether they are related or not by division.

Study the diagram below and determine whether the number in each set are related or not by division.

If they are related, how are they related? Invite several pupils to answer.



Set **A:** the relation between 12, 6 and 3: divided each time by 2.

Considering set **B**: the relation between 9, 3 and 1: divided by 3 to get the next number.

Set **C:** the numbers are **not** related by division. Each subsequent number is not the result of dividing the prior number by a particular number. For example, 32 were divided by 4 to get 8. So, for the set of numbers to be related, 8 would also need to be divided by 4, which would give us 2 and not 4, as shown in the diagram.

To conclude: set (A and B), others are also not related by division (C).

Exercise

Find the relation between the following numbers:

1). A = 16, 8, 4 (Answer: Division by 2)

2). B = 50, 10, 2 (Answer: Division by 5.)

3). C = 16, 8, 2 (Answer: No relation by division)

Pupils to write their answers in their books and work individually.

Have pupils exchange their books and check their work while you read the answers aloud.

Closing

Are the following sets related or unrelated by division?

a. 16, 4, 1 (Answer: related)
b. 36, 6, 1 (Answer: unrelated)

How do you know the set of numbers in B are unrelated by division? Raise your hand to answer. (Example answer: there is no common number to divide 24 to get 6 and 6 to get 1, you divide 24 by 4 = 6 but 6 divided by 4 is not 1).

In this set of numbers, the relationship between each term to get next number is dividing by 2 to get the next term. So, to get the next term after 12 we divide 12 ÷2 = 6 and also divide 6 ÷ 2 = 3, so the missing number are 6 and 3.

Now use this information to answer the question below.

Note: Always study the connection or relation between the numbers to find or get a constant or common difference.

1. ____ 45, 5, $\frac{5}{3}$
   a. 60 (**b)** 67 ½ (**c)** 90 **(d)** 135 (**e)** 180
2. 243, , 27, 9, 3
   (a) 30 **(b) 45** (**c) 81** (**d)** 108 (**e)** 126
3. 1024, _____, 64, 16, ____
   (a) 64, 132, (b) 256, 35 (c) 256, 4 (d) 4, 256 (e) 4, 144
4. 1000, _____ , 40, 8
   (a) 150 (b) 100 (c) 200 (d) 250 (e) 125

UNIT 9

RELATIONS OF SETS OF NUMBERS INVOLVING THE FOUR (4) OPERATIONS

TEACHER'S GUIDE

There are always two set of ordered pairs of numbers, teacher should relate first numbers of the ordered pairs and the second numbers of the ordered pairs to carefully note the operation, which could be addition, subtraction, multiplication or division.

Pupils can be able to identify the relation between two sets of numbers involving the four operations.

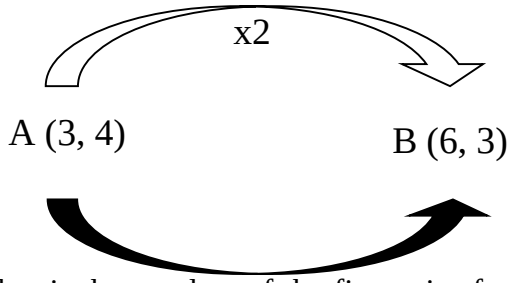
Introduction

In this lesson, we will be making use of ordered pairs of numbers. Ordered pairs fall within set rules and are written in this form (x, y).

X is the first numbers in the bracket and Y is the second numbers in the brackets.

Example 1

1. Draw the example below on the board:



The first number is the x value, of the first pair of numbers in A, should always be related to the first number, or x value of the second pair of numbers in B.

So, in the example above, 3 is related to 6 by multiplying 3 by 2. (3 x 2 = 6)

Also, the second number, the Y value, of the first pair of numbers in A, should always be related to the second number, or Y value, of the second pair of numbers in B.

In the example above, 4 is related to 3 by subtracting 1 from 4.

Example 2

Write A (4, 6) and B (6, 2).

Consider these new sets of ordered pair of numbers: A (4, 6) and B (6, 2).

What rule do these pairs of numbers obey? Point to the **X** value of set A and B (4 and 6) What is the relation between these two numbers?

(Example answers: 4 + 2 = 6, therefore, the relation is adding 2).

The Y values of set A and B (6 and 2) shows there is a relation between these two numbers.

There are two ways to this:

6 ÷ 3 = 2, and 6 – 4 = 2.

Therefore, the relation in the Y values can either be dividing by 3 or subtracting 4.

Example3

Let us make 2 ordered pair of numbers and numbers between 1 and 10.

Write (2, 7) and (3, 5).

Give the relation between these ordered pairs.

(Answer: x = +1, y = -2).

With the X value, 1 was added to 2 arrive at 3 (2+1=3). With the Y values, 2 wa subtracted from 7 to arrive at 5 (7-2=5).

The relation between the ordered pairs (2,7) and (3,5) is x= +1, y= -2

Exercise

1. Write and say:
   Find the rule for the following ordered pairs of numbers:
   a. A= (1, 4) and (4,12)
   b. B= (5, 9) and (4, 3)
2. Using any numbers from and including 1 to 5, write a set of ordered pairs using the rule x= +4, y= ÷2. (Example answer: (1, 4) and (5, 2); (1, 2) and (5, 1)
1. What is the rule for the following ordered pairs: (3, 5) (5, 10)? ? Raise your hand to answer. (Answer: x = +2, y = x2 or +5).
2. Have pupils to exchange their exercise books and check their work as you read the answer aloud

Closing

1. We looked at home to identify and write ordered pairs that follow a rule involving the four operations.
2. We also found out that some ordered pairs can follow more than one rule.
3. Ordered pairs are written in the form (x, y)
4. The x value can have a different rule from the y value

UNIT 10:

NUMBER SERIES

TEACHER'S GUIDE

Teacher to carefully study the series to know the pattern used to get the next terms.

LEARNING OUTCOMES

Pupil scan be able to identify some patterns that are used to get the next terms.

A **SERIES** is a set pattern of numbers appearing in a chosen order. Series can be arranged as thus:

i) Number and square
ii) Multiplying the other number by 10, 5, 2, etc.
iii) By adding 2 to the numerator and 7 to the denominator or any other sequence.
iv) By multiplying the denominator by 2
v) By systematically multiplying with increasing figures

Always study the first two sets to get an idea on how to solve subsequent numbers in the pattern.

The sample below represents a simple series of numbers.

Study it carefully and find the number to fill the space marked "?"

Sample: 2, 4, 8, 16, ?, 64

A) 12 B) 24 **C) 32** D) 36 E) 42

The correct answer is 32 as the numbers are multiplied by 2. Answer space C would be shaded.

Exercise

Q1) 0.5, 1, 1.5, 2, ?, 3

A) 3.5 B) 2.8 C) 0.5 D) 2.2 E) 1.8

Q2) 5, 25, 4, 16, ?, ?, 2, 4

A) 4, 8 B) 3, 9 C) 3, 6 D) 3, 2 E) 1, 2

Q3) 150, 15, 1.5, 0.15, ?, 0.0015

A) 0.015 B) 0.00015 C) 0.0115 D) 0.115 E) 15000

Q4) (10, 100), (?, ?), (6, 36), (4, 16), (2,4) **(NPSE 2016)**

A) 7, 49 B) 7, 64 C) 8, 16 D) 8, 64 E) 8, 66

Q5) $\frac{97}{69}$, $\frac{76}{59}$, $\frac{55}{49}$, $\frac{34}{39}$, ? **(NPSE 2016)**

A) $\frac{11}{19}$ B) $\frac{11}{29}$ C) $\frac{13}{19}$ D) $\frac{13}{29}$ E) $\frac{23}{29}$

UNIT 11

PATTERN WITH DIVISION, ADDITION AND SUBTRACTION

TEACHER'S GUIDE

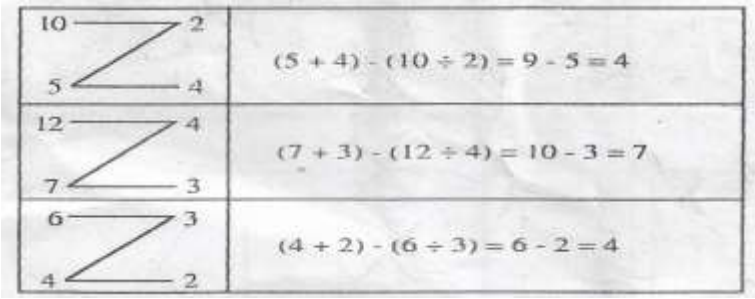
Teacher to study the sample and carefully note how, when and where addition, division and subtraction are being used**.**

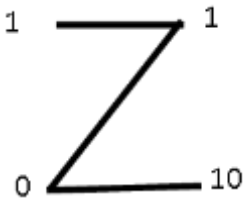
LEARNING OUTCOME

Pupils can be able to identify when, where and how addition, division and subtraction are used in the operation.

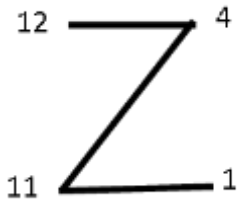
Study the sample below carefully and use it to find the values of each of the samples in the questions that follow (NPSE 2017)

SAMPLE

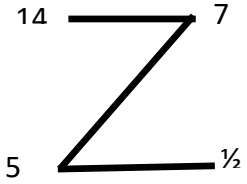


Q1) 

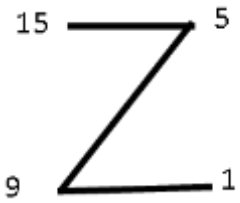
A) 9 B) 10 C) 11 D) 12 E) 13

Q2) 

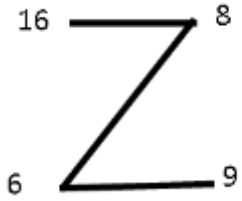
A) 2 B) 5 C) 6 D) 8 E) 9

Q3) 

A) $1\frac{1}{2}$ B) 2 C) $2\frac{1}{2}$ D) 3 E) $3\frac{1}{2}$

Q4) 

A) 2 B) 4 C) 5 D) 6 E) 7

Q5) 

A) 7 B) 9 C) 13 D) 17 E) 23

TOPIC 12:

PATTERNS WITH ADDITION AND MULTIPLICATION

TEACHER'S GUIDE

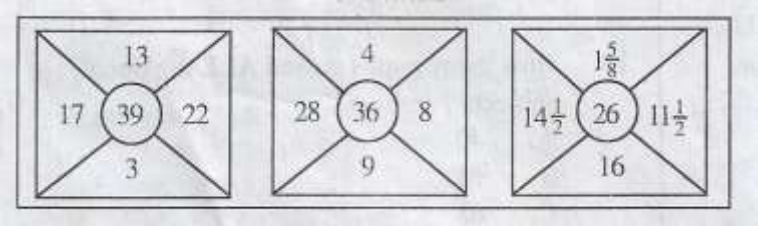
Teacher to understand that the operations are addition and multiplication, we add horizontally and multiply vertically to get the same answer at the center.

LEARNING OUTCOMES

Pupils can be able to find the sum and product of numbers either horizontally or vertically with simple shapes.

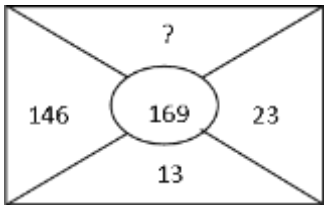
Study the sample carefully and use it to find the value of '?' in the questions that follows (NPSE 2019)

SAMPLE

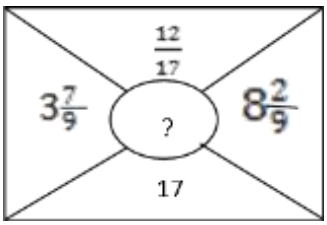


Exercise

Q4)



A) 11 B) 12 C) 13 D) 14 E) 26

Q6) 

A) 8 B) 9 C) 10 D) 11 E) 12

UNIT 13:

SEQUENCING WITH SHAPES

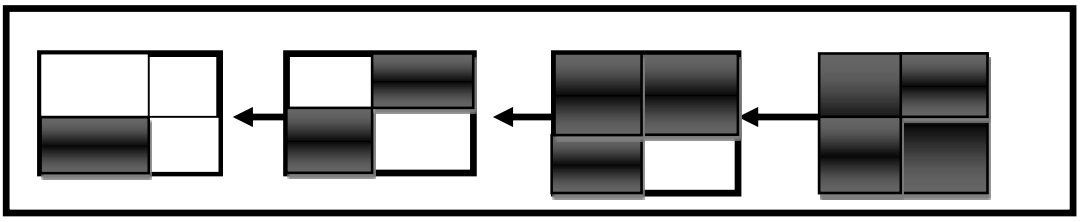
TEACHER'S GUIDE

Teacher to carefully study the sequence regarding the movement of the shapes.

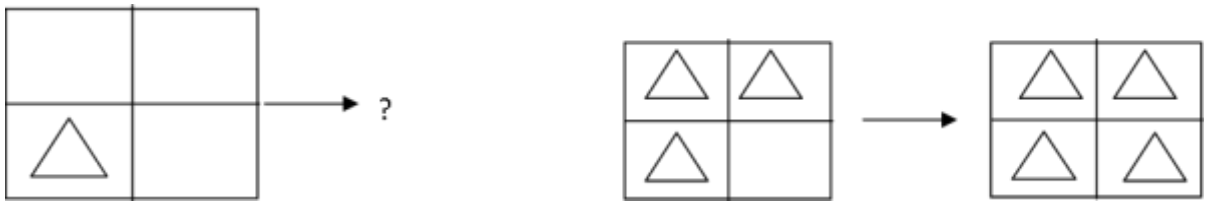
LEARNING OUTCOME

Pupils can be able to identify the sequence in which some common shapes move from one position to another.

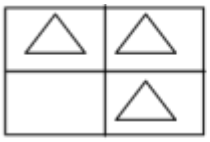
Some shapes are arranged in a definite pattern called sequencing. Study the sample below and use it to find the shapes represented by '?'



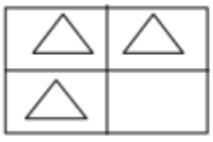
Q1)



A)



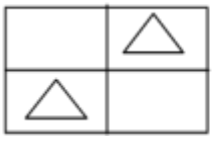
B)



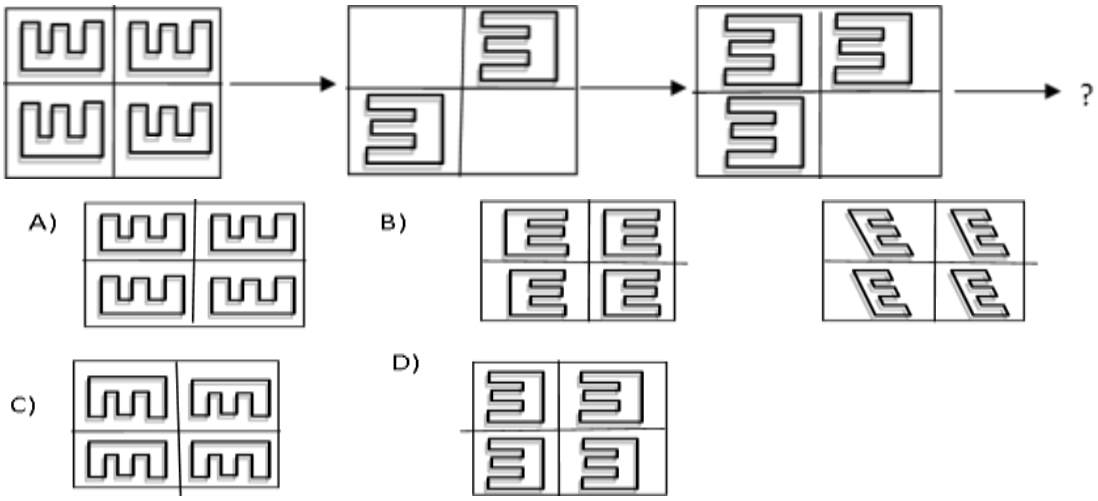
C)

C)

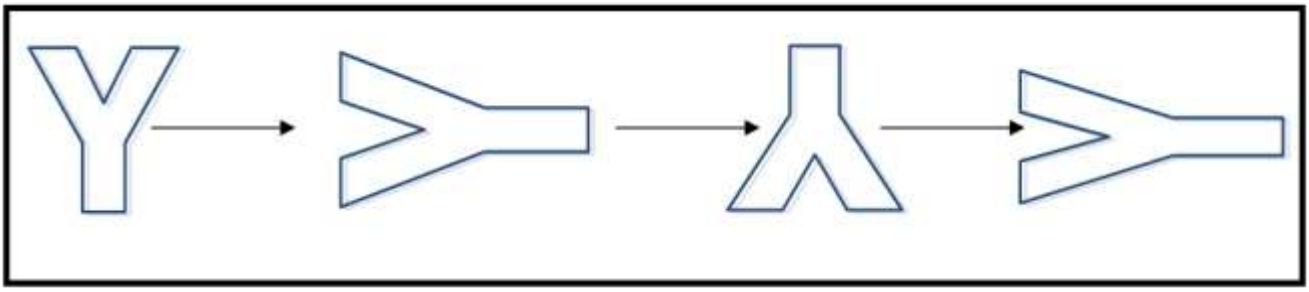
D)



Q2)

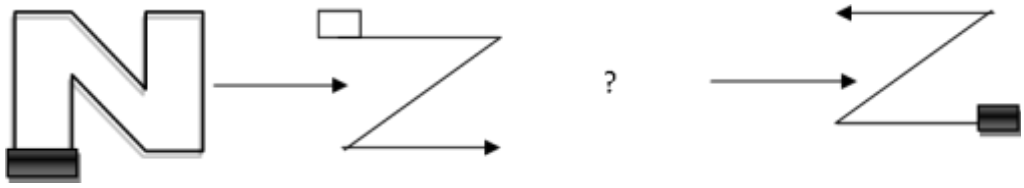


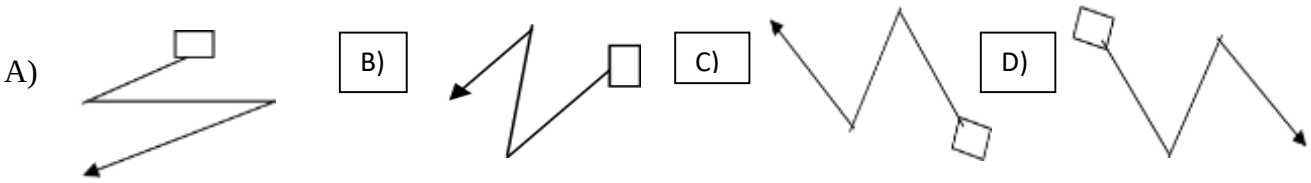
Another way of sequencing is shown in the sample below



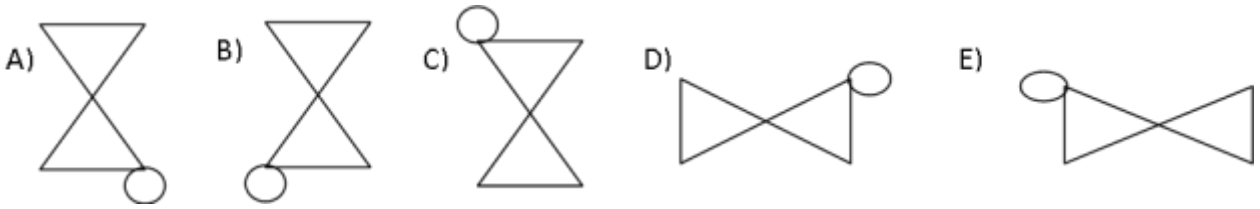
Study the sample above and use it to answer the questions that follow

Q3)





Q4)



UNIT 14: IDENTIFYING CORRECT SHAPES

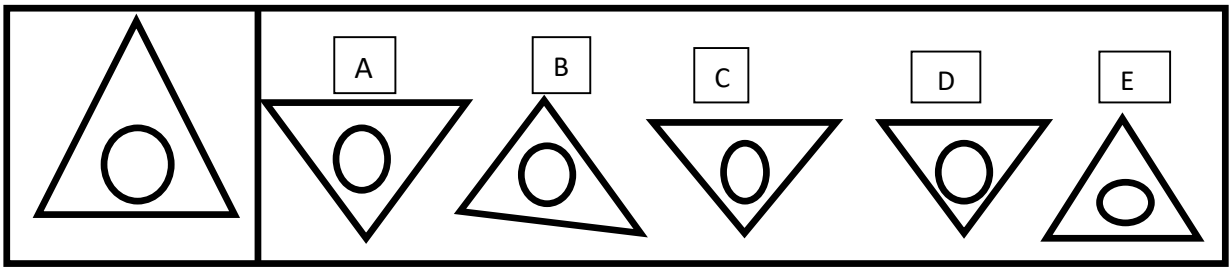
TEACHER'S GUIDE

Teacher should study shapes accurately.

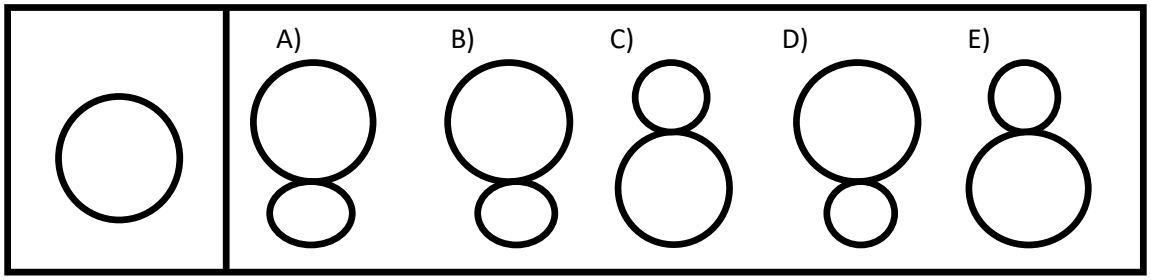
LEARNING OUTCOMES

At the end of the lesson, pupils can now identify shapes correctly.

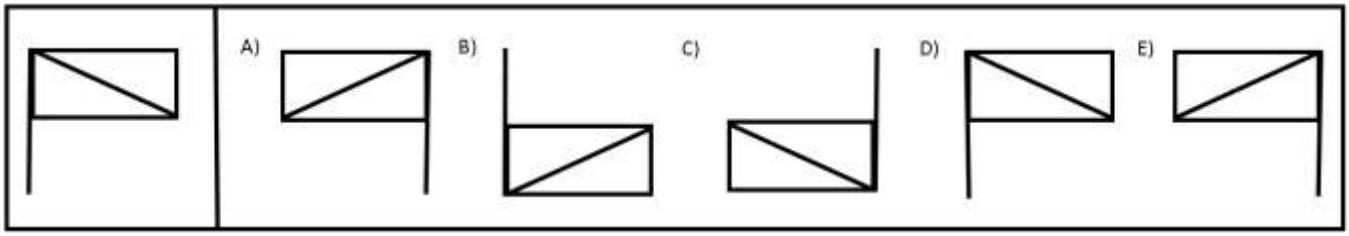
Q1)



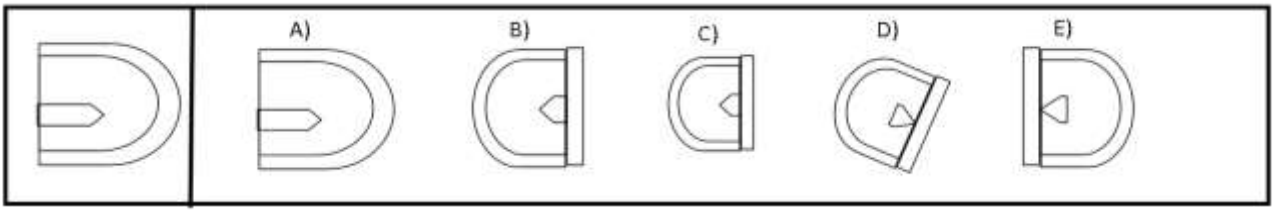
Q2)



Q3)



Q4)



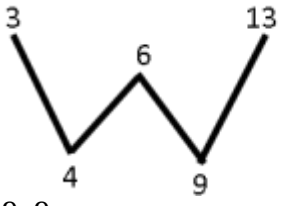
UNIT 15: ADDITION, SUBTRACTION AND MULTIPLICATION

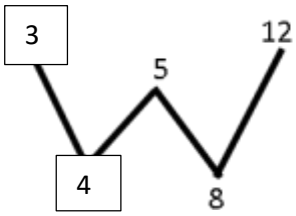
TEACHER'S GUIDE

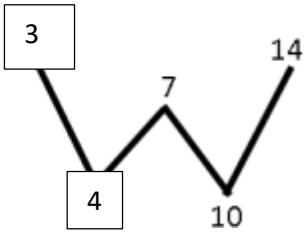
Teacher to guide pupils to understand where to use addition, subtraction and multiplication on various pattern shapes.

LEARNING OUTCOMES

Pupils can find the sum, difference and product of numbers.



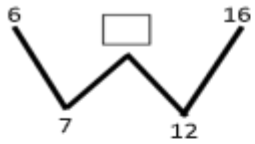




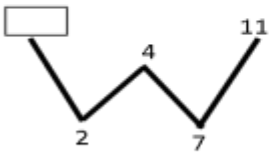
3 + 6 = 9, 9 + 4 = 13, 3 + 4 + 6 = 13.

Use the example above to find out the connection between the numbers. Choose the correct answer for each of the questions below.

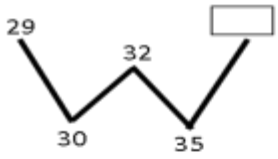
Exercise

Q1) 

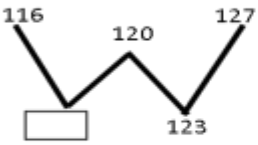
A) 6 B) 7 C) 8 D) 9 E) 10

Q2) 

A) 6 B) 5 C) 3 D) 2 E) 1

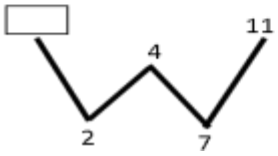
Q3) 

A) 14 B) 20 C) 29 D) 49 E) 39

Q4) 

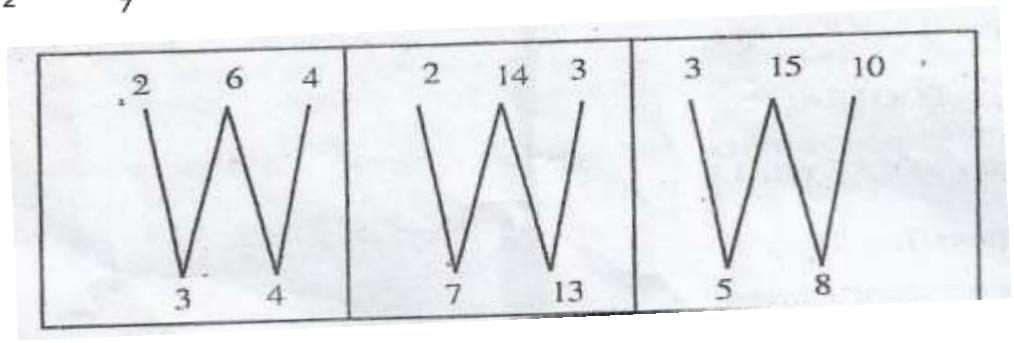
A) 116 B) 117 C) 118 D) 119 E) 121

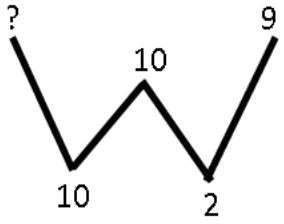
Study the sample below carefully and use it to find the values of "?" in questions that follow (NPSE 2017 Q 13 to 16)

Q5) 

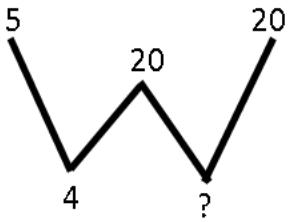
A) 0 B) 1 C) 2 D) 3 E) 45

SAMPLE

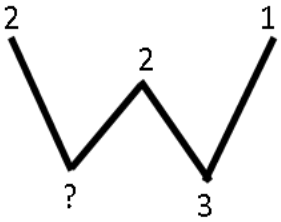


Q6) 

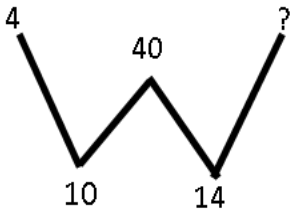
A) 1 B) 8 C) 10 D) 12 E) 20

Q7) 

A) 4 B) 5 C) 20 D) 25 E) 45

Q8) 

A) 0 B) 1 C) 2 D) 3 E) 4

Q9) 

A) 66 B) 44 C) 40 D) 30 E) 10

UNIT 16: PATTERN WITH SEQUENTIAL ADDITION

TEACHER'S GUIDE

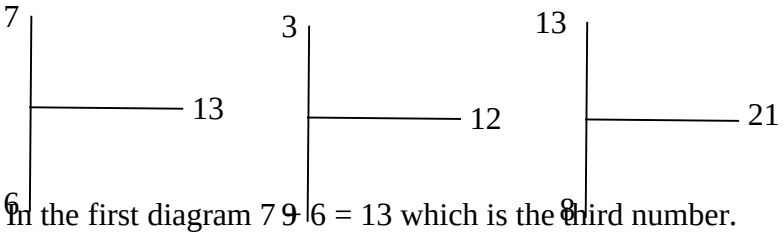
Here, the operation involves addition. Teacher should add where the sum is not given and subtract where the sum is given.

LEARNING OUTCOMES

At the end of the lesson, pupils have the necessary skills of addition whether the sum is given or not.

Two or three diagrams with numbers at various points or positions are given as sample. A close study shows how one number is obtained from the others.

(a) Sample



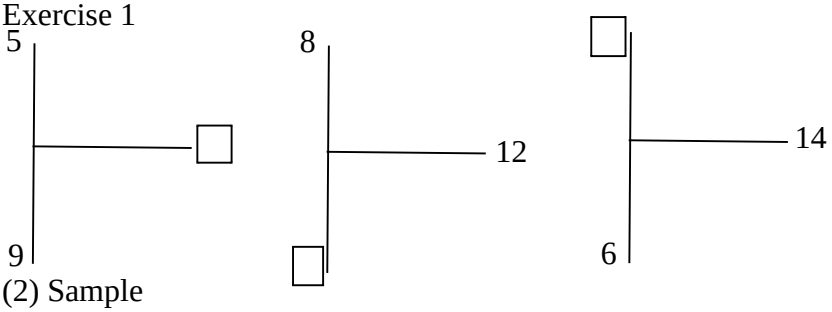
In the first diagram 7 + 6 = 13 which is the third number.

In the second diagram 3 + 9 = 12, which is the third number?

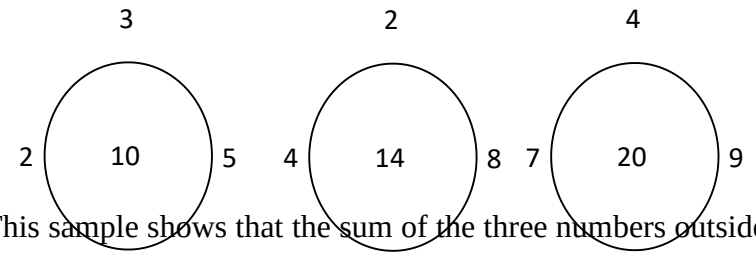
In the third diagram 13 + 8 = 21, which is the third number?

Using this principle, we can find the missing numbers indicated by ' □ ' in the following diagrams.

Exercise 1

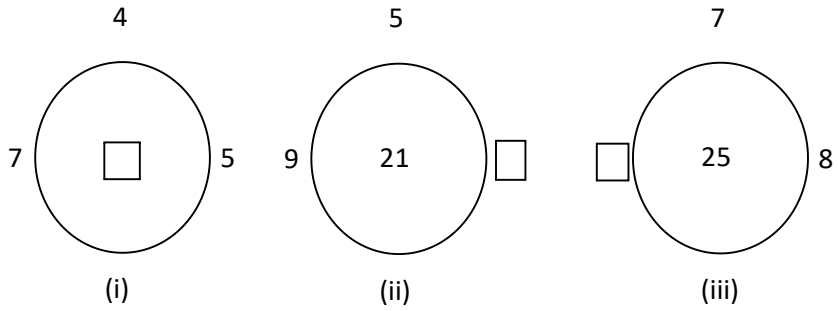


(2) Sample



This sample shows that the sum of the three numbers outside the circle is equal to the number within the circle.

Exercise 2.



(i) (ii) (iii)

UNIT 17:

SQUARE ROOTS AND ADDITION

TEACHER'S GUIDE

Teacher should be able to find the square root of numbers**.**

LEARNING OUTCOME

At the end of the lesson, pupils can be able to find the square root of numbers.

Using symbols in solving square root of numbers

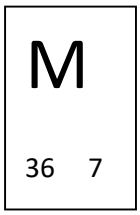
Sample

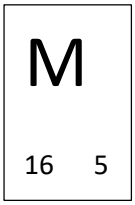
$M_{4\ \ 2} = \sqrt{4} + 2 = 2 + 2 + 2 = 4$
${}_{9}M_{3} = \sqrt{9} + 3 = 3 + 3 = 6$
$M_{16\ 4} = \sqrt{16} + 4 = 4 + 4 = 6$

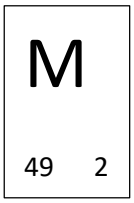
In the example above you find the square root of the number on the left of the symbol and then you add the number on the right part of the symbol. So, you will use the method to answer the questions below.

Exercises. Use the sample above to answer the following questions:

1. $M_{25\ \ 2}$

2. 

3. 

4. 

UNIT 18: SQUARE AND ADDITION

TEACHER'S GUIDE

Teacher should clearly tell pupils that the opposite of square is square root. it is advisable that teacher prepares a chart of squares and square root.

LEARNING OUTCOMES

At the end of the lesson, pupils can express the square and square root of numbers.

Please study the sample below carefully and use it to answer questions below.

Sample

$$_3S^2 = 2^2 + 3 = 4 + 3 = 7$$

$$_3S^4 = 3^2 + 4 = 9 + 4 = 13$$

$$_3S^2 = 1^2 + 2 = 1 + 2 = 3$$

In this example you square the bottom and add the top number

Exercise 1

Q1) What is the value of $3S^3$?

a)10 b) 17 c) 18 d) 20 e) 12

Q2) What is the value of $_4S^2$?

a. 18 b. 9 c. 12 d. 15 e. 14

Q3) What is the value of $_6S^5$?

a.11 b. 17 c. 39 d. 41 e. 4

Q4) What is the value of $_2S^{11}$?

a. 15 b. 14 c. 13 d.

Q5) What is the value of $_0S^4$?

a. 0 b. 16 c. 8 d. 5 e. 4

Q6) What is the value of $_{10}S^{10}$?

a.140 b. 130 c. 120 d. 115 e. 110

UNIT 19:

PATTERN INVOLVING SEQUENTIAL DIVISION

TEACHER'S GUIDE

Teacher to explain to pupils that the opposite of multiplication is division.

LEARNING OUTCOMES

Pupils can be able to solve simple problems that involves division.

Study the sample below carefully and use it to find the value of "?" in the questions

SAMPLE

4	**48**	**28**	**588**	**7**	**174**
3	12	3/4	21	3	21

48 ÷ 12 = 4 588 ÷ 28 = 21 147 ÷ 21 = 7

12 ÷ 4 = 3 28 ÷ 21 = $\frac{3}{4}$ 21 ÷ 7 = 3

In this example you divide the l the top right number by the number on the top left

Exercise

Q1)

4	?
9	36

Q2)

5	120
48	?

a) 96 b) 98 c) 134 d) 144 e)15

a) 20 b) 22 c) 24 d) 30 e) 40

Q3)

?	108
$1\frac{1}{3}$	12

a) 3 b) 6 c) 8 d) 9 e) 10

Q4)

10	400
?	40

a) 4 b) 6 c) 8 d) 9 e) 10

UNIT 20

PATTERN WITH CONTINUOUS MULTIPLICATION

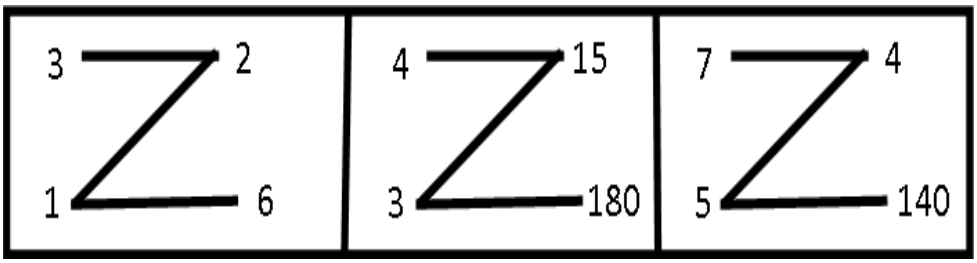
TEACHER'S GUIDE

Teacher should note that we multiply factors to get products and when product is given, we divide to get the factor.

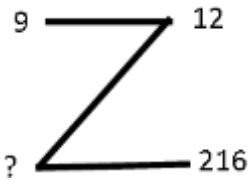
LEARNING OUTCOMES

At the end of the lesson, pupils can do simple operations that involves multiplication.

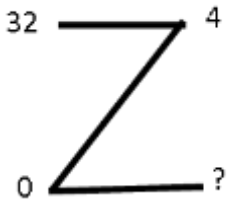
SAMPLE



Exercise 1

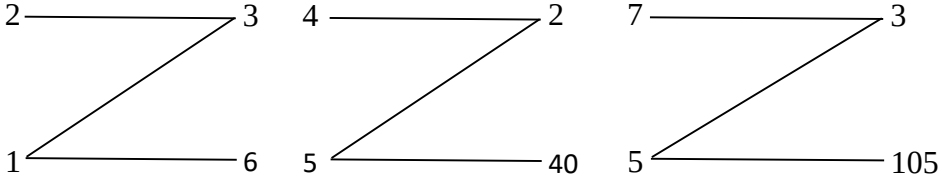
Q1) 

A) 0 B) 1 C) 2 D) 3 E) 4

Q2) 

A) 128 B) 36 C) 0 D) 1 E) 2

Sample



(i) (ii) (iii)

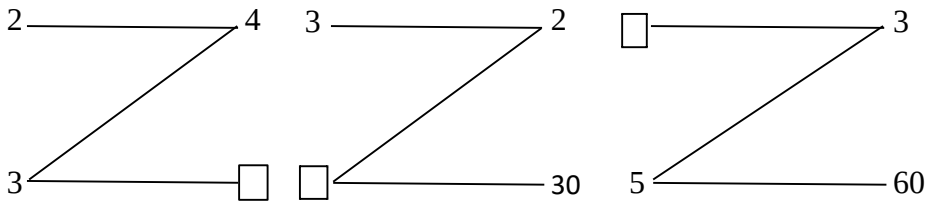
From the sample, it is observed that the fourth number is obtained by multiplying together the other three numbers.

In (i) 2 x 3 x 1 = 6, which is the fourth number?

In (ii) 4 x 2 x 5 = 40, which is the fourth number?

In (iii) 7 x 3 x 5 = 105, which is the fourth number?

Now apply this rule to the following diagrams to find the missing number □ .



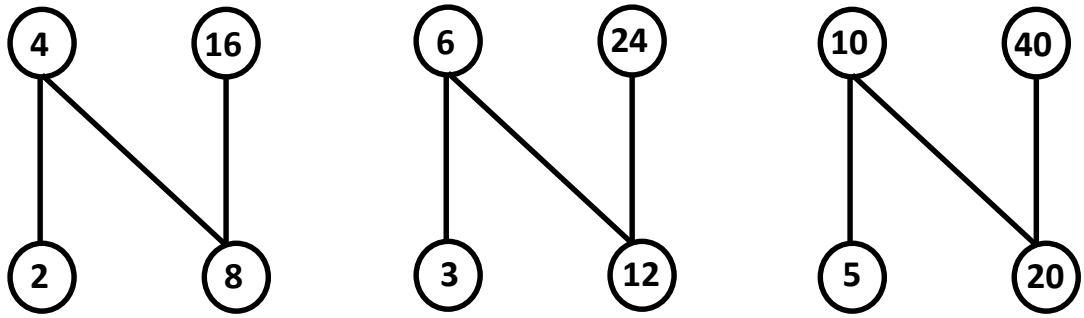
(i) (ii) (iii)

In (i) 2 x 4 x 3 = 24. Therefore 24 goes into the box as the fourth number.

In (ii) 3 x 2 x □ =30

6 x □ = 30. The number to be multiplied by 6 to give you 30 is 5. Therefore 5 goes into the box

Pattern involving sequential multiplication.



2 x 2 = 4
4 x 2 = 8
8 x 2 = 16

3 x 2 = 6
6 x 2 = 12
12 x 2 = 24

5 x 2 = 10
10 x 2 = 20
20 x 2 = 40

In the above examples, 2 is used as a constant number to multiply. Now use the same method to find the unknown.

Study the simple Sample in figure 1 carefully and use it to find the value of '?' in the questions that follow (NPSE 2019)

UNIT 21

PATTERN WITH CONTINUOUS SUBTRACTION

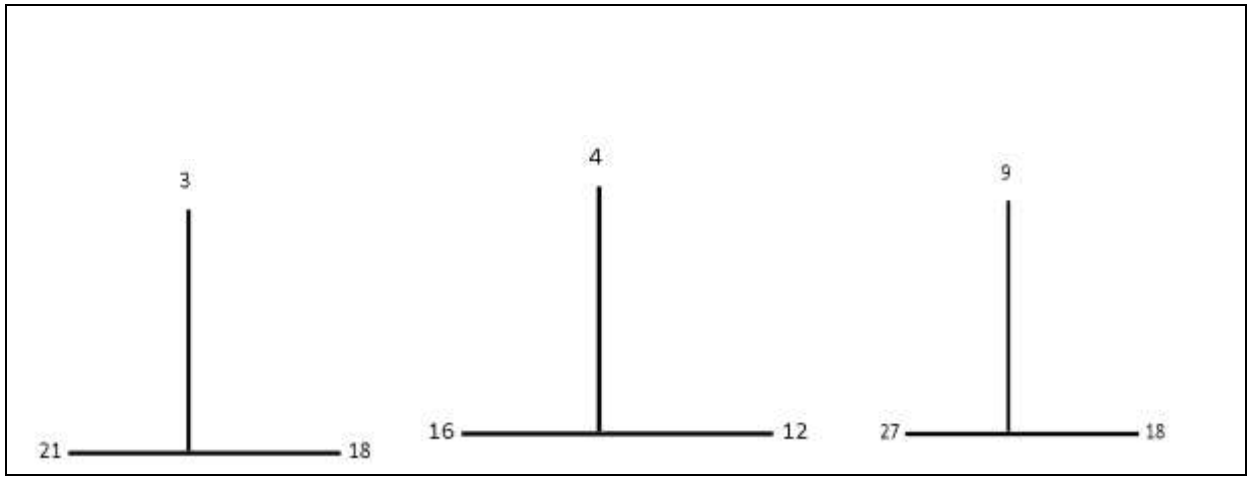
TEACHER'S GUIDE

Here the operation is subtraction, we find the difference between the numbers on the horizontal line to give us the number at the top of the vertical line.

LEARNING OUTCOMES

At the end of the lesson, pupils can do simple operations that involves subtraction.

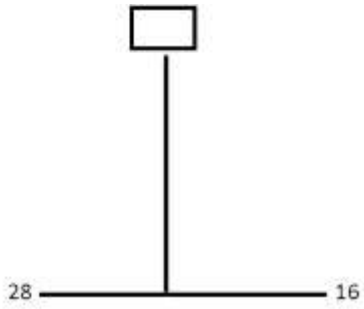
sample



In this pattern, we subtract 21 – 18 = 3, 16 – 12 = 4, 27 – 18 = 9

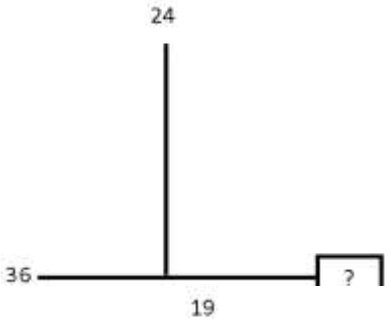
Now use this sample to answer the questions below

Exercise

Q1) 

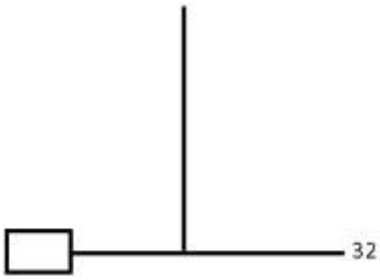
A) 12 B) 6 C) 2 D) 30 E) 32

Q2)



A) 24 B) 10 C) 50 D) 12 E) 25

Q3)



A) 14 B) 51 C) 13 D) 7 E) 45

UNIT 22

VALUES AND PRODUCTS

TEACHER'S GUIDE

Teacher to carefully follow the pattern code to find the product of the numbers.

LEARNING OUTCOMES

Pupils can use simple pattern codes to find product of numbers.

Sometimes, letters and their coefficients have specific values. Use the sample below and answer the questions that follow.

Z_1 =	1 x 4	=	4
Z_2	= 2 x 5	=	10
Z_3	= 3 x 6	=	18

Exercise

Q1) Find the value of Z_5

Q2) Find the value of $Z_4 + Z_1$

Q3) Find the value of $Z_3 + Z_1$

Q4) Find the value of $Z_6 - Z_4$

Use the sample below to answer the questions that under it.

Q0	=	2^1	+ 0	= 2
Q1	=	2^2	+ 1	= 5
Q2	=	2^3	+ 2	= 10
Q3	=	2^4	+ 3	= 19
Q4	=	2^5	+ 4	= 36

Q5) Find the value of Q4 + Q2 – Q0

A) 36 B) 40 C) 44 D) 46 E) 48

Q6) Find the value of $\frac{Q5-Q3}{Q2-Q1}$

A) 10 B) 30 C) 24 D) 21 E) 20

Q7) Find the value of Q6 ÷ Q0

A) 134 B) 128 C) 67 D) 64 E) 53

	A	B	C	D
P	5	4	3	2
Q	2	0	7	6
R	3	1	5	4
S	1	2	3	9

Look at the sample

BP x CS = 4 x 3 = 12

DS – CS = 9 – 3 = 6

Q8) What is DR ÷ AQ?

Q9) What is CQ x DR?

Q10) What is $\frac{D5}{CP}$

Q11) What is BQ + BP?

UNIT 23:

REFLECTION

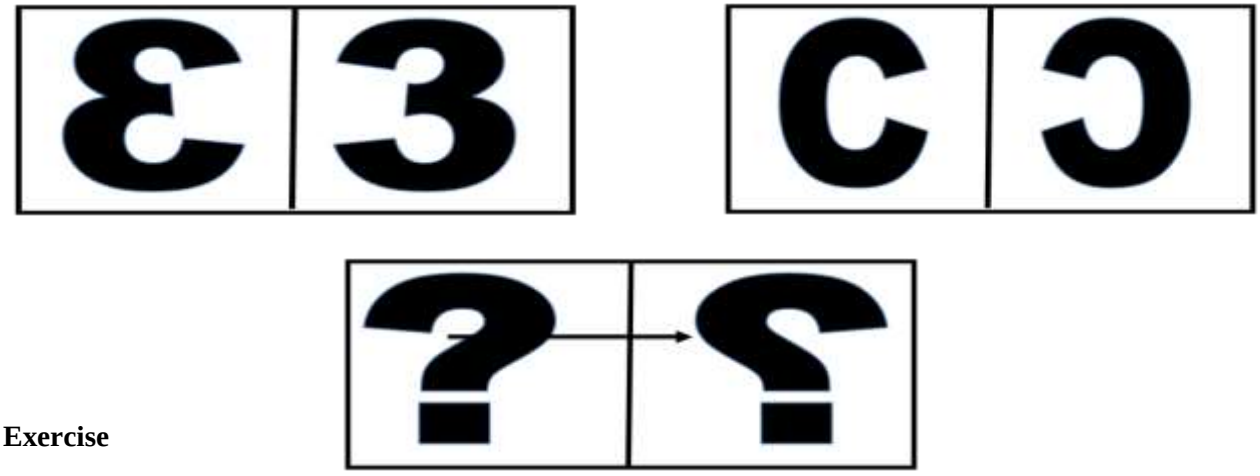
TEACHER'S GUIDE

Teacher should note that symbols, diagrams and shapes can be moved from one point to another or rotated without changing their forms.

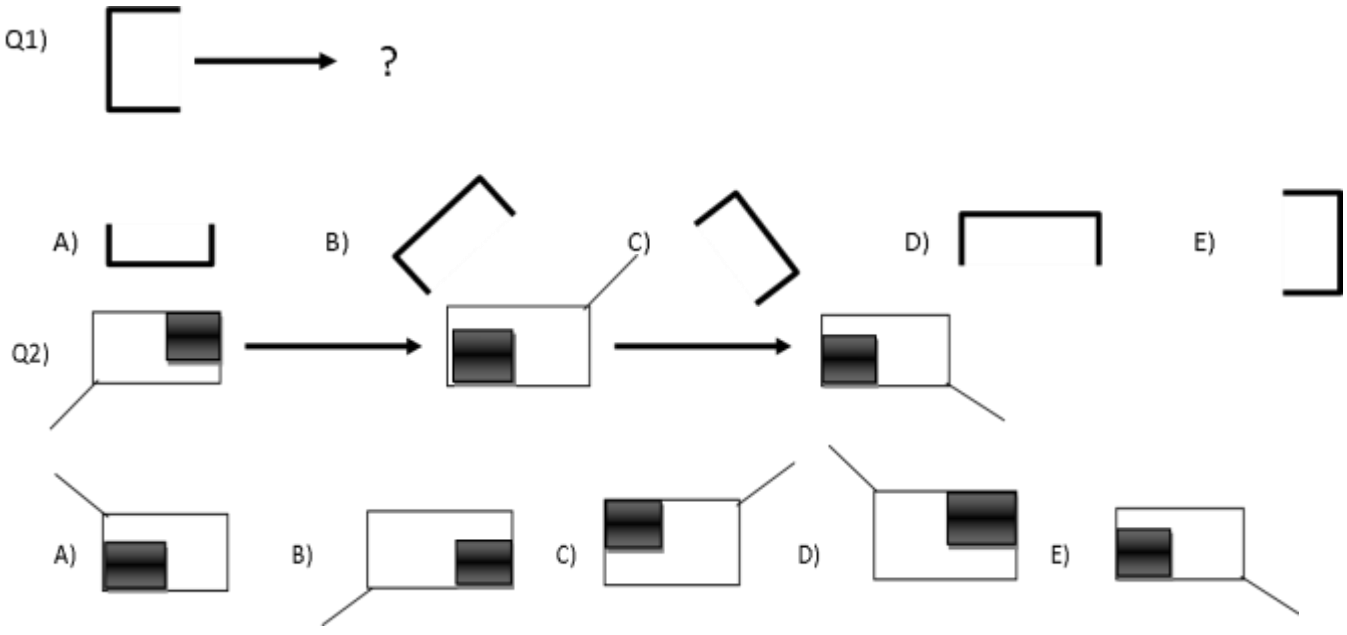
LEARNING OUTCOMES

Pupils can identify symbols, diagrams and shapes when they are reflected, moved or rotated.

Some shapes in Quantitative Aptitude are drawn literally reflected. See sample below:

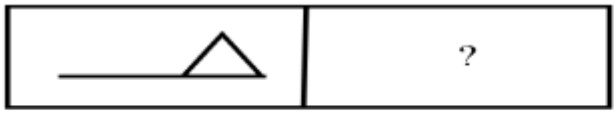


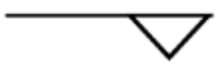
Exercise



=

Q3)

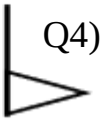


A) 

B) 

C) 

D) 

E) 

Q4)

A) 

B) 

C) 

D) 

E) 

(NPSE 2016 Q31 & 32)

UNIT 24

INVERSION

TEACHER'S GUIDE

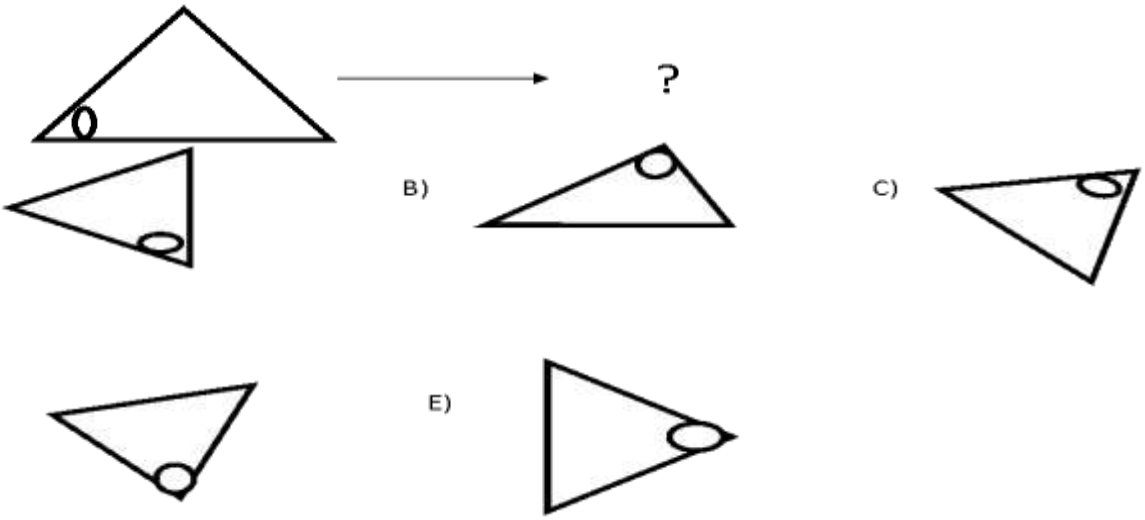
Teacher to understand that shapes and symbols can be inverted without changing their forms.

LEARNING OUTCOMES

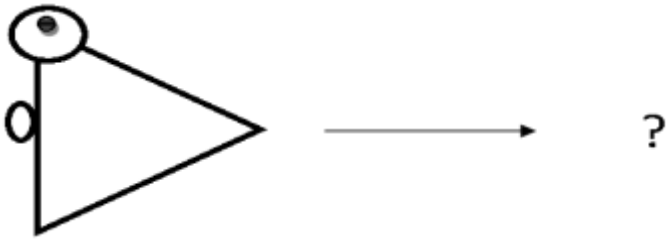
At the end of the lesson, pupils can identify shapes and symbols even when inverted**.**

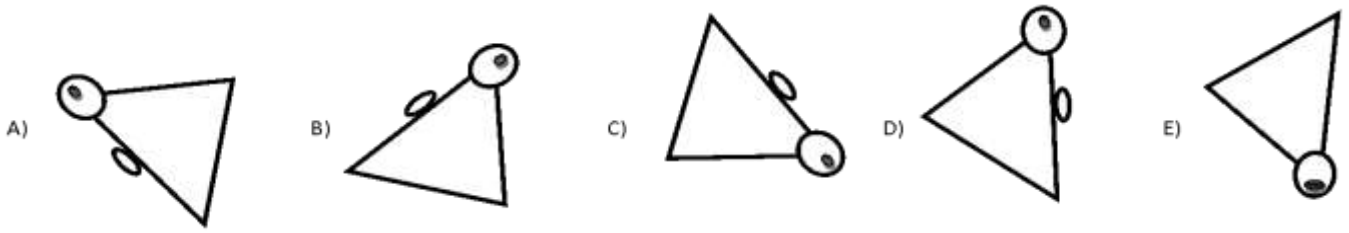
Use the sample above to find the shape represented by "?" in each question

Q1)

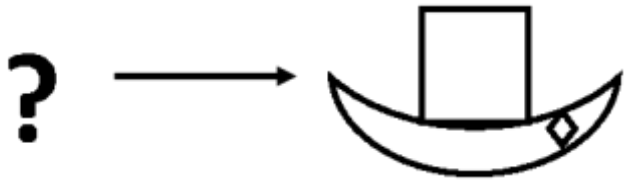


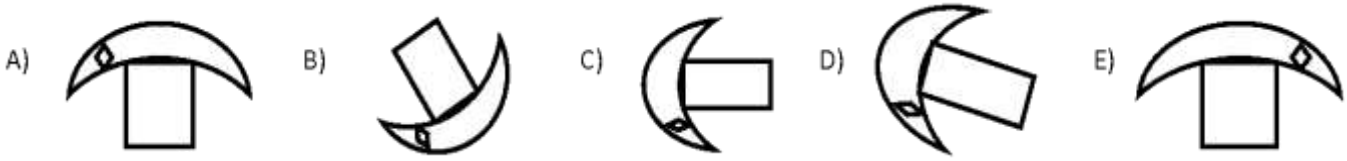
Q2



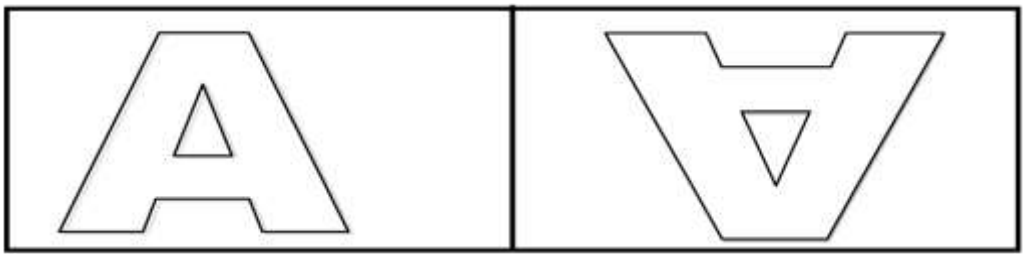


Q3)





Ex. Use the sample below to answer the questions



Q4)  | ?

A)  B)  C)  D)  E) 

UNIT 25: CORRESPONDING ADDITION OF NUMBERS

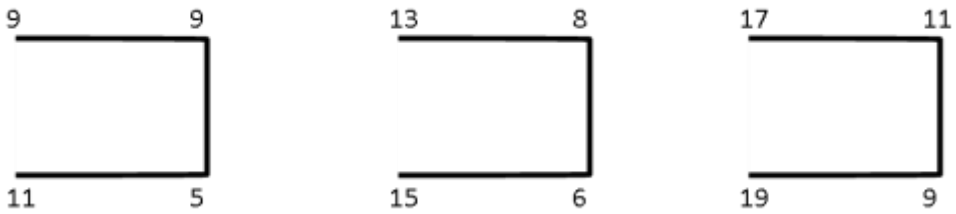
TEACHER'S GUIDE

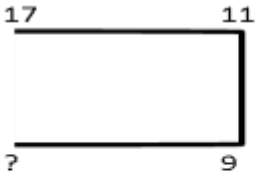
Teacher to carefully explain the meaning of corresponding shapes.

LEARNING OUTCOMES

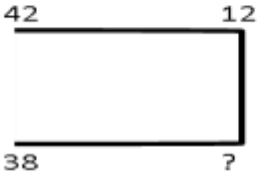
At the end of the lesson, pupils can add numbers on corresponding sides of shapes.

Study the sample below carefully and use it to find the numbers represented by "?" in the questions.

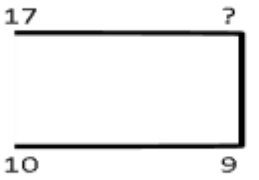


Q1) 

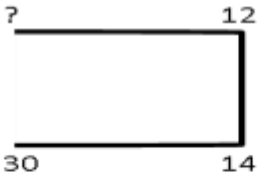
A) 19 B) 6 C) 22 D) 20 E) 17

Q2) 

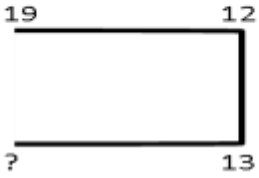
A) 16 B) 26 C) 30 D) 54 E) 18

Q3) 

A) 8 B) 7 C) 2 D) 0 E) 1

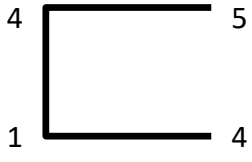
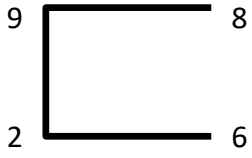
Q4) 

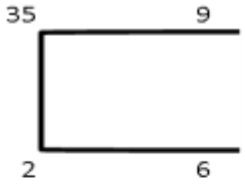
A) 44 B) 42 C) 36 D) 32 E) 26

Q5) 

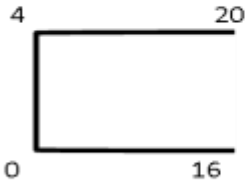
A) 32 B) 31 C) 25 D) 20 E) 18

Ex. Study the sample below carefully and use it to find the value of each of the samples in the questions below.

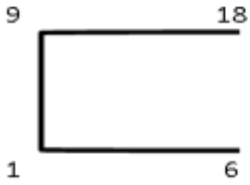
	$= \frac{6+4}{3-1} = \frac{10}{2} = 5$
	$= \frac{5+4}{4-1} = \frac{9}{3} = 3$
	$= \frac{8+6}{9-2} = \frac{14}{7} = 2$

Q1) 

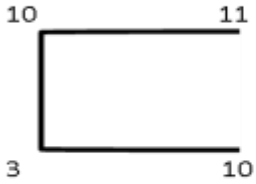
A) 3 B) 5 C) 9 D) 10 E) 15

Q2) 

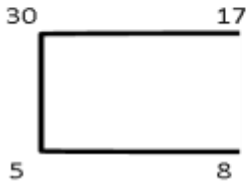
A) 9 B) 6 C) 4 D) 5 E) 3

Q3) 

A) 2 B) 3 C) 24 D) 5 E) 6

Q4) 

A) 28 B) 18 C) 14 D) 4 E) 3

Q5) 

A) 0 B) 1 C) 5 D) 10 E) 15

UNIT 26: PICKING THE ODD

TEACHER'S GUIDE

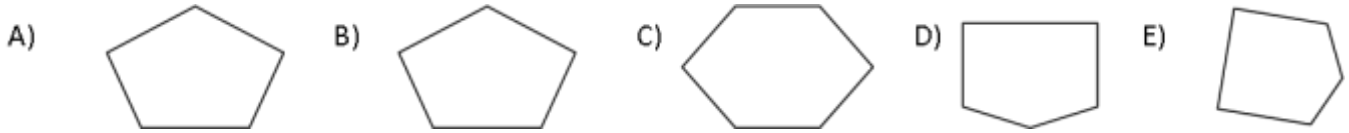
Teacher to understand how to identify and compare shapes that are the same.

LEARNING OUTCOMES

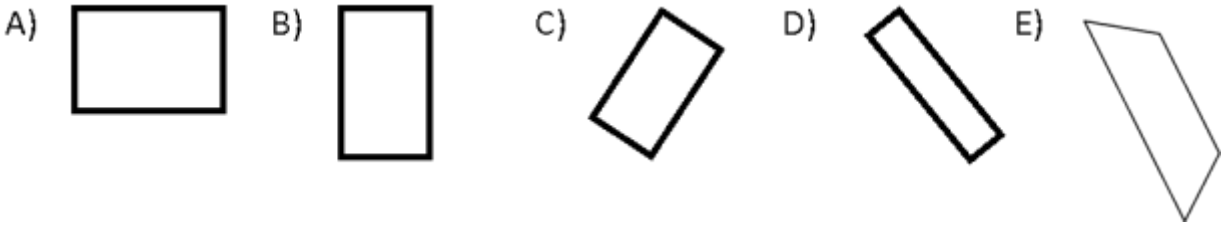
At the end of the lesson, pupils can identify shapes that are not compatible.

Exercise 1

Q1)

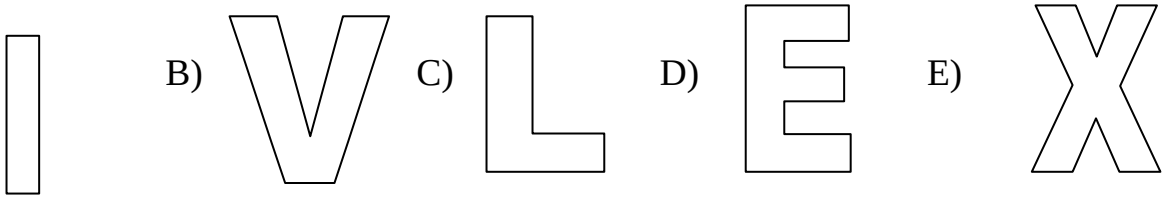


Q2)



Q3)

Q4) A) B) C) D) E)



UNIT 27

EXPONENTS AND SQUARES OF NUMBERS

TEACHER'S GUIDE

Teacher to that the operation here involves multiplying one number by the square of the other number.

LEARNING OUTCOMES

At the end of the lesson, pupils can multiply one number by the square of other numbers.

Use the sample below to find out what is meant by "*". Choose the correct answer for each of the problems below.

Sample; 8*2 = 32

5*4 = 40

6*7 = 294

A square is a number multiplied twice by itself.

e.g 4 is the square of 2 ie $\mathbf{2^2}$ = 2 x 2 = 4

9 is the square of 3

100 is the square of 10 etc.

Q1) 3* 4

a) 10 b) 12 c) 24 d) 16 e) 9

Q2) 5* 7

a) 56 b) 40 c) 35 d) 70 e) 12

Q3) 12* 9

a) 117 b) 108 c) 120 d) 216 e) 240

Q4) 11* 7

a) 88 b)77 c) 70 d) 154 e) 181

UNIT 28

OPERATION MACHINES

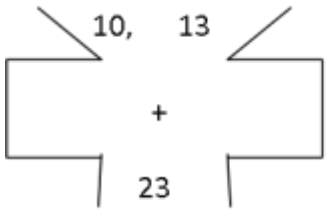
TEACHER'S GUIDE

Teacher should note the operation the machine is using whether its addition or subtraction.

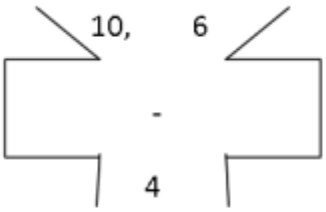
LEARNING OUTCOMES

At the end of the lesson, pupils can do simple operations with machines be it addition or subtraction.

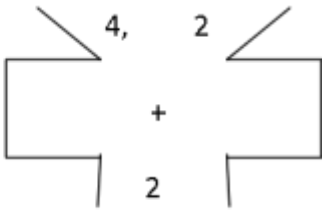
Look at these operation machines and use the same format to answer the rest of the questions.



10 + 13 = 23

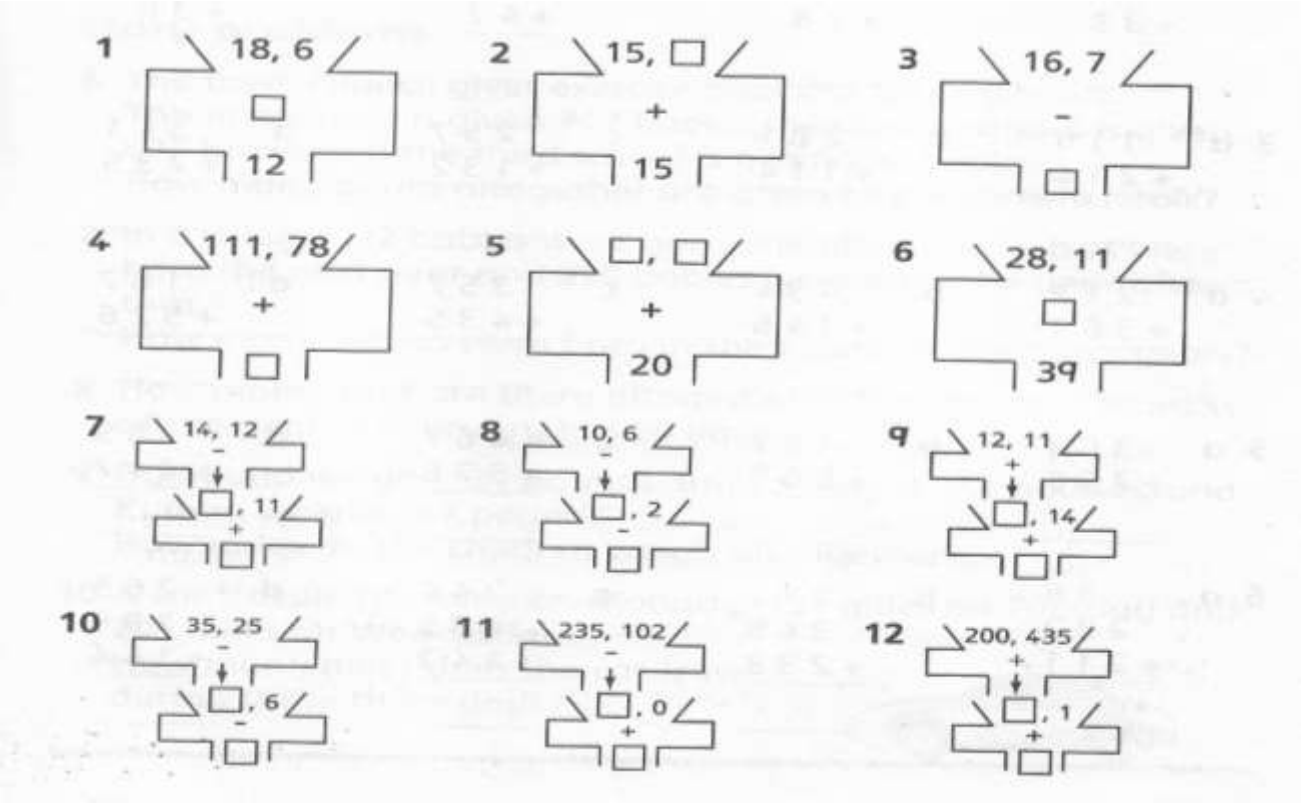


10 — 6 = 4



4 — 2 = 2

Find the missing numbers and signs.



UNIT 29:

MAGIC GAMES

TEACHER'S GUIDE

Teacher to understand that these games uses any of the four numbers operations (i.e. +, -, x and ÷)

LEARNING OUTCOMES

At the end of the lesson, pupils can use the 4 operations to do simple calculations.

Complete the magic squares

Q1)

16	3		13
5		11	8
	6	7	12
4	15		

16 + 3 + 2 + 13 = 34

5 + 10 + 11 + 8 = 34

Q2)

33			30
	28	27	
	24		29
21	31		

33 + 18 + 21 + 30 = 102

Q3) Complete the chart

	Input numbers	+	X	-	÷
1	12, 8	20,	96	4	$1\frac{1}{2}$
2	6, $1\frac{1}{2}$	7.5	4.5	9	9
3					
4					
5					
6					
7					

UNIT 30

ROMAN NUMBERS

TEACHER'S GUIDE

Teacher should draw a chart of roman figures to explain the symbols represented by the numbers for pupils to understand.

LEARNING OUTCOMES

At the end of the lesson, pupils can identify and do simple calculations with roman figures.

The figures 1, 2, 3, 4, 5... Are called Arabic numbers. The basic Roman Numbers are I, II, III, IV, V, X, C, D, M

1 2 3 4 5 10 100 500 1000

To write six (6) put one (I) after the five (V) which gives VI. One (I) in front of any number is an addition. Example VI means 5 + 1 = 6 (VI); 5 + 2 = 7 (VII) and so on. Ten is written as X. to write nine (9), put 1 before ten(x) which means 10 – 1 = 9(ix). To write eleven (11), put one (1) after the ten (x) i. e 10 + 1= 11(xi). Fifteen is 10 + 5 i. e x = v = 15(xv). Hundred is C. Ninety is 100 – 10 = 90(XC) and so on. Study and master the table below. These are the Roman and Arabic numbers from 1 to 100.

1 I	2 II	3 III	4 IV	5 V	6 VI	7 VII	8 VII	9 IX	10 X
11 XI	12 XII	13 XIII	14 XIV	15 XV	16 XVI	17 XVII	18 XVIII	19 XIX	20 XX
21 XXI	22 XXII	23 XXIII	24 XXIV	25 XXV	26 XXVI	27 XXVII	28 XXVIII	29 XXIX	30 XXX
31 XXXI	32 XXXII	33 XXXIII	34 XXXIV	35 XXXV	36 XXXVI	37 XXXVII	38 XXXVIII	39 XXXIX	40 XL
41 XLI	42 XLII	43 XLIII	44 XLIV	45 XLV	46 XLVI	47 XLVII	48 XLVIII	49 XLIX	50 L
51 LI	52 LII	53 LIII	54 LIV	55 LV	56 LVI	57 LVII	58 LVIII	59 LIX	60 LX
61 LXI	62 LXII	63 LXIII	64 LXIV	65 LXV	66 LXVI	67 LXVII	68 LXVIII	69 LXIX	70 LXX
71 LXXI	72 LXXII	73 LXXIII	74 LXXIV	75 LXXV	76 LXXVI	77 LXXVII	78 LXXVIII	79 LXXIX	80 LXX X
81	82	83	84	85	86	87	88	89	90

LXXXI	LXXXII	LXXXIII	LXXXIV	LXXXV	LXXXVI	LXXXVII	LXXXVIII	LXXXIX	XC
91 XCI	92 XCII	93 XCIII	94 XCIV	95 XCV	96 XVI	97 XCVII	98 XCVIII	99 XCIX	100 C

M = 1000 D = 500 C = 100 L = 50 X = 10 V = 5 I = 1

Now take these questions for exercise

1. Which is the longest Roman Number in the table?
    a. How many symbols does it have?
    b. How many symbols are in this Arabic number?
2. Do these calculations in Arabic and Roman numerals.
    a. 25 x 3 =
    b. 42 ÷ 3 =
    c. 15 + 4 =
    d. XXV x III =
    e. XV + IV =
3. If M means 1000 and D means 500, what does MMDCCXIX means?

Answers

UNIT 1

Exercise 1

1. Jots 2. B 3. D 4. E 5. B 6. D 7. B 8. E 9. C 10. B 11.A

UNIT 2

Exercise 1

1. A 2. E

UNIT 4

1. E 2. A 3. C

UNIT 5

1. add 10 2. add 3 3. Add 3 4. add 1 5. add 2

6 a. 19, 24 b. 11, 14 c. 60, 65

UNIT 6

a) Subtract 5 b) Subtract 4 c) Subtract 3

UNIT 7

1. TIMES 2 2. TIMES 5 3. TIMES 2

UNIT 8

1. Divide by 2 2. Divide by 5 3. No relation

UNIT 9

a) add 3 (x -axis) and times 3(Y-axis) b) minus 1 (X – axis) and divide by 3 or -6

UNIT 10

1. ADD 5 2. (3, 9) 3. Divide by 10 4. (8, 64) 5. 13/29

UNIT 11

1. B 2. E 3. E 4. E 5. C

UNIT 15

1. E 2. D

UNIT 16

Exercise 1

1). 15 2) 4 3) 8

Exercise 2

1) 7 2) 13 3) 9 4) 9

UNIT 18

1. **E** 2. A 3. D 4. A 5. E 6. E

UNIT 19

1. D 2. C 3. D 4. A

UNIT 20

1. A 2. C

UNIT 21

1. **A** 2. D 3. B

UNIT 22

1. 40 2. 44 3. 22 4. 36 5. 44 6. A 7. E

UNIT 23

1. E 2. A 3. B 4. B

UNIT 24

1. C 2. D 3. A 4. C

UNIT 25

1. A 23. A 3. B

UNIT 26

1. C 2. E 3. D 4. C

UNIT 27

1. B 2. C 3. B 4. B

UNIT 28

1. 1I – 6 = 12 2. 0 3. 126-7 = 9 4. 189 5. 9 + 11 OR 10 + 1O, etc.

6. 28 + 11 = 39

UNIT 30

1a. LXXXVII 1b. 8

2a. LXXV 2b. CXXVI 2C. XIX 2d. LXXV 2e. LX

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