

①

MATHS

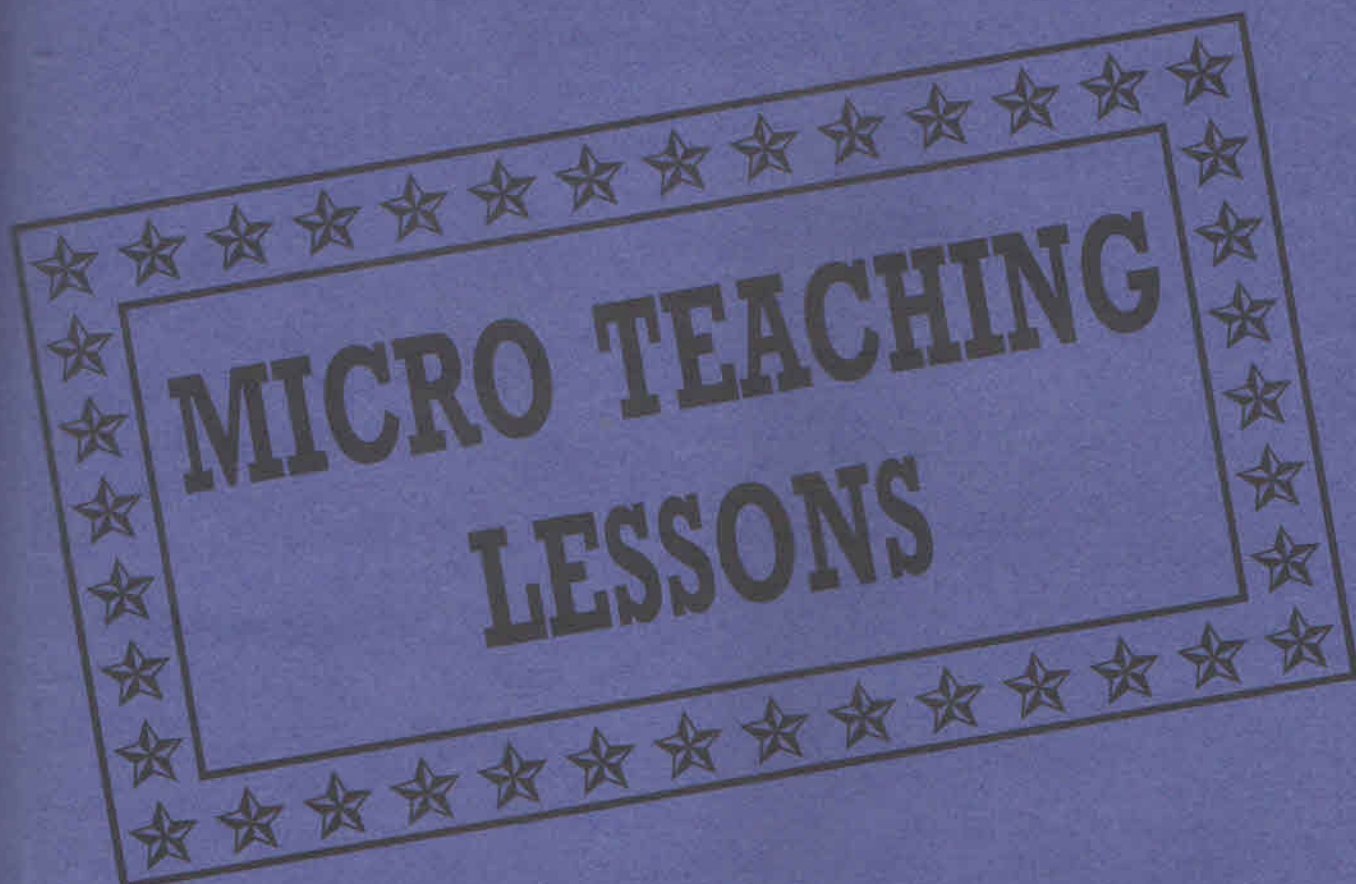
(ENGLISH
MEDIUM)

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3



(4)

(1)

LESSON No.1.....

Date.....

Duration of the period.....5-6 mins

Pupil Teacher's Name.....KAMINI

Pupil Teacher's Roll No.....

Class.....X

Average Age of the pupils.....15 yrs

Subject.....Mathematics

Topic.....Basic Geometrical

Ideas (Triangles)

INTRODUCTION SKILL

Pupil Teacher
Activity

Student
Activity

(1) What is a point?

Smallest portion of figure that cannot be divided further.

(2) What is a line

A line is a combination of point in a straight line having a starting point but no ending point

(3) What is this figure



A Ray

(4) Putting a single line on the chalk board a teacher asks.



Simple line

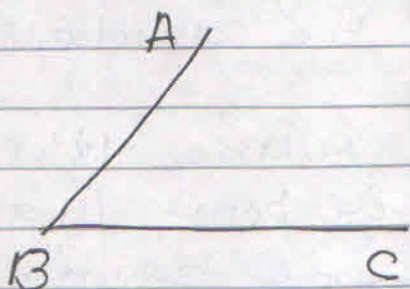
②

⑤

What the figure AB is called in the language of mathematics

5. When two simple lines meet on a point what the figure thus made is called in mathematics

Angle

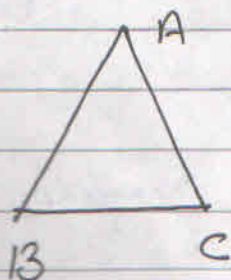


$\angle ABC$

⑥

What the figure ABC is called

A Triangle



It can be written as $\triangle ABC$

6

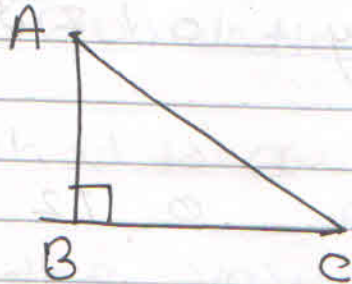
3

⑦ How many types of triangle are there on the basis of angles

Three type

⑧ What type of triangle ABC is?

Right angled triangle.



⑨ In triangle ABC what the side BC is called

Base

⑩ In triangle ABC what the side AB is called

Perpendicular

⑪ What is the area of ΔABC

No comments

(4)

(7)

OBSERVATION SHEET FOR SKILL OF

INTRODUCTION

1. use of previous knowledge 0 1 2 3 4 5 6
2. use of proper device
or Technique 0 1 2 3 4 5 6
3. Maintaining Continuously 0 1 2 3 4 5 6
4. Duration of Lesson
Introduction 0 1 2 3 4 5 6
5. Capability to create 0 1 2 3 4 5 6

DATE

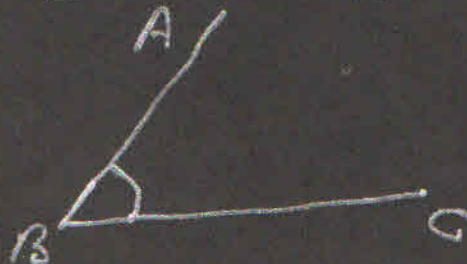
CLASS - X

Basic Geometrical Idea

A RAY



$\angle ABC$



8

LESSON No. 2

5

Date

Duration of the period 8-10 min

Pupil Teacher's Name

Pupil Teacher's Roll No.

Class X

Average Age of the pupils 15

Subject Mathematics

Topic Quadratic equation

SKILL OF EXPLAINING

Pupil Teacher Activity

Starting up with the def.
of quadratic equation:

What is quadratic equation $\rightarrow$

A quadratic equation in the variable x is an equation of the form $ax^2 + bx + c = 0$, where a, b, c are real number, $a \neq 0$

Today we shall discuss about "nature of roots in quadratic equation".

Pupil Teacher Activity

There are Three type of roots of a quadratic equation

$$ax^2 + bx + c = 0$$

Student Activity

Students listen carefully.

(6)

Pupil Teacher Activity

Two distinct real roots of the equation
 $ax^2 + bx + c = 0$
 is given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

than if
 $b^2 - 4ac > 0$
 we get two distinct roots

$$-b/2a + \frac{\sqrt{b^2 - 4ac}}{2a} \text{ and}$$

$$-b/2a - \frac{\sqrt{b^2 - 4ac}}{2a}$$

(11) two equal real roots

if $b^2 - 4ac = 0$
 then $x = \frac{-b \pm 0}{2a}$

i.e. $x = -b/2a$ or $-b/2a$

we can say that the quadratic eq. $ax^2 + bx + c = 0$

(9)

Student Activity

Student will listen carefully

Pupil Teacher Activity

has two equal
real roots in this
case.

(iii) two-real roots

$$\text{If } b^2 - 4ac < 0,$$

Find the nature of
roots of equation

$$2x^2 - 4x + 3 = 0$$

Student Activity

Here $a = 2$ $b = (-4)$
 $c = 3$

$$b^2 - 4ac$$

$$= (-4)^2 - (4 \times 2 \times 3)$$

$$-8 < 0$$

given equation has
no real root

OBSERVATION SHEET FOR SKILL of EXPLANATION

(1) words Linking Ideas state
ment were used.

0 1 2 3 4 5 6

2 Language used in
explaining.

0 1 2 3 4 5 6

(11)

3. Appropriate words
were used.

0 1 2 3 4 5 6

4. Relevant question
were used

0 1 2 3 4 5 6

Supervisor's
Signature

Observer
Signature

Date

SUB MATH

CLASS X

Quadratic Equation

Types of roots of quadratic
Equation

$$ax^2 + bx + c = 0$$

12

LESSON No. 3

9

Date

Duration of the period 8-10 mints

Pupil Teacher's Name

Pupil Teacher's Roll No.

Class

Average Age of the pupils 15

Subject Mathematics

Topic Area of a circle

* SKILL OF ILLUSTRATION WITH EX.

Pupil Teacher Activity

What is the perimeter of a circle.

What is the area of the circle.

Student Activity

Perimeter of the circle is $= 2\pi R$

Area of the circle $= \pi R^2$

Today we will find the area of circles with the help of example.

Pupil Teacher Activity

1. The cost of fencing a circular field at the rate of 24 per meter is Rs 5280. The field is to rate of Rs 0.50 per m^2 .

Student Activity

Student will understand the ex. Carefully

13

Pupil Teacher Activity

Sol: Length of the
fence (in meter)
Total Cost

$$\frac{3280}{24}$$

Length of frame is 220
So, Circumference
of the field = 220m

Therefore, if 'r' meter
is the radius of the
field, then

$$2\pi r = 220$$

$$2 \times \frac{22}{7} \times r = 220$$

$$r = \frac{220 \times 7}{2 \times 22}$$

$$r = 35$$

Hence radius of
the field is 35m

$\therefore$ area of field
 πr^2

$$\frac{22}{7} \times 35 \times 35$$

$$= 22 \times 35 \times 5 \text{ m}^2$$

Student Activity

Student will
listen and
understand the
concept.

Student will note
it in their note
book.

Pupil Teacher Activity

Total cost of Ploughing
the field

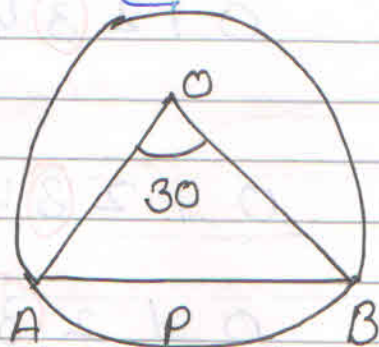
$$= 22 \times 5 \times 35 \times 0.50$$

Rs 1925 only

Student Activity

Q2 Find the area of the sector of a circle with radius 4cm and of angle 30° . Also find the area of the corresponding major sector (Use $\pi = 3.14$)

Students will study the question, what is given and what to find out?



Sol $\rightarrow$

Given sector $WOAPB$
Area of sector

$$\frac{\theta}{360} \times \pi r^2$$

$$\frac{30}{360} \times 3.14 \times 4 \times 4$$

4.14 cm^2 (approx)

15

Area of the corresponding
major sector = $\pi r^2 \times \frac{\theta}{360}$
of sector OAPB

Students will understand and note it.

$$(3.14 \times 16 - 4.19) \text{ cm}^2$$

$$46.05 \text{ cm}^2 \text{ ans}$$

OBSERVATION SHEET FOR SKILL OF ILLUSTRATION WITH EXAMPLE

COMPONENTS

RATINGS

- | | | |
|---|---|---------------|
| ① | Simple example were used | 0 1 2 ③ 4 5 6 |
| ② | Example were interesting | 0 1 2 ③ 4 5 6 |
| ③ | Inductive method was used for example | 0 1 2 ③ 4 5 6 |
| ④ | Deductive method was used for example | 0 1 ② 3 4 5 6 |
| ⑤ | Example were asked from pupils to test their learning | 0 1 2 ③ 4 5 6 |

16

LESSON No. 4

12

Date

Duration of the period. 5-8 min

Pupil Teacher's Name

Pupil Teacher's Roll No.

Class. X

Average Age of the pupils. 15

Subject. Mathematics

Topic. CIRCLES

STIMULUS VARIATION



Pupil Teacher Activity

Student Activity

Black

1. Is this a tangent or a secant?

This is a tangent

2. What is the diffel. b/w a tangent and a secant?

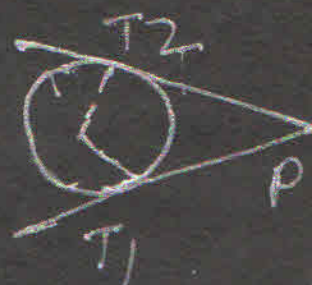
The tangent to a circle is a special case of the secant when the two ends points of its corresponding chord coincide.

3. How many tangents are there at a point of circle.

There is one tangent at a point of the circle.

4. If the length of the tangent T_1 is 24 then

$$T_1 = T_2 = 24$$



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Pupil Teacher
ACTIVITY

Student
ACTIVITY

Block
board

5. Why are the
two lengths
equal.

The lengths
of tangent
drawn from
an external
point to a
circle are
equal.

OBSERVATION SHEET FOR THE SKILL OF STIMULUS VARIATION

COMPONENTS

RATINGS

- | | | |
|---|--------------------------------------|---------------|
| ① | Gestures were used
by the teacher | 0 1 2 ③ 4 5 6 |
| ② | Verbal focussing
was alone | 0 1 2 3 ④ 5 6 |
| ③ | Elucutation in voice | 0 1 2 ③ 4 5 6 |

- ④ was thought about 0 1 2 3 ④ 5 6
- ⑤ Pupil teacher interaction 0 1 2 3 ④ 5 6
- ⑥ Gesture focusing was done 0 1 2 3 ④ 5 6
- ⑦ Use of proper device and Technique 0 1 2 3 ④ 5 6
- ⑧ Maintaining Continuity 0 1 2 3 ④ 5 6
- ⑨ Duration of Lesson stimulus Variation 0 1 2 3 ④ 5 6
- ⑩ Capability to create student interest and motivation in lesson 0 1 2 ③ 4 5 6

Supervisor's
Signature

Observer's
Signature

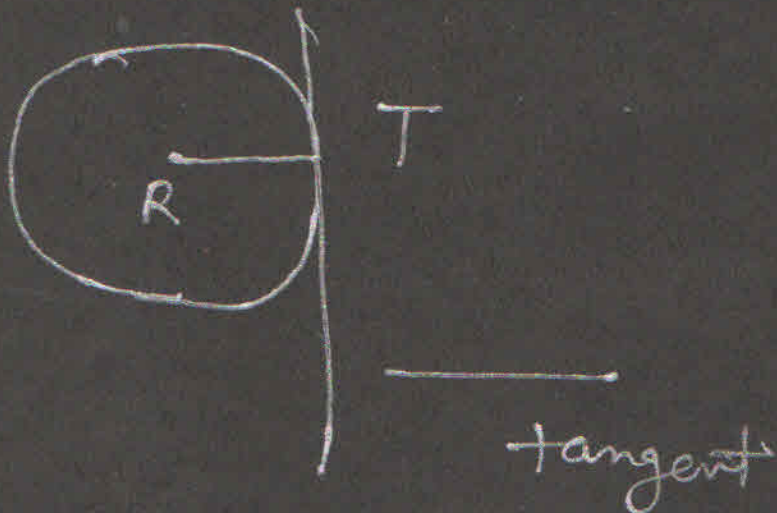
(19)

DATE

Sub-MATH

CLASS-X.

Circles



20

LESSON No. 5

16

Date

Duration of the period 5-8 min

Pupil Teacher's Name

Pupil Teacher's Roll No.

Class X

Average Age of the pupils

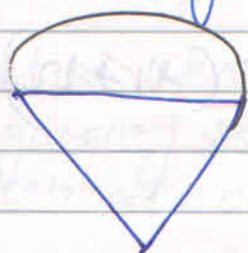
Subject Mathematics

Topic Volume & Surface Area

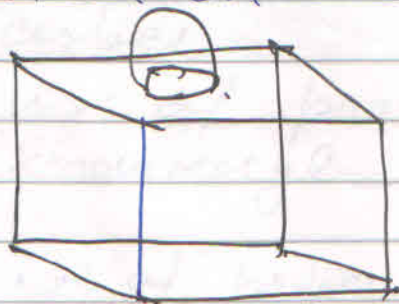
SKILL OF Questioning

Pupil Teacher Activity

1. What is the total surface area of the top shown in the fig.



2. The decorative block shown in fig is made of two solids - a cube and a hemisphere. The base of the block is a cube of hemisphere fixed on the top.



Student Activity

Total surface area of the top =
Curved surface area of hemisphere
+ curved surface area of cone.

The surface area of the cube =
Total surface area of the cube -
base area of hemisphere +
curved surface area of hemisphere

(21)

Pupil Teacher Activity

Student Activity

3. What is the Vol. of a frustum

$$\frac{1}{3} \pi h (r_1^2 + r_2^2 + r_1 r_2)$$

4. The curved surface area of the frustum of the cone is.

$$\pi (r_1 + r_2) l$$

5. Total surface area of the frustum of cone

$$\pi l (r_1 + r_2) + \pi r_1^2 + \pi r_2^2$$

OBSERVATION SHEET FOR SKILL OF Question

Components

Rating's

- | Components | Rating's |
|--|-----------------------------|
| 1. Prompting questions were asked | 0 1 2 3 <u>4</u> 5 6 |
| 2. Question were asked regarding seeking further information | 0 1 2 <u>3</u> 4 5 6 |
| 3. Question asked were refocused | 0 1 2 3 <u>4</u> 5 6 |
| 4. Question asked were asked | |
| 5. Question for creating critical awareness were asked | 0 1 2 <u>3</u> 4 5 6 |
| 6. use of previous knowledge | 0 1 2 <u>3</u> <u>4</u> 5 6 |
| 7. use of proper device and technique. | 0 1 2 3 <u>4</u> 5 6 |

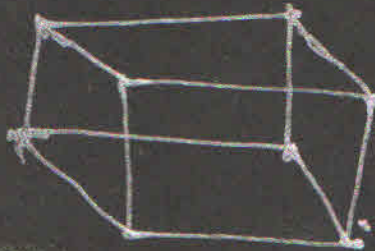
23

DATE

Sub math

Class X

Volume of surface area
and
Volume of solid figure



24

**MEGA TEACHING
LESSONS**

(25)

(24)

LESSON No. 1

Date

Duration of the period 20-25 min

Pupil Teacher's Name

Pupil Teacher's Roll No.

Class X

Average Age of the pupils

Subject Mathematics

Topic Quadratic Equation

INSTRUCTIONAL OBJECTIVES →

- ① The Learner will be able to define quadratic equation.
- ② The learner will be able to understand the nature of roots
- ③ The learner will be able to give example related to diff. roots
- ④ The learner will be able to solve problems related to quadratic equation

Teaching Aids →

General Teaching Aids →
chalk, black board, Duster, pointer etc

Instructional Teaching Aids →
chart, model
Roller & board.

PREVIOUS KNOWLEDGE →

The pupil teacher will assume the students already have some knowledge about it.

PREVIOUS Knowledge Testing

1. What is a Linear equation?
2. What is a polynomial equation?
3. What is a quadratic equation?

ANNOUNCEMENT OF TOPIC

Well students we will learn how to solve quadratic equation.

PRESENTATION →

The pupil teacher will teach the following chapter with help of problem solving.

(27)

(29)

Teaching Point

What is a quadratic equation

Standard form of quadratic equation

Pupil Teacher Activity

A quadratic eq. in the variable x is an eqn. of form $ax^2 + bx + c = 0$ where a, b, c are real $a \neq 0$

Any equation of the form $P(x) = 0$ where $P(x)$ is a polynomial of degree 2, is a quadratic eq. But when we write the terms

Check whether following are quadratic eq. or not

$$(x-2)^2 + 1 = 2x - 3$$

Student Activity

Student will listen carefully

Blackboard work

$$ax^2 + bx + c = 0$$

=

$$(x-2)^2 + 1 = 2x - 3$$

$$\begin{aligned} (x-2)^2 + 1 &= 2x - 3 \\ 1 \cdot H.S. \cdot (x-2)^2 + 1 &= 2x - 3 \\ 2 \cdot H.S. \cdot (x-2)^2 + 1 &= 2x - 3 \\ x^2 + 4 - 4x + 1 &= 2x - 3 \\ x^2 - 4x + 5 &= 2x - 3 \end{aligned}$$

28

Teaching Point	Pubil Teacher Activity	Student Activity	Black work
----------------	------------------------	------------------	------------

Solution of quadratic equation by factorization

A real num. x is called a root of the quadratic eqn.

$$ax^2 + bx + c = 0$$

$$\text{If } ax^2 + bx + c = 0$$

Student will listen carefully

$$2x^2 - 5x + 3 = 0$$

$$2x^2 - 2x - 3x + 3 = 0$$

$$2x(x-1) - 3(x-1) = 0$$

Problem (1)

Find roots of equation $2x^2 - 5x + 3 = 0$ by factorization

student will copy the problem then roots books.

$$(2x-3)(x-1) = 0$$

So

$$x =$$

$$\frac{2}{3}, 1$$

Solution

Let us first split the middle term

$$-5x \text{ as } -2x - 3x$$

$$\therefore (-2x)(-3x) = 6x^2$$

$$\text{So } 2x^2 - 5x + 3 = 0$$

(29)

(26)

Teaching point V	Pupil Teacher Activity	Student Activity	Black board work.
------------------	------------------------	------------------	-------------------

So the value of x for which $2x^2 - 5x + 3 = 0$ are either $2x - 3 = 0$ or $x - 1 = 0$
 $x = 3/2$ or $x = 1$

$$6x^2 - x - 2 = 0$$

So, $3/2$ & 1 are roots of eqn.

Problem (2)

Find the roots of the quadratic equation $6x^2 - x - 2 = 0$

$$6x^2 - x - 2 = 0$$

$$6x^2 + 3x - 4x - 2 = 0$$

$$3x(2x+1) - 2(2x+1) = 0$$

$$(3x-2)(2x+1) = 0$$

$$x = \frac{2}{3} \quad x = -\frac{1}{2}$$

$$3x^2 - 2\sqrt{6}x + 2 = 0$$

are the roots of equation

Problem (3)

Find the roots of quadratic equation $3x^2 - 2\sqrt{6}x + 2 = 0$

Student will copy the problem in their note books

(30)

Teaching point	Pupil Task Activity	Student Activity	Black Board work
----------------	---------------------	------------------	------------------

Solution

Here again we will first split $2\sqrt{6}x$ to $\sqrt{6}x - \sqrt{6}x$ so the eq. can be written as $3x^2 - 2\sqrt{6}x + 2$
 $3x^2 - \sqrt{6}x - \sqrt{6}x + 2$
 $x(\sqrt{3}x - \sqrt{2}) - \sqrt{2}(\sqrt{3}x - \sqrt{2})$
 root of the eq.
 $\sqrt{2}/3, \sqrt{2}/3$

$$3x^2 - 2\sqrt{6}x + 2 = 0$$

$$3x^2 - \sqrt{6}x - \sqrt{6}x + 2 = 0$$

$$\sqrt{3}x(\sqrt{3} - \sqrt{2}) - \sqrt{2}(\sqrt{3}x - \sqrt{2}) = 0$$

$$(\sqrt{3}x - \sqrt{2})(\sqrt{3}x - \sqrt{2}) = 0$$

So roots are $x = \frac{\sqrt{2}}{\sqrt{3}}, \frac{\sqrt{2}}{\sqrt{3}}$

Recapitulation

- ① What is a quadratic equation
- ② What is the standard form of quadratic equation

Home work

- ① Find the roots
 $x^2 - 3x - 10 = 0$
- ② $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$
- ③ $2x^2 + x - 6 = 0$

31

28

LESSON No. 2

Date

Duration of the period... 20-25 min

Pupil Teacher's Name

Pupil Teacher's Roll No.

Class... X

Average Age of the pupils

Subject... Mathematics

Topic... Area of a circle

INSTRUCTIONAL OBJECTIVES: →

- ① The Learner will be able to solve problems related to circle.
- ② Learner will be able to distinguish b/w area and perimeter of circle

Teaching AIDS →

General Teaching Aids →

A board, chalk, cluster, pointer

Instructional Teaching Aids →

A chart on which formula and theorems for finding area of circle

PREVIOUS Knowledge →

The pupil teacher assumed that student know about some basic concept related to circles

PREVIOUS Knowledge Testing →

Pupil Teacher will ask following question

- Q1. what is the circle
- Q2. what is the perimeter of a circle.

ANNOUNCEMENT of Topic →

well student today we will study Area of circle

PRESENTATION

Teaching point

What is the area of a circle

Formula

Pupil Teacher Activity

The area of the circle means number of square units in the circle.

Area of a circle

Pupil Activity

Student will listen carefully

Student will copy

B. Board work

$$A = \pi R^2$$

(33)

(30)

Teaching
pointsPupil Teach
ActivityPupil
ActivityB. Board
work

Formula

Area of a
sector of
angle

$$\frac{\theta}{360} \times \pi r^2$$

Student
will listen
Copy from
black
board.minor
sectorWhat is
the perimeter
of a circlePerimeter
is the distance
covered
by travelling
once
around a
circleStudent
will listen
carefully

$$C = \frac{\theta}{360} \times \pi r^2$$

Formulae

Perimeter
can be
calculated
by using
the follow-
ing
formulaeStudent
will Copy the
formulae
from black
board.Circumference
diameter
= 17Circumference
 $\pi \times \text{Dia}$
= Circumference

$$= 2\pi R$$

Problem

Cost of
fencing
a circleStudent will
understand
the problems
carefully

34

Teaching point ✓

Pupil Teacher Activity

Pupil Activity

B. Board work

field at the rate of Rs 24 per m² Rs 5280 The field is to be ploughed at the rate of 0.50 per m²

Solution

Here we can find the length of the fence by using the formula

$$\text{Length} = \frac{\text{Total Cost}}{\text{Rate}}$$

$$\frac{5280}{24} = 220$$

So given us the information about the area of circle

$$= 220 \text{ m}$$

$$\begin{aligned} 2\pi R \\ 2 \times \frac{22}{7} \times 220 \\ = 35 \end{aligned}$$

$$\text{Length} = \frac{\text{Total Cost}}{\text{Rate}}$$

$$\frac{5280}{24} = 220$$

$$\Rightarrow 2\pi R = 220$$

$$R = \frac{220}{2\pi}$$

$$\begin{aligned} \text{Area} &= \pi R^2 \\ &= \pi \times \left(\frac{220}{2\pi}\right)^2 \end{aligned}$$

$$\text{Area} = \pi (35)^2$$

$$\begin{aligned} \text{Total Cost} \\ 22 \times 5 \times 35 \times 50 \end{aligned}$$

$$\text{Rs } 1925$$

(35)

(32)

Teaching point

Pupil Teacher Activity

Pupil Activity

B. Board work

$\pi r^2 = 11 \times (35)^2 \text{ m}^2$
Cost of Paving
of 1 m^2 of field
is given to us
as 0.50.

So

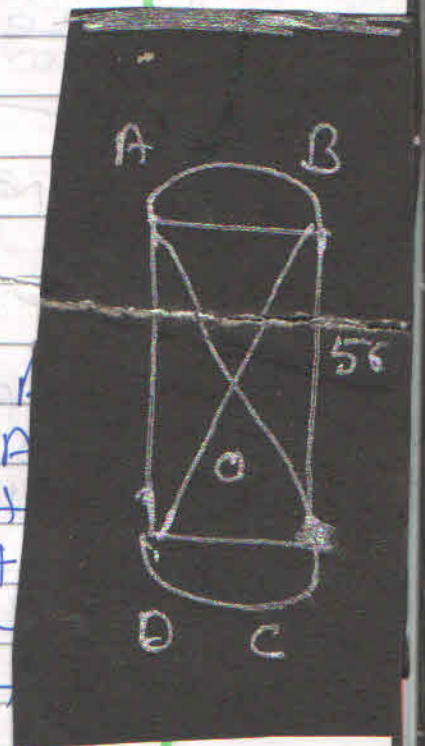
Rs $25 \times 5 \times 35 \times 50$
Rs 1925

Problem
2

In fig two circular flower beds have been shown on 2 sides of a square lawn ABCD of side 56 m. The centre of each circular flower bed is point of intersection of diag. of square. find sum of area of lawn and flower bed.

Total Area of sector
 $\angle OAB + \angle ODC + \angle OAD + \angle OBC$
Area of $\triangle OAD + \triangle OBC$
 $\frac{90}{360} \times \frac{22}{7} \times 28 \times 56$

$= \frac{90}{360} \times \frac{22}{7} \times 28 \times 56$
 $+ (\frac{1}{2} \times 56 \times 56) 2$
 $= \frac{1}{4} \times 28 \times 56 \times \frac{22}{7} \times 2$
 $+ 2 + 2$
 $= 56 \times 12 \text{ m}^2$
 4032 m^2



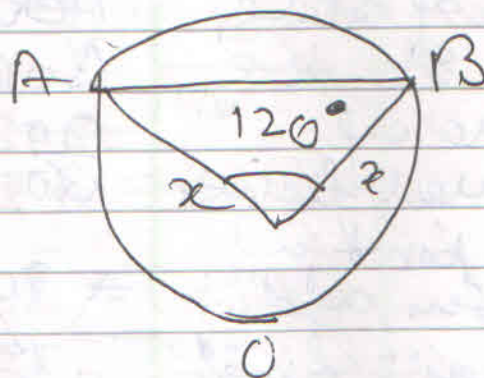
RECAPITULATION →

- ① what is the area of a circle.
- ② what is the perimeter of the circle
- ③ what is the area of the sector of a circle.

HOME WORK

- Q1 Find the area of the segment AB shown in the fig. if radius of the circle is 2 cm, $\angle AOB = 120^\circ$

using $\pi = \frac{22}{7}$



- Q2 Find the area of quadrant of a circle whose circumference is 22 cm.

(37)

LESSON No. 3

(34)

Date.....

Duration of the period..... 20 or 25 min

Pupil Teacher's Name.....

Pupil Teacher's Roll No.....

Class..... X

Average Age of the pupils..... 15

Subject..... Mathematics

Topic..... TRIANGLES

INSTRUCTIONAL OBJECTIVE $\Rightarrow$

- ① The learner will be able to solve problem related to similarity of triangles.
- ② The learner will be able to understand the criteria for similarity of triangles.
- ③ The learner will learn theorems related to triangles.
- ④ The learner will be able to analyse the fact of similar triangles.

Teaching Aids $\Rightarrow$

General Teaching Aids
Board, chalk, pointer

Instructional aids $\rightarrow$

A chart with fig. of similar triangle and some theorems

Previous Knowledge $\rightarrow$

The pupils

Teacher assume that the student know about general things related to similar triangles

PREVIOUS Knowledge Testing

1. what is a polygon?
2. what are different type of Triangle.
3. what are similar figure.

ANNOUNCEMENT OF TOPIC

will student today we study " triangles ".

PRESENTATION →

Pupil Teacher will explain about triangles with the help of " Analytic — synthetic method ".

Teaching
part VPupil Teacher
ACTIVITYPupil
ACTIVITYB. Board
work

Two figures
having the
same shape
(not necessarily
the same size)
are called
similar figures

Student will
listen carefully

Two figures are
said to be
congruent if
they have
same size
and the same
shape

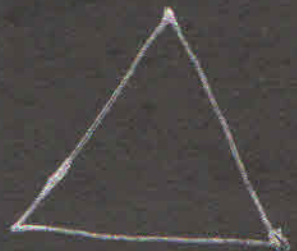
student will
listen carefully

Are all congruent
fig. similar

yes

Are all similar
fig. congruent

no.

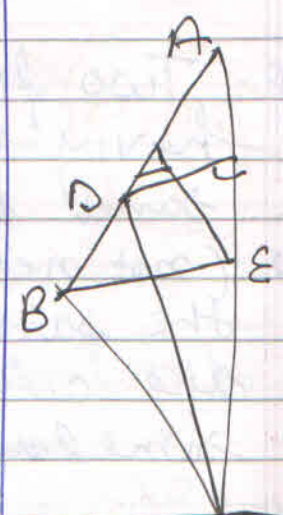


Teaching point	Pupil teacher Activity	Pupil Activity	B. Board work
----------------	------------------------	----------------	---------------

Similarity of the triangle

Two triangles are similar
 (i) Their corresponding sides are in the same ratio
 (ii) Their corresponding sides are in the same ratio

Student will ~~come~~ listen carefully



If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct point

Student will listen carefully

Proof

we are given the triangle ABC in

To Prove

$$\frac{AD}{DB} = \frac{AE}{EC}$$

$$\begin{aligned} \text{Area of } \Delta &= \frac{1}{2} \times B \times H \\ &= \frac{1}{2} \times AD \times EN \\ &= \frac{1}{2} \times AD \times EN \end{aligned}$$

Teaching point ✓

Pupil Teacher Activity ✓

Student Activity ✓

B. Board work

$$2 \text{ ar}(\triangle ADE) = \frac{1}{2} \times AE \times DM$$

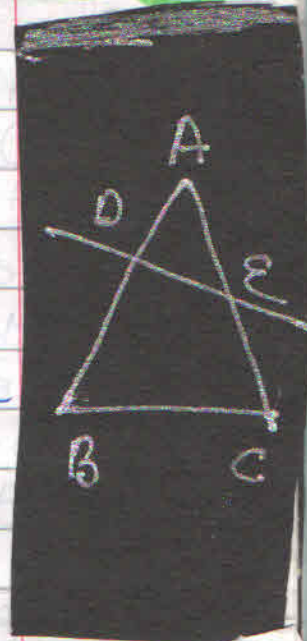
$$\text{ar}(\triangle DEC) = \frac{1}{2} \times EC \times DM$$

$$\frac{AE}{EC}$$

Note that $\triangle BDE$ and $\triangle DEC$ are on the same base DE & b/w same parallel BC & DE so $\text{ar}(\triangle BDE) = \text{ar}(\triangle DEC)$

$$\text{so } \frac{AD}{DB} = \frac{AE}{EC}$$

Student will note down in their copies



Prob.

①

If a line intersects side AB & AC of a $\triangle ABC$ at D & E respectively and is parallel to BC

$$\text{Prove that } \frac{AD}{AB} = \frac{AE}{AC}$$

Student will understand & copy from the black board.

Sol.

As we can see in fig $DE \parallel BC$ So by theo 1 we can say the

Teaching point

Pupil Teaching Activity

Student Activity

B. Boreel work.

$$\text{or } \frac{DB}{AD} = \frac{EC}{AE}$$

Adding on both the side we get

$$\frac{DB+1}{AD} = \frac{EC+1}{AE}$$

$$\frac{AB}{AD} = \frac{AC}{AE}$$

$$\text{or } \frac{AD}{AB} = \frac{AE}{AC}$$

$$DE \parallel BC$$

So from here

$$\frac{AD}{DB} = \frac{AE}{EC}$$

$$\frac{DB}{AD} = \frac{EC}{AE}$$

Adding 1 on B

$$\frac{DB}{AD} + 1 = \frac{EC}{AE} + 1$$

$$\frac{AB}{AD} = \frac{AC}{AE}$$

$$\frac{AD}{AB} = \frac{AE}{AC}$$

Hence prove

Recapitulation

- ① what are similar fig-
- ② what are congruent fig?
- ③ what are the diff. b/w two

Home work

① In the fig, $\frac{PS}{SQ} = \frac{PT}{TR}$ and $\angle PST = \angle PTR$
Prove that $PQ \parallel R$ is isosceles



(43)

LESSON No. 4

(40)

Date

Duration of the period 20 - 25 min

Pupil Teacher's Name

Pupil Teacher's Roll No

Class ~~X~~

Average Age of the pupils 15

Subject Mathematics

Topic Volume of Solids

INSTRUCTIONAL OBJECTIVES →

- ① The Learner will be able to the understand and solve problems related to the circle
- ② The Learner will be able the verify the theorems.
- ③ The learner will be able to able to dis.criminate b/w area and volume

Teaching AIDS →

General Teaching Aids →
 chalk, Black board
 duster, pointer, etc.

Instructional Teaching Aids →
 Chart, model sales
 board.

Previous knowledge :- TESTING

Pupil Teacher Activity

Pupil Activity

- ① What is the volume of the cube of side 'a'.

$$a^3$$

- ② What is the volume of a sphere

$$\frac{4}{3}\pi R^3$$

- ③ What is the volume of this fig.

No Reply



ANNOUNCEMENT of Topic

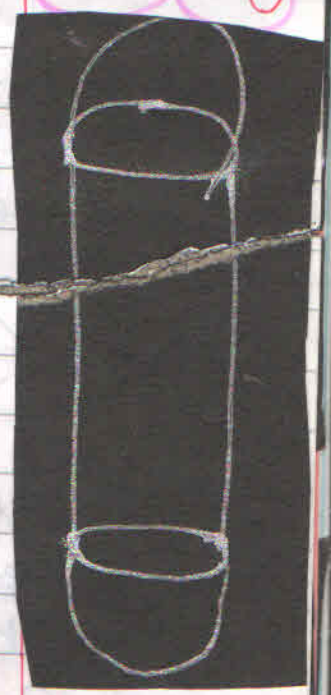
WILL STUDENTS today we will study the Volume of a combination of solids

PRESENTATION



The pupil Teacher will teach the following Chapter with help of "Problem" solving and deductive method.

Teaching point	Pupil Teacher Activity	Pupil Activity	B. Board Activity
Diff b/w TSA and Vol. of Combination solids	You already know how to cal. surface area of combination solids.		
	There we have not added the surface area of two constituents because some part of surface area disappears in process of joining them.	Student will listen carefully	



46

Learning
point - U

Pupil Teacher
Activity

Pupil
Activity

B. Board
Activity

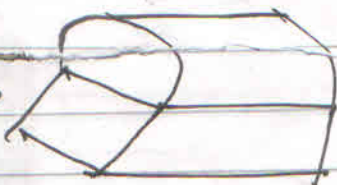
Problem

①

There will act
ually be the
sum of the
volumes of
the constituents.

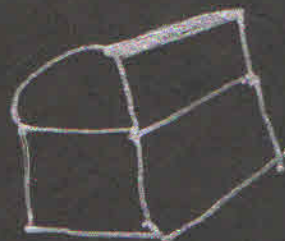
Find the volume
of the fig. given
below

Solu →



Here as you can
see from the fig
that we have
a cuboid above
it we have
have cylinder

Student
will copy
the problem
from the
black
board



Required
Volume

Vol. of
Cuboid
+ $\frac{1}{2}$ Vol. of
cylinder

Teaching point -

Pupil Teacher Activity

Pupil Activity

B. Board Activity

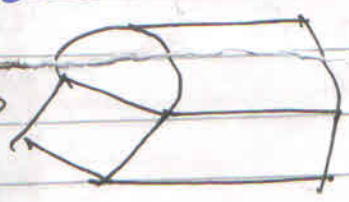
Problem

①

There will act really be the sum of the volumes of the constituents.

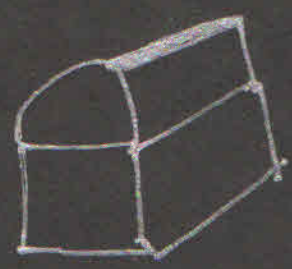
Find the volume of the fig. given below

Solu →



Here as you can see from the fig that we have a cuboid above it we have have cylinder

Student will copy the problem from the black board



Required Volume
Vol. of Cuboid + $\frac{1}{2}$ Vol. of cylinder

T. Point

Pupil Teaching Activity

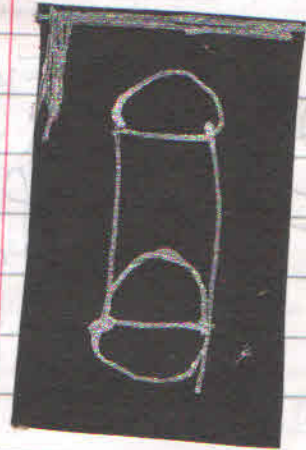
Pupil Activity

B. Board Work.

Problem
II

Cylinder glass had a hemispherical raised portion which reduced the capacity of the glass. If the height of the glass was 10cm find apparent capacity of glass also its actual capacity

The student will listen carefully



Sol

Since the inner dia. of the glass = 5cm
height = 10cm
How glass in of cylindrical shape

The student will copy the problem from the board

Apparent capacity of the glass

$$\pi r^2 h$$

$$3.14 \times (2.5)^2 \times 10$$

$$196.25 \text{ cm}^2$$

Vol. of the sphere

$$\frac{4}{3} \pi r^3$$

$$\frac{4}{3} \pi (2.5)^3$$

$$\pi r^2 h$$

$$3.14 \times (2.5)^2 \times 10$$

$$196.25$$

T.
point

Pupil Teacher
Activity

Pupil
Activity

Prob
lem

Find the diff.
in the Volume of the
of the cylinder
is of the top
in given fig

The radius
of the
cone is
 $\frac{1}{2} \times 4 = 2 \text{ cm}$

Volume of
top =

$$\frac{2}{3} \pi r^3 + \frac{1}{3} \pi r^2 h$$

$$= \frac{2}{3} \times 3.14 (2)^3 + \frac{1}{3} \times 3.14 \times (2)^2 \times 2$$

$$25.12 \text{ cm}^3$$

RECAPITULATION

What is the diff. b/w Volume & surface area of the combination solids.

Q. Br. of
- 32.71 cm^2
Actual capacity
of glass
= apparent
capacity of
glass
= Vol of the
hemisphere
 $19.625 - 32.71$
 $= 163.54$
 cm^2



(49)

LESSON No. 5

(46)

Date.....

Duration of the period..... 20-25 min.

Pupil Teacher's Name.....

Pupil Teacher's Roll No.....

Class..... V

Average Age of the pupils..... 15

Subject..... Mathematics

Topic..... TRI

INSTRUCTIONAL OBJECTIVE $\Rightarrow$

- ① The learner will be able to understand the properties of right angled triangles
- ② The learner will be able to relate right angle triangle problems in general life
- ③ The learner will be able to generate their own examples

Teaching AIDS $\Rightarrow$

Aids $\rightarrow$ General Teaching
Chalk, blackboard,
Pointer etc.

Instructional Teaching Aids $\rightarrow$

Chart, roller board,

ANNOUNCEMENT OF TOPIC →

well students today we will study about "trigonometry".

PRESENTATION →

The pupil teacher will explain trigonometry with the help of Deductive method.

Teaching point ()

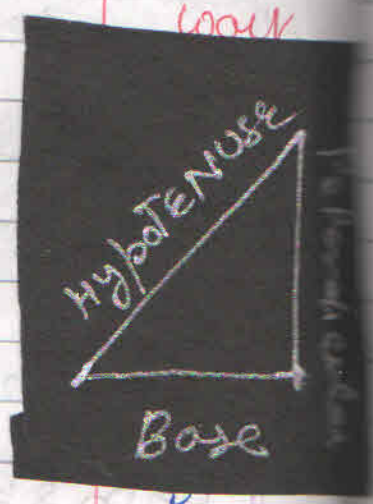
Pupil teacher

Pupil Activity

B' Board work

Triangle
No. of
melic
Ratios

Let us take a right angle triangle ABC. Side BC face LA. we call it the side app. to angle A. AC is the hypotenuse of the right triangle and side "



Teaching point

Pupil Teacher Activity

Pupil Activity

B. Board work

Sine of $\angle A = \frac{\text{side opp.}}{\text{hypotenuse}}$

$$= \frac{BC}{AC}$$

Cosine of $\angle A = \frac{\text{Side adjacent to } \angle A}{\text{hypotenuse}}$

$$= \frac{AB}{AC}$$

Tangent of $\angle A = \frac{\text{Side opp. of } \angle A}{\text{Side adjacent to } \angle A}$

$$= \frac{BC}{AB}$$

$$= \frac{BC}{AB}$$

Cosecant of $\angle A$

$$\frac{1}{\sin \angle A} = \frac{\text{hypotenuse}}{\text{side opp. to } \angle A}$$

$$\text{secant of } \angle A = \frac{1}{\cos \angle A}$$

$$= \frac{1}{\cos \angle A}$$

Student will listen carefully

$$\sin \angle A = \frac{BC}{AC}$$

Cosine of $\angle A$

$$= \frac{AB}{AC}$$

Tangent of $\angle A$

$$= \frac{BC}{AB}$$

Cosecant of $\angle A$

$$= \frac{AC}{BC}$$

Secant of $\angle A$

$$= \frac{AC}{AB}$$

$$= \frac{AC}{AB}$$

T. point

Pupil Teaching
activity

pupil
Activity

B. Board
Activity

Cotangent of LA
tangent of LA

side adjacent of LA
side opp to LA

$$= \frac{AB}{AC}$$

The ratio defns
above are
abbreviated as
~~sin~~ $\cos A$, $\tan A$
Case A sec A
& $\cot A$ resp.

You will notice
one thing here
that the ratio
 $\cos A$, sec A
and $\cot A$
are resp
reciprocals
of the ratio
 $\sin A$, $\tan A$
and $\csc A$.

Cotangent

LA

$$= \frac{AB}{BC}$$

$\cos A =$

$$\frac{1}{\sin A}$$

$$\sec A = \frac{1}{\cos A}$$

$$\cot A = \frac{1}{\tan A}$$

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T-Point Pupil Teacher Activity

Pupil Activity

B. Board

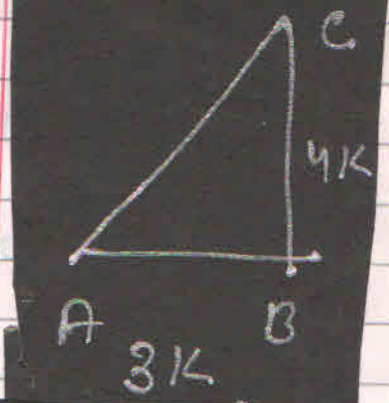
Problem Given $\tan A = \frac{4}{3}$
 other triangle metric ratio of $\angle A$

Sol $\Rightarrow$ Let us draw a ratio ΔABC first
 Now we know that $\tan A = \frac{BC}{AB} = \frac{4}{3}$

Student will carefully and then copy the problem

$\therefore$ If $BC = 4k$ then $AB = 3k$
 where k is a positive number

Now by using Pythagoras theorem
 $(3k)^2 + (4k)^2 = (5k)^2$
 $AC = 5k$



$\tan A = \frac{4}{3}$
 By using pyth. theorem (trigonometric Ratio)
 $BC = 4k$ & $AB = 3k$
 By pyth. theorem
 $AC^2 = AB^2 + BC^2$
 $(5k)^2 = (3k)^2 + (4k)^2$
 $= 25k^2$
 $AC = 5k$
 $\sin A = \frac{4}{5}$
 $\cos A = \frac{3}{5}$
 $\csc A = \frac{5}{4}$
 $\sec A = \frac{5}{3}$

(59)

Teaching Point

Pupil Teacher Activity

Pupil Activity

B. Board work

$$\sin A = \frac{BC}{AC} = \frac{4}{5} = \frac{4}{5}$$

$$\cos A = \frac{AB}{AC} = \frac{3}{5} = \frac{3}{5}$$

$$\cot A = \frac{1}{\tan A} = \frac{3}{4}$$

$$\operatorname{cosec} A = \frac{1}{\sin A} = \frac{5}{4}$$

$$\sec A = \frac{1}{\cos A} = \frac{5}{3}$$

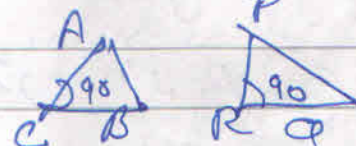
Hence Solved

RECAPITULATION

①
②

What Pythagoras Theorem
What is $\cot A$, $\operatorname{cosec} A$?

HOME WORK



①

if $\angle B$ & $\angle Q$ are acute angle such that
 $\sin A = \sin B$

SS

**DISCUSSION
LESSON - I**

S6

54

LESSON No. I

Date.....

Duration of the period..... 20-25 min

Pupil Teacher's Name.....

Pupil Teacher's Roll No.....

Class..... ~~X~~

Average Age of the pupils..... 15

Subject..... Mathematics

Topic..... Surface Area of Cone & Cylinder

INSTRUCTIONAL OBJECTIVES

- ① The Learner will be able to get knowledge about the shape of cone and cylinder
- ② The Learner will be able to understand difference b/w cone and cylinder.
- ③ The Learner will be able to solve problem related to Cone and cylinder.
- ④ The Learner will be able to explain the formula of surface area of cone and cylinder

Teaching Aids

General Teaching Aids →

Chalk, Blackboard, chart

(57)

In Structural Teaching Aids

A model on which total surface area of cones & cylinders are shown with their fig.

PREVIOUS Knowledge Testing →

Pupil Teacher Activity

- ① what is a circle
- ② what is the area of a circle
- ③ what is the S.A of cylinder

Student Activity

A cylinder is a solid of all pts

$$\text{Area} = \pi R^2$$

No reply

ANNOUNCEMENT of Topic

well student today we will study how to find surface area of cone & cylinder

Teacher's

Pupil Teacher
Activity

Pupil Activity

B' Board
Work.

Total
surface
area
of
a
cylinder
is
Sol.

Total surface
area of
cylinder

$$2\pi R(r+h)$$

where $r=6\text{cm}$
 $h=4\text{cm}$

$$T.S.A =$$

$$\begin{aligned} & \frac{2 \times 22 \times 6(6+4)}{7} \\ &= \frac{2 \times 22}{7} \times 60 \\ &= \frac{2540}{7} \\ &= 362.85 \text{ cm}^2 \end{aligned}$$

The student
will write
in their notebook
after
listening
carefully

Total surface
area of
cylinder

$$= 2\pi rh + 2\pi r^2$$

T.S.A of
cylinder
curved s.p
of cylinder
+ area
of circle

Question

radius of
cylinder = 3cm
height = 4cm

Then find out
its total surface
area

Total surface
area of
cylinder

$$\begin{aligned} & \frac{2 \times 22 \times 3(3+4)}{7} \\ &= \frac{44 \times 3 \times 7}{7} \\ &= 132 \text{ cm}^2 \end{aligned}$$

$2\pi Rh + 2\pi r^2$
where radius
of cylinder



(59)

T. point	Pupil Teach Activity	Pupil Activity	B. Board work
----------	----------------------	----------------	---------------

Formula of total surface area of cone

Total Surface of cone

$$\pi R(r+l)$$

curved surface area of cone + Area of circle

where

$r = \text{radius}$

$$\pi = \frac{22}{7}$$

$l = \text{slant surface}$

Q101

$$r = 7 \text{ cm}$$

$$l = 10 \text{ cm}$$

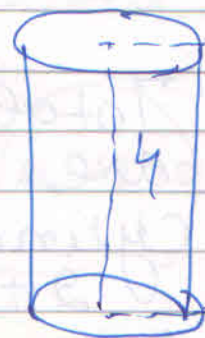
its total surface area of cone

$$\pi r(r+l)$$

$$\frac{22}{7} \times 7(7+10)$$

$$= 374 \text{ cm}^2$$

student will write down the their note book carefully



T.S.A of cone =

C.S.A of cone area + area of circle

$$\pi r l + \pi R$$

where R is the radius of circle

$l = \text{slant surface}$



student will solve the question solved by teacher carefully

T. S. A

Q3

If the height
of cone
= 16 cm

radius
= 12 cm

then total
surface of
Cone

$$\pi r(r+l)$$

$$l^2 = r^2 + h^2$$

$$l^2 = 144 + 256$$

$$l^2 = 400$$

$$l = 20 \text{ cm}$$

$$T.S.A = \pi r(r+l)$$

$$\frac{22}{7} \times 12(12+20)$$

$$\frac{22 \times 12 \times 32}{7}$$

$$\frac{8448 \text{ cm}^2}{7}$$

$$1206.8 \text{ cm}^2$$

60

P.A

58

B.B.W



Height of the

Cone

$$= 16 \text{ cm}$$

Radius of cone

$$= 12 \text{ cm}$$

the

$$l = \sqrt{r^2 + h^2}$$

$$l = 20 \text{ cm}$$

T.S.A of
Cone

$$\pi r(r+l)$$

$$\frac{22}{7} \times 12 \times 32$$

$$\frac{8448 \text{ cm}^2}{7}$$

$$= 1206.8 \text{ cm}^2$$

T.
point

P.T.A

P.A

B.B.W.

Question

3

If the radius
of cone =
4cm

and height = 8cm

find out
the total
surface
area of
Cone.

$$e^2 = r^2 + h^2$$

$$4^2 + 8^2$$

$$16 + 64$$

$$= 80$$

$$e = 4\sqrt{5} \text{ cm}$$

then total
surface
area of cone

$$\pi r L + \pi r^2$$

$$\frac{22}{7} \times 4 \times 4\sqrt{5}$$

$$+ \frac{22}{7} \times (4)^2$$

$$= \frac{352\sqrt{5}}{7} + \frac{352}{7}$$

$$\frac{352}{7} (\sqrt{5} + 1)$$

Question

4

If the radius
of cone = 6cm

height of
Cone = 8cm

find total
surface area
of Cone?

$$e^2 = r^2 + h^2$$

$$6^2 + 8^2$$

$$= 36 + 64$$

$$= 100$$

$$e = 10 \text{ cm}$$

T. point

P.T.A

P.A.

B. Black

than the

$$\pi r^2 + \pi r^2$$

$$\frac{22}{7} \times 60 + \frac{22}{7} \times 36$$

$$\begin{array}{r} 1320 + 792 \\ \hline 7 \end{array}$$

$$301.7 \text{ cm}^2$$

301.7 cm²

Hencl solved

(63)

RECAPITULATION →



① what is the surface area of cylinder

② what is the surface area of cone

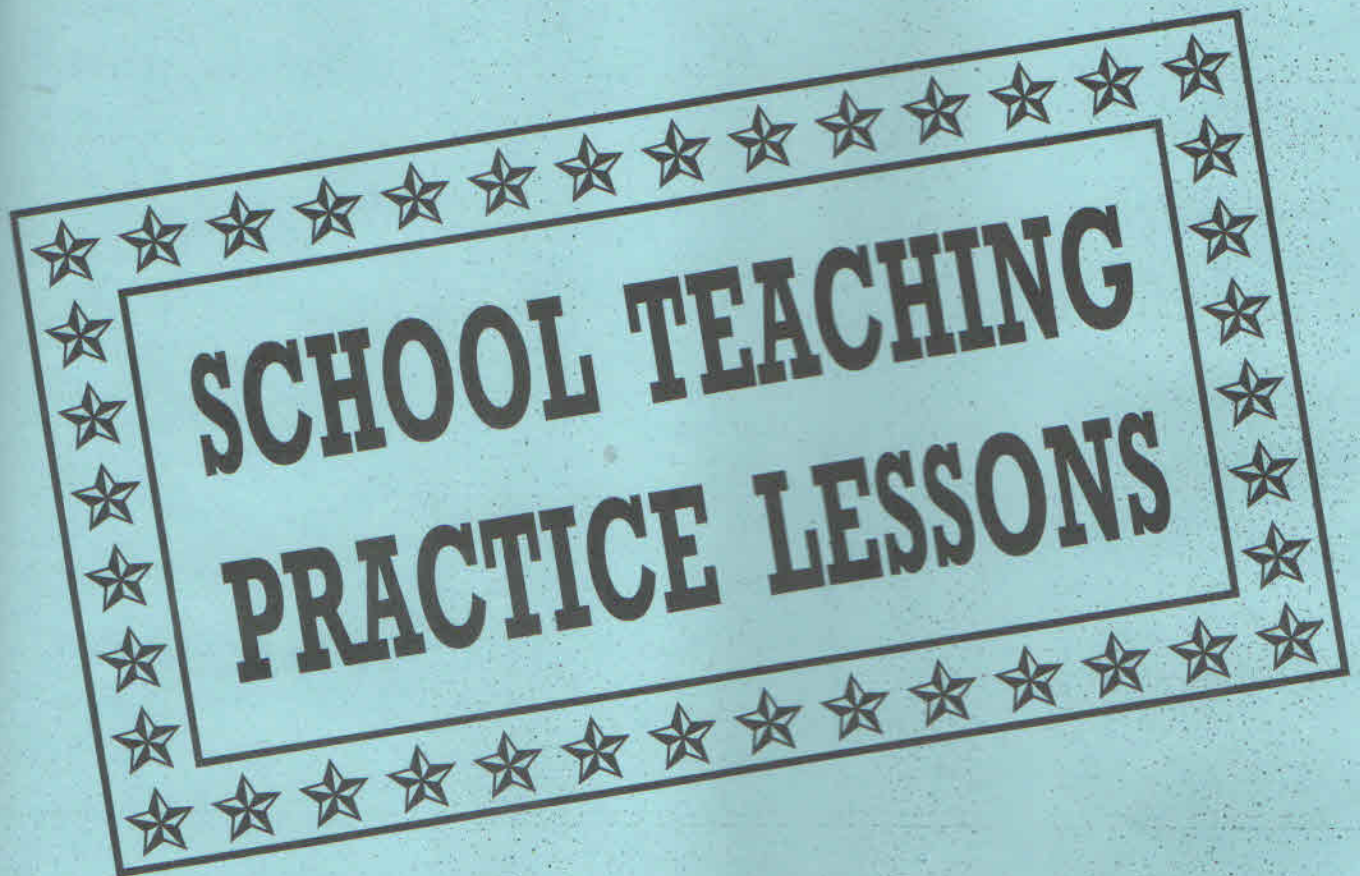
HOME WORK →



① The radius of cylinder = 6cm and height = 14cm
Find the total surface area of cylinder.

② If the radius of the cone = 4cm and height = 18cm then find out the total surface area of cone.

64



(65)

(64)

LESSON No. 1

Date

Duration of the period 35-40 min

Pupil Teacher's Name

Pupil Teacher's Roll No.

Class

Average Age of the pupils 15

Subject Mathematics

Topic Trigonometry

Instructional Objectives

- ① The learner will be able to understand the properties of right angled triangle.
- ② The learner will be able to relate right angle triangle problem in general life.
- ③ The learner will be able to generate their own examples

Teaching Aids

General → chalk, black board, cluster pointer.

Instructional Teaching Aids → Chart, roller, board.

(6)

PREVIOUS Knowledge Testing →

PTA

- ① What is a right angle
- ② What is Pyth a gross theorem
- ③ What is trigonometry

PA

A triangle whose 1 angle is of ab.

$$(\text{Hypotenuse})^2 = \text{Base}^2 + \text{height}^2$$

No reply

ANNOUNCEMENT OF TOPIC

Teaching point

Pupil Teacher Activity

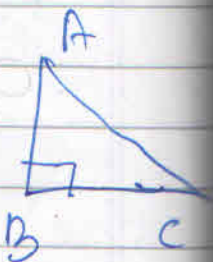
Pupil Activity

B. Board work

Right angle Triangle

The fig shows a right angle triangle right angle at B

Student listen carefully



T: Hint

Pupil Teacher Activity

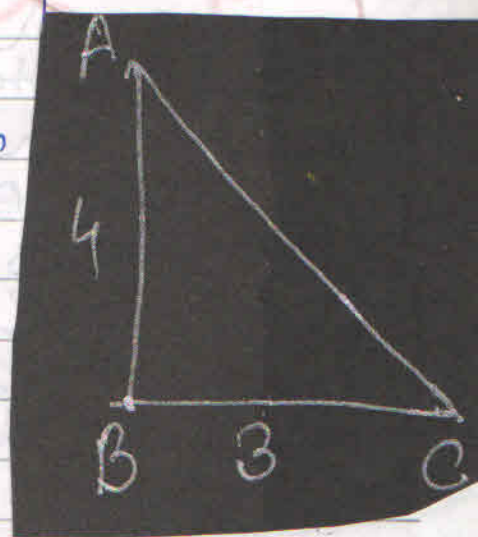
Pupil Activity

B. Board work

By this way

This theorem is valid for only right angled triangles

Student listens carefully



For muler $(\text{hypotenuse})^2$

$$= (\text{Base})^2 + (\text{height})^2$$

$$(AC)^2 = (BC)^2 + (AB)^2$$

If $AB = 4\text{cm}$
 & $BC = 3\text{cm}$
 then find AC

$$(AC)^2 = (AB)^2 + (BC)^2$$

$$(AC)^2 = 4^2 + 3^2$$

$$(AC)^2 = 25$$

$$AC = 5$$

T-Point

Pupil Teacher Activity

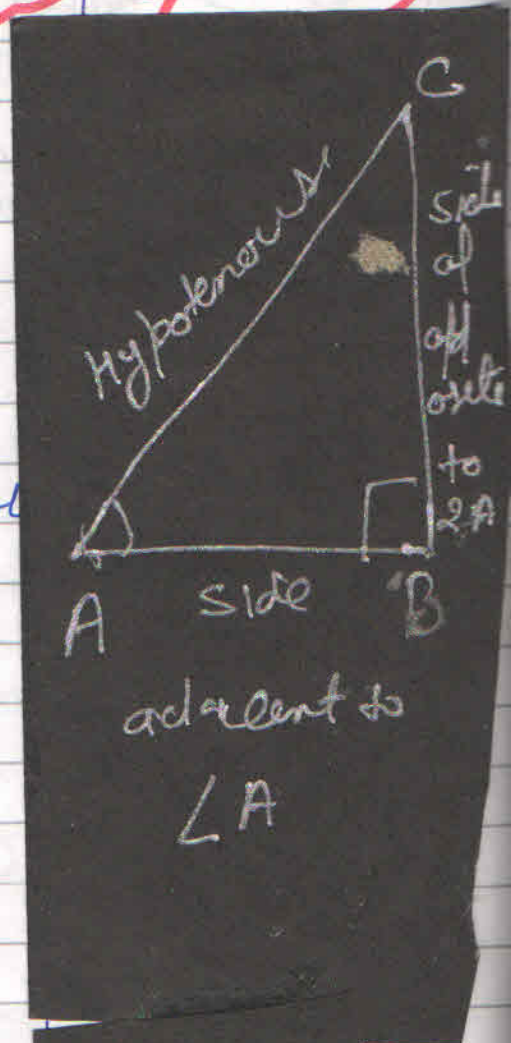
Pupil Activity

B. Bo Board work.

Trigonometric Ratio.

Let us take a right angle ABC side BC faces $\angle A$ we call it the side opp. to the angle A in the hypotenuse of the right triangle and the side AB is a part of $\angle A$, so we call it side adjacent to angle A.

Student will listen carefully



$$\frac{\text{side opposite to } \angle A}{\text{hypotenuse}} = \frac{BC}{AC}$$

$$\text{Cosine of } \angle A = \frac{\text{adjacent to } \angle A}{\text{hypotenuse}}$$

$$\frac{AB}{AC}$$

Sin of $\angle A$

$$\frac{BC}{AC}$$

Cosine of $\angle A$

$\angle A$

$$\frac{AB}{AC}$$

T. Point

Pupil Teacher activity

Pupil Activity

B. Board Activity

tangent of $\angle A$

Side opp to $\angle A$

Side adjacent of $\angle A$

$$= \frac{BC}{AB}$$

Coscent of $\angle A$
hypotenuse

Side opp to $\angle A$

$$= \frac{AC}{BC}$$

Secant of $\angle A =$

1
Cosine of $\angle A$

$$= \frac{AC}{AB}$$

Cotangent of $\angle A$

1
Tangent of $\angle A$

$$= \frac{AB}{BC}$$

Student
Lesson
Pulley

$$\tan A = \frac{BC}{AB}$$

$$\cosine P = \frac{AC}{BC}$$

$$\sec A = \frac{AC}{AB}$$

$$\cot A = \frac{AB}{BC}$$

$$= \frac{AB}{BC}$$

70

T. Point

Pupil Teacher Activity

Pupil Activity

B.B walk

The ratios
define above
are abbreviated
as $\sin A$, $\cos A$,
 $\tan A$, $\csc A$,
 $\sec A$, $\cot A$

Q1

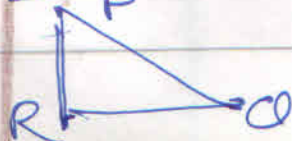
Given $\tan A = \frac{4}{3}$ Student
find other trigonometric ratios of $\angle A$ will listen
carefully

RECAPITULATION →

- ① What is Pythagoras theorem
- ② What is $\csc A$, $\sec A$

HOME WORK →

- ① If $\angle B = \angle C$ are equal angles
such that $\sin B = \sin C$ then
Prove that $\angle B = \angle C$



(71)

LESSON No. 2

(70)

Date

Duration of the period..... 35-40 min

Pupil Teacher's Name

Pupil Teacher's Roll No.

Class..... X

Average Age of the pupils.....

Subject..... Mathematics

Topic..... Trigonometry

INSTRUCTIONAL OBJECTIVES ⇒

Knowledge ⇒
Know the trigonometric formulae.

Understanding ⇒

Develop the understanding of trigonometry

Application ⇒

Apply the trigonometric formulae solve the problem related to Trigonometry

Teaching AIDS ⇒

General → Chalk, black-board duster

Instructional Teaching AID →
chart related to topic

PREVIOUS Knowledge Testing →

72

15

~~PTA~~

PTA

Pupil Activity

①

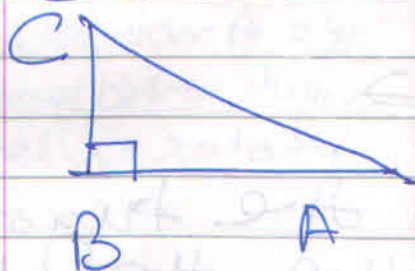
What is trigonometry

It is study of relationship b/w the sides & angle of a Δ

②

Trigonometric ratio
 $\sin A$
 $\cos A$

$$\sin A = \frac{BC}{AC}$$



$$\cos A = \frac{AB}{AC}$$

Announcement of Topic

Well student today we shall study Trigonometric ratio, of specific angles.

PRESENTATION →

T. Point

Trigonometric
ratio

Pupil Teacher
Activity

Pupil Activity

B. Board
work

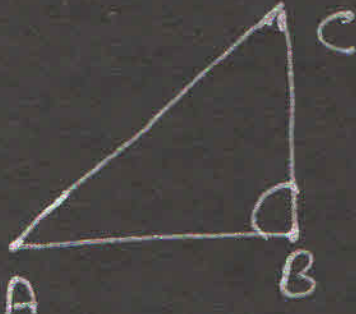
① Trigonometric
Ratio of 45°

In $\triangle ABC$ right
angled at B if
one angle is
 45° then the
other angle is
also at 45°
as total sum
of angle is
i.e. 180°
 $= \angle A = \angle C = 45^\circ$
 $BC = AB$

Then Pythagoras
theorem

$$AC^2 = AB^2 + BC^2$$

Student
will take
carefully
and should
apply the
formulae
in their
note
book



$\angle B = 90^\circ$
 $\angle A = \angle C = 45^\circ$
 $AB = BC$
 Let $AB = BC = 9$
 By Pythagoras
 $a^2 + a^2 = 2a^2$
 $AC = a\sqrt{2}$
 Using trigonometric
ratio

(74)

T. Point

P.T.A.

P.A

B.B.W

$$= a^2 + a^2 = 2a^2$$

$$AC = \sqrt{2} a$$

using the definition of the trigonometric ratios, we have $\sin 45^\circ = \frac{\text{side opp to } 45^\circ}{\text{hypotenuse}}$

$$\frac{BC}{AC} = \frac{a}{a\sqrt{2}} = \frac{1}{\sqrt{2}}$$

$$\cos 45^\circ = \frac{\text{side adj to } 45^\circ}{\text{hypotenuse}}$$

$$\frac{AB}{AC} = \frac{a}{a\sqrt{2}} = \frac{1}{\sqrt{2}}$$

$$\tan 45^\circ = \frac{\text{side opp to } 45^\circ}{\text{side adj to } 45^\circ}$$

$$\frac{BC}{AB} = \frac{a}{a} = 1$$

$$\sec 45^\circ = \frac{1}{\cos 45^\circ}$$

$$= \frac{1}{\frac{1}{\sqrt{2}}} = \sqrt{2}$$

$$\csc 45^\circ = \frac{1}{\sin 45^\circ} = \sqrt{2}$$

$$\sin 45^\circ = \frac{BC}{AC}$$

$$\frac{a}{a\sqrt{2}} = \frac{1}{\sqrt{2}}$$

$$\cos 45^\circ = \frac{AB}{AC}$$

$$\frac{a}{a\sqrt{2}} = \frac{1}{\sqrt{2}}$$

$$\tan 45^\circ = \frac{BC}{AB}$$

$$\frac{a}{a} = 1$$

$$\sec 45^\circ = \frac{1}{\sin 45^\circ} = \sqrt{2}$$

$$\csc 45^\circ = \frac{1}{\cos 45^\circ} = \sqrt{2}$$

$$\cot 45^\circ = \frac{1}{\tan 45^\circ} = 1$$

75

74

T. Point

Pupil Teacher
Activity

Pupil Activity

B.B.W

(11) Trigonometric
Ratio of 30° & 60°

Let us now consider
the trigonometric
ratio of 30° & 60°
Consider an equilateral
triangle. Each angle
is 60° , therefore
 $\angle A = \angle B = \angle C = 60^\circ$

Draw the $\perp$ AD
from A to the
side BC. Now $\triangle ABD$
 $\cong \triangle ACD$

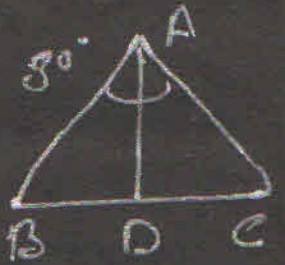
Ans

$$\begin{aligned}\angle ABD &= \angle ACD = 60^\circ \\ \angle BAD &= \angle DAC = 30^\circ \\ \angle ADB &= \angle ADC = 90^\circ\end{aligned}$$

$$\begin{aligned}\therefore BD &= DC \\ \angle BAD &= \angle CAD \\ \text{By (PCT)}\end{aligned}$$

Now observe that
 $\triangle ABD$ is a right angle
 $\angle ADB = 90^\circ$

Student
will listen
carefully
and then
write in
their
notebook



$$\begin{aligned}\triangle ABD &\cong \triangle ACD \\ \angle ABD &= \angle ACD = 60^\circ \\ \angle BAD &= \angle DAC = 30^\circ \\ \angle ADB &= \angle ADC = 90^\circ \\ BD &= DC \\ \text{and} \\ \angle BAD &= \angle CAD \\ \text{C.P.C.T.} \\ BD &= \frac{1}{2} BC \\ AD^2 &= AB^2 - BD^2 \\ (9)^2 - a^2 &= 3a^2 \\ AD &= 3a\end{aligned}$$

$$\sin 30^\circ$$

$$\frac{BD}{AB} = \frac{1}{2}$$

$$\cos 30^\circ$$

$$= \frac{AD}{AB}$$

$$= \frac{\sqrt{3}}{2}$$

(76)

RECAPITULATION →

① $\sin 30^\circ = \frac{1}{2}$

② $\sin 45^\circ = \frac{1}{\sqrt{2}}$

HOME WORK →

① $\sin 2A = 2 \sin A$ in true when $A = ?$

② $\sin 60^\circ \cos 30^\circ + \sin 30^\circ \cos 60^\circ$

③ $\frac{1 - \tan^2 45^\circ}{1 + \tan^2 45^\circ} = ?$

(77)

LESSON No.

Duration of the period... 35-40 min

Date.....

Pupil Teacher's Name

Pupil Teacher's Roll No.

Class... X

Average Age of the pupils... 15

Subject... Mathematics

Topic... Trigonometry

INSTRUCTIONAL OBJECTIVE →

Knowledge → Know the trigonometric formula.

Understanding → Develop the understanding of trigonometric.

Application → Apply the trigonometric formula.

①① Solve the problem related to trigonometric

Teaching AIDS →

General → Chalk black board
duster.

Instructional teaching AIDS →
Chart related to
topic.

PREVIOUS Knowledge TESTING

Pupil Teacher
Activity

Pupil Activity

①

How we can call
 $\sin A$

$\sin A = \frac{\text{Perpendicular}}{\text{Hypotenuse}}$

②

what is $\sin 45^\circ$;

$\sin 45^\circ = \frac{1}{\sqrt{2}}$

ANNOUNCEMENT

well student today we
will study about trigono-
metric ratio of comp-
lementary angle

PRESENTATION

T.P

Pupil Teacher
Activity

Pupil
Activity

B.B.W

Trigo
name
pic
rations
of
Compl
ment
1/2

Two angles are said to be complementary if their sum is equal to 90° . Here the Δ is right angled at B

so $\angle A + \angle C = 90^\circ$.
So, They form a pair of complementary angles

No we have

$$\sin A = \frac{BC}{AC}$$

$$\cos A = \frac{AB}{AC}$$

$$\tan A = \frac{BC}{AB}$$

$$\operatorname{cosec} A = \frac{AC}{BC}$$

$$\operatorname{cosec} A = \frac{AC}{AB}$$

$$\cot A = \frac{AB}{BC}$$

Student will try to understand note in the copies

and think the question



$$\angle B = 90^\circ$$

$$\angle A + \angle C = 90^\circ$$

$$\sin A = \frac{BC}{AC}$$

$$\cos A = \frac{AB}{AC}$$

$$\tan A = \frac{BC}{AB}$$

$$\operatorname{cosec} A = \frac{AC}{BC}$$

$$\sec A = \frac{AC}{AB}$$

$$\cot A = \frac{AB}{BC}$$

$$\text{Let } \angle C = 90^\circ$$

$$\sin(90^\circ - A)$$

$$\frac{AB}{AC}$$

T.A

Pupils Teacher
Activity

90

Pupils
Activity

(B.B.W)

Now let us
write trigono-
metric ratios
for $\angle C = 90^\circ - \angle A$
for

Convenience
we shall

write $90^\circ - A$
instead of

$90^\circ - \angle A$ Now
 $\sin(90^\circ - A) = \frac{AB}{AC}$

$$\cos(90^\circ - A) = \frac{BC}{AC}$$

$$\tan(90^\circ - A) = \frac{AB}{BC}$$

$$\operatorname{cosec}(90^\circ - A) = \frac{AC}{AB}$$

$$\sec(90^\circ - A) = \frac{AC}{BC}$$

$$\cot(90^\circ - A) = \frac{BC}{AB}$$

Now compare w/
① & ② we get

$$\sin(90^\circ - A) = \frac{AB}{AC}$$

$$\cos A = \frac{BC}{AC}$$

$$\cos(90^\circ - A) = \frac{BC}{AC} = \sin A$$

Students
will list
careful
and make
a note
of it

$90^\circ - \angle A$ Now

$$\sin(90^\circ - A) = \frac{AB}{AC}$$

$$\cos(90^\circ - A) = \frac{BC}{AC}$$

$$\tan(90^\circ - A) = \frac{AB}{BC}$$

$$\operatorname{cosec}(90^\circ - A) = \frac{AC}{AB}$$

$$\sec(90^\circ - A) = \frac{AC}{BC}$$

$$\cot(90^\circ - A) = \frac{BC}{AB}$$

Now compare by
① and ② we get

$$\sin(90^\circ - A) = \frac{AB}{AC}$$

$$\cos A$$

$$\cos(90^\circ - A) = \frac{BC}{AC}$$

$$\sin A$$

T.P

Pupil Teacher
Activity

81

Pupil
Activity

B.B.W

$$\tan(90-A) = \frac{AB}{AC}$$

$$= \cot A$$

$$\cot(90-A) = \frac{BC}{AB}$$

$$\tan A$$

$$\sec(90-A) = \frac{AC}{BC}$$

$$\csc A$$

$$\operatorname{cosec}(90-A) = \frac{AC}{AB}$$

$$= \sec A$$

Q1 Evaluate $\frac{\tan 65^\circ}{\cot 65^\circ}$

We know

$$\cot A = \tan(90-A)$$

Now

$$\cot 25^\circ = \tan(90-25^\circ)$$

$$\tan 65^\circ$$

$$\frac{\tan 65^\circ}{\cot 65^\circ} = \frac{\tan 65^\circ}{\tan 65^\circ}$$

$$= 1$$

Stu
will
theStu
will
Star
prob
sol
and
it in the
Couple)

$$\tan(90-A) = \frac{AB}{AC}$$

$$= \cot A$$

$$\cot(90-A) = \frac{BC}{AB}$$

$$= \tan A$$

$$\sec(90-A) = \frac{BC}{AB}$$

$$\csc A$$

$$\operatorname{cosec}(90-A) = \frac{AC}{AB}$$

$$= \sec A$$

We know

$$\cot A = \tan(90-A)$$

Now

$$\cot 25^\circ = \tan(90-25^\circ)$$

$$\tan 65^\circ$$

$$\frac{\tan 65^\circ}{\cot 65^\circ} = \frac{\tan 65^\circ}{\tan 65^\circ}$$

$$= 1$$

T.P	Pupil Teacher Activity	Pupil Activity	B.B.W
-----	------------------------	----------------	-------

Q2
Express $\cot 85^\circ$
+ $\cot 75^\circ$ in
terms of
trigonometric
ratio of
angles b/w
 0° & 45°

$$\cot 85^\circ + \cot 75^\circ$$

$$\cot(90-5^\circ)$$

$$+ \cot(90-15^\circ)$$

$$\tan 5^\circ + \tan 15^\circ$$

$$\cot 85^\circ$$

$$+ \cot 75^\circ$$

RECAPITULATION →

- ① $\sin(90-A) = \cos A$
- ② $\cot(90-A) = \tan A$

HOME WORK →

- ① Evaluate
 $\frac{\sin 18^\circ}{\cos 72^\circ}$
- ② $\frac{\tan 26^\circ}{\cot 64^\circ}$

(83)

LESSON No. 4

(82)

Date.....

Duration of the period... 35-40 mins

Pupil Teacher's Name.....

Pupil Teacher's Roll No.

Class... X

Average Age of the pupils... 15

Subject... Mathematics

Topic... TRIGONOMETRY

INSTRUCTIONAL Objectives: →

Knowledge → Know the trigonometric formula.

Understanding → Develop the understanding of Trigonometry

Application : →

① Apply the trigonometric formula

② Solve the problem related to trigonometry

Teaching AIDS →

General → chalk, black board/cluster.

Instru ctional Teaching AIDS →

chart related to Topic

PREVIOUS Knowledge Testing

84

Pupil Teacher
Activity

Pupil Activity

① $\tan(90-A) = ?$

Cot A

② $\operatorname{cosec}(90-A) = ?$

sec A

③ $\tan 45^\circ = ?$

1

ANNOUNCEMENT of TOPIC

Well Student today we will study about "Trigonometric"

PRESENTATION : →

T.P.

Pupil Teacher
Activity

Pupil
Activity

B.B.W

Trigonometric
identities

An equation involving trigonometric ratios of an angle is called 'trigonometric identities'

Student will listen carefully

T.P.

Pupil Teacher
Activity

Pupil Activity

B.B.W.

Proof
of
activity

In $\triangle ABC$
right angle
at B
we have
 $AB^2 + BC^2 = AC^2$
----- ①

dividing each
term by
 AC^2 we get

$$\frac{AB^2}{AC^2} + \frac{BC^2}{AC^2} = \frac{AC^2}{AC^2}$$

$$\left(\frac{AB}{AC}\right)^2 + \left(\frac{BC}{AC}\right)^2 = 1$$

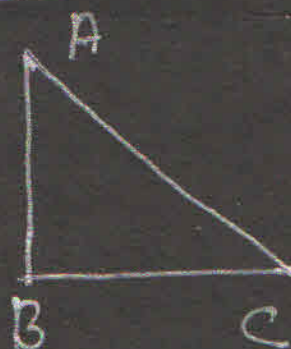
We know that

$$\frac{AB}{AC} = \cos A$$

$$\frac{BC}{AC} = \sin A$$

This is a very
important
relation
of $\angle A$ & 90°

Student will
listen carefully



$$AB^2 + BC^2 = AC^2$$

dividing by AC^2

$$\left(\frac{AB}{AC}\right)^2 + \left(\frac{BC}{AC}\right)^2 = \left(\frac{AC}{AC}\right)^2$$

$$= \left(\frac{AB}{AC}\right)^2 + \left(\frac{BC}{AC}\right)^2 = 1$$

T.P.

Pupil Teacher
Activity

Let us now divide
(1) by AB^2
we get

$$\frac{AB^2}{AB^2} + \frac{BC^2}{AB^2} = \frac{AC^2}{AB^2}$$

$$\left(\frac{AB^2}{AB^2}\right) + \left(\frac{BC}{AB}\right)^2 = \left(\frac{AC}{AB}\right)^2$$

$$1 + \left(\frac{BC}{AB}\right)^2 = \left(\frac{AC}{AB}\right)^2$$

$$\frac{BC}{AB} = \tan A$$

$$\frac{AC}{AB} = \sec A$$

from trigonometric ratios

Here we get

$$1 + \tan^2 A = \sec^2 A$$

$$\frac{AB^2}{BC^2} + \frac{BC^2}{BC^2} = \frac{AC^2}{BC^2}$$

$$\frac{AB^2}{BC^2} + 1 = \frac{AC^2}{BC^2}$$

$$\frac{AB^2}{BC^2} + 1 = \frac{AC^2}{BC^2}$$

$$\cos^2 A + 1 = \sec^2 A$$

Pupil
Activity

B.B.W

$$\frac{AB}{AC} = \cos A$$

$$\frac{BC}{AC} = \sin A$$

$$\cos^2 A + \sin^2 A = 1$$

dividing eq. (1) by
(2) we get

$$\frac{AB^2}{AB^2} + \frac{BC^2}{AB^2} = \frac{AC^2}{AB^2}$$

$$\frac{AC}{AB} = \sec A$$

$$1 + \tan^2 A = \sec^2 A$$

$$\frac{AB^2}{BC^2} + 1 = \frac{AC^2}{BC^2}$$

$$\cos^2 A + 1 = \sec^2 A$$

87

86

T.P. Pupil Teacher Activity

Pupil Activity

B.B.W

Q1 Express ratio $\cos A$ $\tan A$ & $\sec A$ in terms of $\sin A$

$$\cos^2 A + \sin^2 A = 1$$

$$\cos^2 A = 1 - \sin^2 A$$

$$\cos A = \pm \sqrt{1 - \sin^2 A}$$

$$\tan A = \frac{\sin A}{\cos A}$$

$$\frac{\sin A}{\sqrt{1 - \sin^2 A}}$$

$$\sec A = \frac{1}{\cos A}$$

$$\frac{1}{\sqrt{1 - \sin^2 A}}$$

Express $\cos A$ $\tan A$ & $\sec A$ in terms of $\sin A$

Q2 Prove that $\sec A (1 - \sin A) (\sec A + \tan A) = 1$

L.H.S

$$\sec A (1 - \sin A) (\sec A + \tan A)$$

$$\frac{1}{\cos A} (1 - \sin A)$$

$$= \frac{1}{\cos A} \frac{1 + \sin A}{\cos A}$$

$$\frac{(1 - \sin A) (1 + \sin A)}{\cos^2 A}$$

$$\frac{1 - \sin^2 A}{\cos^2 A} = 1$$

$$\sec (1 - \sin A) \sec A + \tan A = 1$$

RECAPITULATION

$$(1) \cos^2 A + \sin^2 A = 1$$

$$(2) 1 + \tan^2 A = \sec^2 A$$

HOME WORK →

$$(1) \frac{1 + \tan^2 A}{1 + \cot^2 A}$$

$$(11) \frac{\sin^2 63^\circ + \sin^2 27^\circ}{\cos^2 17^\circ + \cos^2 73^\circ}$$

(89)

LESSON No. 5

(88)

Date

Duration of the period 35-40 min

Pupil Teacher's Name

Pupil Teacher's Roll No.

Class X

Average Age of the pupils 15

Subject Mathematics

Topic TRIGONOMETRY

INSTRUCTIONAL OBJECTIVE →

Knowledge → Application of
understanding → trigonometry
Application of trigonometric problem
in height distance calculation.
Application →
(1) Apply in the trigonometric
problem
(2) Height & distance problem

Teaching AIDS →

General: → Chalk, blackboard
cluster

Instructional Teaching AIDS →
chart in which all
formulae are written

Pupil Teacher
Activity

Pupil Activity

(90)

(1) How can we calculate $\sin A$?

$$\sin A = \frac{\text{Perpendicular}}{\text{Hypotenuse}}$$

(2) $1 + \tan^2 A = \sec^2 A$

$$\sec^2 A$$

(3) Where can we apply trigonometry?

No reply

ANNOUNCEMENT OF TOPIC

Well done student
today we will study
about the same
application of the
trigonometry



91

90

T.P Pupil Teacher
Activity

Pupil Activity

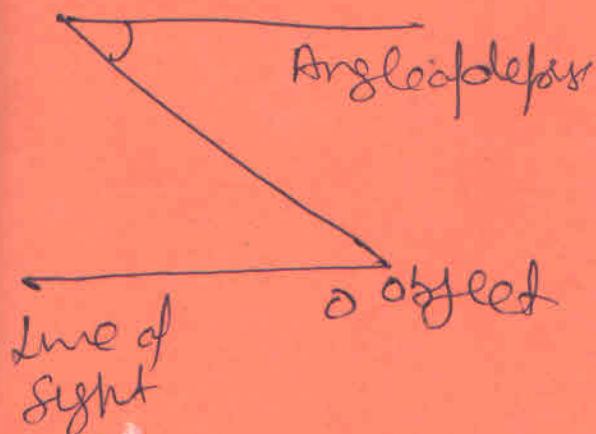
B.B.W

Height On this figure
the line AC,
drawn from

Trigonometry

Application of functions
of height

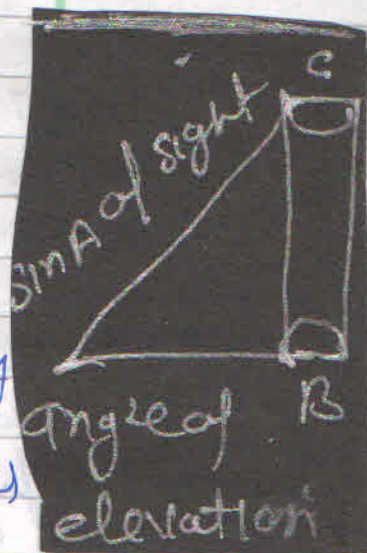
Distance problems
Horizontal



at top of the
mineral

Now consider
the situation.

Student will
listen carefully
and note
in their copies



91

90

T-P

Pupils Teacher
Activity

Pupils Activity

B.B.W

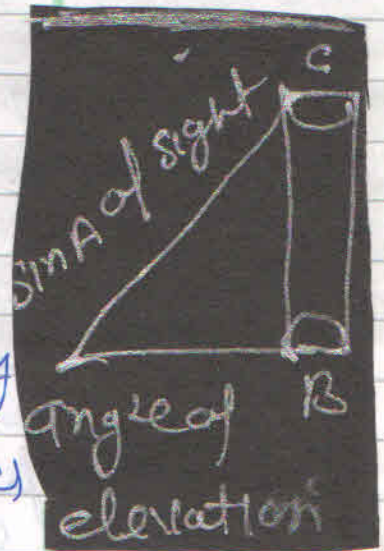
Height

and

distance

In this figure
the line AC,
drawn from
the eye of the
student to
the top of the
minaret is
called the
line of
sight

Student will
listen carefully
and note
in their copies



The angle BAC,
so formed
by line of
sight with
the horizontal
is called
angle of
elevation
at top of the
minaret

Now consider
the situation.

92

T.P

Pupil Teacher
Activity

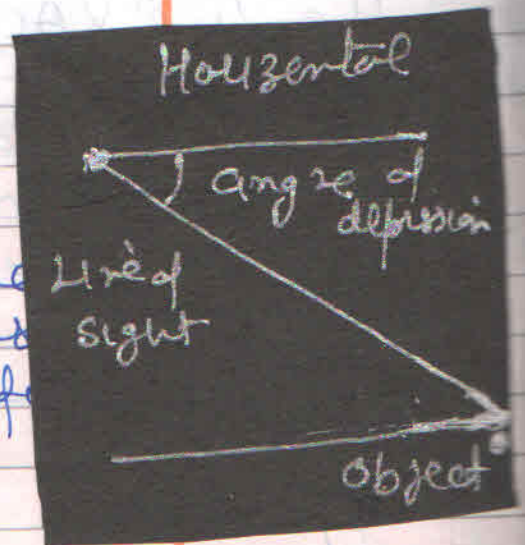
Pupil's
Activity

B.B.W

Where the girl
sitting on the
balcony is looking
down at a
flower pot
placed on the
slab of a
terrace. In
this case sight
of below horizon
level. The angle
subtended by
line of sight
with horizontal
line called
angle of
depression.

Thus angle of
depression of
a point on
object being
viewed in
the angle
formed by
the line of
sight

Student
will have
careful



T.P

Pupil Teacher
ActivityPupil
Activity

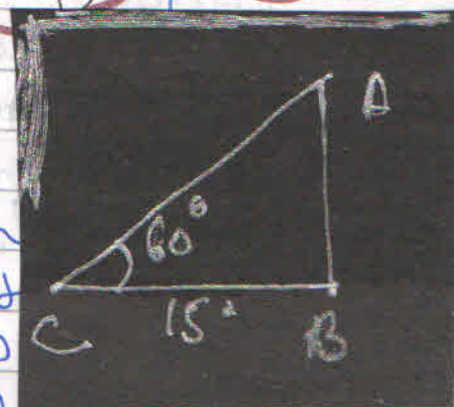
B.B.W

ques
tion

A tower stands vertically on the ground. From a point on the ground, which is 15m away from the foot of the tower, the angle of elevation of the top of the tower is found to be 60° .

Find height of tower.

Students will list try to understand the problem



Students will copy the problem in their note book.

To solve the problem we choose the trigonometric ratio $\tan 60^\circ$ (or $\cot 60^\circ$)

$$\text{Now } \tan 60^\circ = \frac{AB}{BC}$$

$$\sqrt{3} = \frac{AB}{15} \quad AB = 15\sqrt{3}$$

$$\tan 60^\circ$$

$$\frac{AB}{AC}$$

$$\sqrt{3} = \frac{AB}{15}$$

$$AB = 15\sqrt{3}$$

T.P

P.T.A

P.A

B.B.W

An observer
1.5 m tall m
28.5 m away
from chimney
at top of the
chimney from
eye is 45°
What is
height of
chimney

Here AB is chimney
So the observer
at D the angle
of elevation
in this case
ADE is a right
angle
at E and we are
required to
find the height
of chimney

$$AB = AE + BE$$

$$AE + 1.5$$

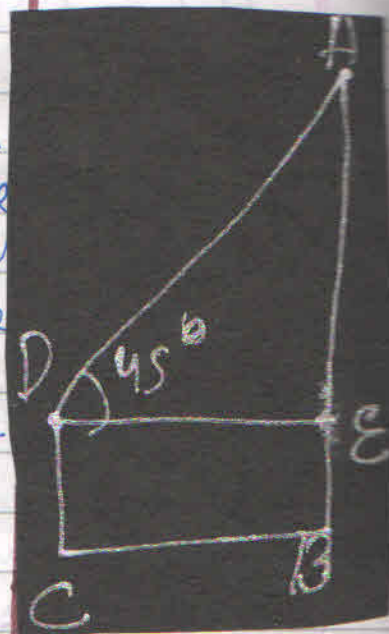
$$DB = CB = 28.5 \text{ m}$$

$$\text{Now } \tan 45^\circ = \frac{AE}{DE}$$

$$1 = \frac{AE}{28.5}$$

$$AB = 28.5 + 1.5$$

$$= 30 \text{ m}$$



RECAPITULATION

angle of depression
Angle of elevation

HOME WORK →

The shown of tower standing on a
ground is found to be 40 m from all side
Find height of tower

(95)

LESSON No. 6

99

Date

Duration of the period 35-40 min

Pupil Teacher's Name

Pupil Teacher's Roll No.

Class X

Average Age of the pupils 15

Subject Mathematics

Topic Quadratic Equation

Introduction $\rightarrow$ objectives $\rightarrow$

Knowledge $\rightarrow$ The learner will be able to solve quad 'eqn'

Understanding $\rightarrow$ The learner will be able to understand the nature of the roots

Application $\rightarrow$ ① Define Quadratic Equation
② Give example related to different roots

Teaching Aids $\rightarrow$

General $\rightarrow$ chalk blackboard, duster etc

Instruction Teaching Aids $\rightarrow$ Chart, tables, board.

96

PREVIOUS KNOWLEDGE TESTING $\Rightarrow$

PUPIL Teacher Activity

① What is linear equation

Equations which have power 0 or 1.

What are quadratic equations

No reply

ANNOUNCEMENT OF the Topic $\Rightarrow$

Well students study about quadratic equations

(97)

(96)

PRESENTATION

T.P. Popil Teacher Activity Pupil Activity B.B.W

A quadratic equation is a variable x in a equation of the form of $ax^2 + bx + c = 0$ where a, b, c are real no

$$a \neq 0$$

Students will listen care fully

$$ax^2 + bx + c = 0$$

Any equation of the form $P(x) = 0$

where $P(x)$ is a polynomial of degree 2 is the quadratic equation

the equation that is

$$ax^2 + bx + c = 0$$

$$a \neq 0$$

is called standard equation

(99)

T.P

Pupil Teacher Activity

Pupil Activity

B.B.W

Check whether
the following
are quadratic
equation or
not

$$(x-2)^2 + 1 = 2x - 3$$

Question

Check whether
the following
are quadratic
equation or
not

$$(x-2)^2 + 1 = 2x - 3$$

$$(x-2)^2 + 1 = 2x - 3$$

L.H.S

$$(x-2)^2 + 1$$

$$x^2 + 4 - 4x + 1$$

$$x^2 - 4x + 5$$

R.H.S

Written as

$$x^2 - 4x + 5 = 2x - 3$$

$$x^2 - 4x - 2x + 5 + 3 = 0$$

$$x^2 - 6x + 8 = 0$$

This is the
quadratic
equation.

$$(x-2)^2 + 1 = 0$$

(99)

98

T.P	Pupil Teacher Activity	Pupil Activity	B.B.W.T
-----	------------------------	----------------	---------

Solution of a quadratic equation
A real no α is called a root of the quadratic equation

$$ax^2 + bx + c = 0$$

$$ax^2 + bx + c = 0$$

student will listen carefully.

$$\begin{aligned} 2x^2 - 5x + 3 &= 0 \\ 2x^2 - 2x - 3x + 3 &= 0 \\ 2x(x-1) - 3(x-1) &= 0 \\ (2x-3)(x-1) &= 0 \\ x &= 3/2, 1 \end{aligned}$$

Problem Find the

roots of the equation

$$2x^2 - 5x + 3$$

$$-2x^2 = 2x - 3x + 3$$

$$(2x-3)(x-1)$$

Now

$$2x^2 - 5x + 3 = 0$$

100

T.P P. T Activity

Pupil Activity

B. B. W.

$$(x-3)(x-1)$$

Here the roots of

the

equation

are

$$2x^2 + 13x + 3$$

$= 0$ is

Verify

roots

of

equation

Student
will be
listen carefully

RECAPITULATION →

What are Quadratic equation

Home Work →

Find the roots of the quadratic equation.

$$3x^2 - 2\sqrt{5}x + 2 = 0$$

101

LESSON No. 7

100

Date

Duration of the period 35-40 min

Pupil Teacher's Name Kamani

Pupil Teacher's Roll No.

Class VIII

Average Age of the pupils 15

Subject Mathematic

Topic Quadratic Equation

Instructional objectives →

Knowledge → learner will be able to solve equation

Understanding → The learner will be able to understand the nature of roots

Application → Define quadratic equations
Give example related to different roots

Teaching Aids → Teaching Aids

General → Chalk, blackboard, duster etc.

Instructional Teaching → Chart roller board etc

Previous Knowledge Test →

Pupil Teacher Activity { PA

① What are quadratic equation.

standard form

Equation with the highest Power 2

$$ax^2 + bx + c = 0$$

$$a \neq 0$$

ANNOUNCEMENT of the Topic →

Well student today we will see some Application of the Quadratic Equation.

PRESENTATION →

T.P	Pupil Teacher Activity	Pupil Activity	B.B.W
	Find the roots of the quadratic equation $6x^2 - x - 2 = 0$	$6x^2 - x - 2$ $= 6x^2 + 3x - 4x - 2$ $3x(2x+1) - 2(2x+1)$ $= (3-2)(2x+1)$	
	Find the roots of the quadratic equation	So roots of the equation $6x^2 - x - 2 = 0$ are the value of x $3x - 2 = 0$ $x = \frac{2}{3}$	

01/11/2019

103

102

T.P. (Lupil Teacher Activity)

Lupil Activity

B.B.W

$$3x^2 = 2\sqrt{3}x + 2$$
$$= 0$$

$$2x - 1 = 0$$

$$2x = 1$$

$$x = \frac{1}{2}$$

$$3x^2 = 2\sqrt{3}x + 2 = 0$$

$$3x^2 - \sqrt{3}x - \sqrt{3}x + 2$$
$$= 0$$

$$\sqrt{3}x(\sqrt{3} - \sqrt{2}) - \sqrt{3}x$$

$$(\sqrt{3}x - \sqrt{2})\sqrt{3}x - \sqrt{2}$$

So the roots of the equation are the value of x for which.

$$(\sqrt{3}x - \sqrt{2})(\sqrt{3}x - \sqrt{2})$$
$$= 0$$

$$\text{Now } \sqrt{3}x - \sqrt{2} = 0$$

$$x = \frac{\sqrt{2}}{\sqrt{3}}$$

So roots related repeated twice one for each repeated factor $\sqrt{3}x - \sqrt{2}$

$$3x^2 = 2\sqrt{3}x + 2$$
$$= 0$$

T.P

Pupil Teacher
Activity

Pupil Activity

B.B.W

Therefore the
roots of

$$3x^2 - 2\sqrt{3}x + 2 = 0$$

are

$$\frac{\sqrt{2}}{3} \text{ and } \frac{\sqrt{2}}{3}$$

Find the dimensions of the prayer hall where the breadth of the hall is x m and the quadratic equation is

$$2x^2 + x - 300 = 0$$

So we can say value of x are $\frac{\sqrt{2}}{3}$ and $\frac{\sqrt{2}}{3}$
If breadth of the prayer hall is given by x (let)

x is satisfied the equation

$$2x^2 + x - 300 = 0$$

(105)

(104)

T.P

Pupil Teacher
Activity

Pupil Activity

BBW

$$2x^2 + x - 300 = 0$$

$$2x^2 - 24x + 25x - 300 = 0$$

$$2x(x-12) + 25(x-12) = 0$$

$$(2x-25)(x-12) = 0$$

$$2x + 25 = 0$$

$$x - 12 = 0$$

$$2x = -25$$

$$x = \frac{-25}{2}$$

$$\text{and } x - 12 = 0$$

$$x = 12$$

Since x is the breadth of the hall hence it cannot be negative

$$x = 12$$

Hence breadth of prayer hall

$$x = 12 \text{ m}$$

$$2x^2 - x - 3 = 0$$

(10)

RECAPITULATION →

Q.1 How to find out the roots of the quadratic equation

Q.2 What do you understand by the quadratic

Home Work →

① Find the roots of the equation

$$x^2 - 3x + 10 = 0$$

② $100x^2 + 2x + 1 = 0$

107

LESSON No. 8

166

Date

Duration of the period 35-40m

Pupil Teacher's Name

Pupil Teacher's Roll No.

Class

Average Age of the pupils 15

Subject Mathematics

Topic Quadratic Equations

INSTRUCTIONAL OBJECTIVES

Knowledge $\rightarrow$ learner will be able to solve eq.

UNDERSTANDING $\rightarrow$ The learner will be able to understanding the nature of roots

Application $\Rightarrow$ ① Define quadratic equation

② Give example related to different roots

Teaching Aids $\Rightarrow$

General :- Chalk, blackboard dust etc

Instruction Teaching Aids

PTA

PA

① What are quadratic equation

Equation with power.

solution by completing square

No reply.

PRESENTATION →

T. P

Pupil Teacher Activity

Pupil Activity

B. B. W

Solution
of word
problem
Equation

Consider the following situation

students
will listen
carefully.

The product of
senitlon age. (in
year) two year
ago, and her
age four years
from now one
more than
twice

Two years ago
 $(x-2)$

four years from
now $= (x+4)$

T.P Pupil Teacher Activity

Pupil Activity

B.B.W

$$\Rightarrow (x-2)(x+4) = 2x+1$$

$$x^2 + 4x - 2x - 8 = 2x + 1$$

$$x^2 + 4x - 2x - 2x - 8 =$$

①

$$x^2 - 8 - 1 = 0$$

$$x^2 - 9 = 0$$

$$x^2 = 9$$

$$x = \pm 3$$

we can write

$$x^2 - 9 = 0$$

$$\text{get } x = 3$$

$$\text{or } x = -3$$

since age
of positive
no

$$x = 3$$

sunita present
age $x = 3$ students will
note down in
their Copiesstudent will
listen
and note
down their
Copies

$$(x-2)(x+4) = 2x+1$$

$$x^2 + 4x - 2x - 8 = 2x + 1$$

$$x^2 + 2x - 8 = 2x + 1$$

$$x^2 + 2x - 2x - 9 = 0$$

$$x^2 - 9 = 0$$

$$x^2 = 9$$

$$x = \pm 3$$

T.P	Pupil Teacher Activity	Pupil Activity	B.BW
-----	------------------------	----------------	------

Solution Now Consider
of the quad rate
Equation

$$(x+2)^2 - 9 = 0$$

to solve it we
can write it
as

$$(x+2)^2 = 9$$

Taking square
roots we get

$$x+2=3 \text{ or}$$

$$x=3-2$$

$$x=1 \text{ or}$$

$$x=-5$$

$$x=1 \text{ or}$$

$$x=-5$$

So roots of
Equation

$$(x+2)^2 - 9 = 0$$

are 1 or -5

students will

be listen

Carefully

and copy in

the note Book

$$(x+2)^2 = 9$$

$$x+2=3$$

$$x=3-2$$

$$x=1$$

or

$$x=-5$$

$$x=1, 5$$

(111)

(116)

T.P	Pupil Teacher Activity	Pupil Activity	B.B.W
-----	------------------------	----------------	-------

In both the exam

above the terms
Containing x is

Completely inside
a square and
we found the roots.
But what happens
if we are asked to
solve the
equation

Students will be
Understand the
Concept and note
the example in
their Copies.

The teacher will
give the
another example
in the class

RECAPITULATION →

What are the quadratic equation.

What is the standard form of the quadratic equation.

How can we find the roots by the method of factorization

HOME WORK →

Solve the quadratic equation

$$x^2 + 4x - 5$$

Use the method of finding the solution

(13)

LESSON No. 9

(12)

Date.....

Duration of the period 35-40 min

Pupil Teacher's Name.....

Pupil Teacher's Roll No.....

Class X

Average Age of the pupils 15

Subject MathematicsTopic Quadratic Equation

INSTRUCTIONAL OBJECTIVES →

Knowledge →

Learner will be able to solve quad. Equ.

Understanding →

The learner will be able to understand the nature of roots.

Application : →

- ① Define quadratic equation
- ② Give example related to different roots

Teaching Aids →

General → chalk, blackboard, pointer, duster etc.

Instructional Teaching Aids
chart roller board etc.

PREVIOUS Knowledge Testing

PTA

PA

①

Solution for
equation with
perfect square

By method of
completing the
square

②

Solution for
equation which
are not the
perfect square

No Reply

ANNOUNCEMENT OF PERIOD

Well done student today
we study the application
of quadratic equation

115

114

PRESENTATION →

T.P.

Pupil Teacher Activity

Pupil Activity

Solution of 9
problems
in 10 minutes

Consider the equation
 $3x^2 - 5x + 2 = 0$
Now that the
coefficient of x^2 is
not a perfect square
so we multiply the
equation through
out by 3 to get

$$3(3x^2 - 5x + 2) = 0$$

$$9x^2 - 15x + 6 = 0$$

$$(3x)^2 - 2 \times 3x \times \frac{5}{2} + 6$$

$$(3x)^2 - 2 \times 3x + \frac{5}{2} + \left(\frac{5}{2}\right)^2$$

$$\left(\frac{5}{2}\right)^2 - \left(\frac{5}{2}\right) + 6$$

$$(3x - \frac{5}{2})^2 - \frac{25}{4} + 6$$

$$(3x - \frac{5}{2})^2 - \frac{25}{4} + 6$$

$$(3x - \frac{5}{2})^2 - \frac{1}{4}$$

$$9x^2 - 15x + 6 = 0$$

Student
will listen
the
Lesson
with
care fully

Student
will listen
the Lesson
carefully

$$3x^2 - 5x + 2 = 0$$

$$3(3x^2 - 5x + 2) = 0$$

$$9x^2 - 15x + 6 = 0$$

$$(3x)^2 - 2 \times 3x + \frac{5}{2} + \left(\frac{5}{2}\right)^2 + 6$$

$$(3x)^2 - 2 \times 3x + \frac{5}{2} + \left(\frac{5}{2}\right)^2 + 6$$

$$(3x - \frac{5}{2})^2 - \frac{25}{4} + 6$$

$$(3x - \frac{5}{2})^2 - \frac{1}{4}$$

$$9x^2 - 15x + 6 = 0$$

①

T.P P.T.A P.A B.B.W T.P

we can write
this as
 $3x - 5/2 = +1/2$

$$3x = 5/2 + 1/2$$

$$3x = 5/2 + 1/2$$

$$x = 5/6 + 1/6$$

$$x = 6/6$$

$$= 1$$

$$x = 4/6$$

$$x = 2/3$$

$$\begin{aligned} x &= 1 \\ x &= 2/3 \end{aligned}$$

roots are
given

$$1, 2/3$$

student
listen were
fully

$$3x - 5/2 = +1/2$$

$$3x = 5/2 + 1/2$$

$$3x = 5/2 + 1/2$$

$$x = 5/6 + 1/6$$

$$x = 6/6$$

$$x = 1$$

$$x = 4/6$$

$$x = 2/3$$

$$\begin{aligned} x &= 1 \\ x &= 2/3 \end{aligned}$$

$$1, 2/3$$

117

116

T.P

P.T.A

Pupil Activity 4

B.B.W

Another way of showing this is of allay

Equation

$$3x^2 - 5x + 2 = 0$$

$$x^2 = \frac{5}{3}x + \frac{2}{3} = 0$$

$$x^2 = \frac{5x}{3} + \frac{2}{3}$$

$$x - \frac{1}{2}\left(\frac{5}{3}\right)^2 = \left\{\frac{1}{2}\left(\frac{5}{3}\right)\right\}^2 + \frac{2}{3}$$

$$\left(x - \frac{5}{6}\right)^2 + \frac{2}{3} - \frac{25}{36}$$

$$\left(x - \frac{5}{6}\right)^2 + \frac{24 - 25}{36}$$

$$\left(x - \frac{5}{6}\right)^2 - \frac{1}{36}$$

$$\left(x - \frac{5}{6}\right)^2 - \frac{1}{6^2}$$

$$\left(x - \frac{5}{6}\right)^2 - \left(\frac{1}{6}\right)^2$$

$$\left(x - \frac{5}{6}\right) = \pm 6$$

$$x = \frac{5}{6} + \frac{1}{6} =$$

$$x = \frac{5}{6} - \frac{1}{6} =$$

Student did care fully

$$3x^2 - 5x + 2 = 0$$

$$x^2 = \frac{5}{3}x + \frac{2}{3}$$

$$x^2 = \frac{5}{3}x + \frac{2}{3}$$

$$x - \frac{1}{2}\left(\frac{5}{3}\right)^2 = \frac{1}{2}\left(\frac{5}{3}\right)^2 + \frac{2}{3}$$

$$\left(x - \frac{5}{6}\right)^2 + \frac{2}{3} - \frac{25}{36}$$

$$\left(x - \frac{5}{6}\right)^2 + \frac{24 - 25}{36}$$

$$\left(x - \frac{5}{6}\right)^2 - \frac{1}{36}$$

$$\left(x - \frac{5}{6}\right)^2 - \frac{1}{6^2}$$

$$\left(x - \frac{5}{6}\right) = \pm 6$$

$$x = \frac{5}{6} + \frac{1}{6}$$

$$x = \frac{5 - 1}{6} = \frac{4}{6} = \frac{2}{3}$$

$$x = \frac{5 + 1}{6} = 1$$

(118)

T.A Pupil Teacher Activity	Pupil Activity	B.B.W
$(3x - 5/2)^2 = 1/4$ $3x - 5/2 = \pm \sqrt{1/4}$ $3x - 5/2 = \pm 1/2$ or $3x - 5/2 = 1/2$ $3x = 1/2 + 5/2$ or $3x = 3$ $x = 3/3 = 1$ or $3x - 5/2 = -1/2$ $3x = -1/2 + 5/2$ $3x = 2$ $x = 2/3$ $x = 1 \text{ or } 2/3$	Student will listen carefully	

HOME WORK

- ① Find the roots of the equation $5x^2 - 6x - 2$ by method completing the square.

(119)

LESSON No. 10

(118)

Date

Duration of the period 35-40 min

Pupil Teacher's Name

Pupil Teacher's Roll No.

Class X

Average Age of the pupils 15

Subject Mathematics

Topic Quadratic equation

INSTRUCTIONAL OBJECTIVE →

Knowledge → learner will be able to solve the equation.

Understanding →

The learner will be able to understand nature of roots.

Application

- ① Define quadratic equations
- ② Give example related to diff roots

Teaching AIDS →

General →

Chalk, black board, pointer, cluster etc.

Instructional Teaching Aids → Chart, Roller board.

etc.

PREVIOUS Knowledge Testing

120

P11

P.T.A.

P.A.

T.P.

- ① What are quadratic equation
- ② Standard form
- ③ Quadratic formula

Equation with Power 2

$$ax^2 + bx + c = 0$$
$$a \neq 0$$

No Reply

ANNOUNCEMENT of Topic

Well student today we learn to find different quadratic formula.

PRESENTATION

(121)

(124)

T.P. P.T.A. P.A. A.T.V. B.B.W

Problem

Find the roots of $4x^2 + 3x + 5 = 0$ by the method of completing square

As calculated we see that $(2x + 3/4)^2$ has negative roots are the real value of why?

There are no real no. of x satisfying the given eq. so given eq. has no real roots

$$4x^2 + 3x + 5 = 0$$

Can be written as

$$(2x)^2 + 2x(2x) + (3/4)^2 - (3/4)^2 = 0$$

$$(2x + 3/4)^2 - (3/4)^2 + 5 = 0$$

$$(2x + 3/4)^2 - 9/16 + 5 = 0$$

$$(2x + 3/4)^2 - \frac{71}{16} = 0$$

$$(2x + 3/4)^2 = \frac{71}{16}$$

< 0

No real

Student
listen carefully.

$$4x^2 + 3x + 5 = 0$$

1.22

T.P.

P.T.A

P.T.

B.B.W

~~Question~~
Quadratic
formula

Now you
have seen

$$ax^2 + bx + c = 0$$

($a \neq 0$)
dividing the
by a

$$\frac{x^2 + bx}{a} + \frac{c}{a} = 0$$

then same
as

$$x^2 - 2bx + \left(\frac{b}{2a}\right)^2$$

$$\left(-\frac{b}{2a}\right)^2 + \frac{c}{a} = 0$$

$$\left(x + \frac{b}{2a}\right)^2 - \frac{c^2}{4a^2} + \frac{c}{a} = 0$$

$$\left(x + \frac{b}{2a}\right)^2 - \frac{b^2 - 4ac}{4a^2} = 0$$

$$\left(x + \frac{b}{2a}\right)^2 - \frac{b^2 - 4ac}{4a^2} = 0$$

Student will
listen care
fully

They will note
down in their
wps.

$$ax^2 + bx + c = 0$$

$$x^2 + \frac{b}{a}x + \frac{c}{a} = 0$$

$$\left(x + \frac{b}{2a}\right)^2 + \frac{c}{a} = 0$$

(123)

(22)

T.P

P.T.A

P.A.

B.B.W

So

$$\left(\frac{x+b}{2a}\right)^2 = \frac{b^2-4ac}{4a^2} = 0$$

those of

$$\left(\frac{x+b}{2a}\right)^2 = \frac{b^2-4ac}{4a^2}$$

if $b^2-4ac > 0$

than taking the square root in (1) get

$$\frac{x+b}{2a} = \pm \frac{\sqrt{b^2-4ac}}{2a}$$

$$\Rightarrow \frac{x+b}{2a} = \pm \frac{\sqrt{b^2-4ac}}{2a}$$

$$x = \frac{-b}{2a} \pm \frac{\sqrt{b^2-4ac}}{2a}$$

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

So roots of ax^2

$$= \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

if $b^2-4ac > 0$
 $b^2-4ac < 0$

They will note down their copies

(124)

I.A

P.T.A

P.A

B.B.A

Equation will
have no real
roots

thus if $b^2 - 4ac > 0$
then roots are
given by quadratic
formula

RECAPITULATION →

- ① what are the real roots.
- ② what are the quadratic formula.

HOME WORK →

Find the roots of following
quadratic equation if they
exist the quadratic formula

① $3x^2 - 5x + 2 = 0$

② $x^2 + 4x + 5 = 0$

125

LESSON No. 11

124

Date

Duration of the period 35-40 min

Pupil Teacher's Name

Pupil Teacher's Roll No.

Class X

Average Age of the pupils 15

Subject Mathematic

Topic Quadratic Equation

Instructional objective

Knowledge → Learner will be able to solve quad. Equation

Understanding → The learner will be able to understand nature of roots

Application →

- ① define quadratic equation
- ② Give example related to diff roots

Teaching AIDS ⇒

General → chalk, blackboard
duster

INSTRUCTIONAL Teaching AIDS
chart roller, board
etc.

PREVIOUS Knowledge Testing

126

- ① What are the quadratic equation
- ② Standard form
- ③ Quadratic formula

Equation with power 2

$$ax^2 + bx + c = 0$$

$$a \neq 0$$

No reply

ANNOUNCEMENT of the TOPIC

well student today we will study the nature of roots

PRESENTATION

127

126

T.A Pupil Teacher
Activity

Pupil
Activity

B.B.W

The equation
 $ax^2 + bx + c = 0$

Quadratic Equation

Nature of root

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$b^2 - 4ac > 0$$

we get two different root

$$\text{If } b^2 - 4ac = 0$$

we get two root

$$b^2 - 4ac < 0$$

no real roots

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-b}{2a}$$

$$b^2 - 4ac > 0$$

So Therefore we
can understand

A

Pupil Teacher Activity

The equation
 $ax^2 + bx + c = 0$
 has roots

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

If $b^2 - 4ac > 0$
 we get two distinct
 real roots

$$\frac{-b}{2a} \pm \frac{\sqrt{b^2 - 4ac}}{2a}$$

and

$$\frac{-b}{2a} - \frac{\sqrt{b^2 - 4ac}}{2a}$$

If $b^2 - 4ac = 0$

$$x = \frac{-b}{2a} = 0$$

$$x = \frac{-b}{2a} \text{ or } \frac{-b}{2a}$$

So sol of eq. $ax^2 + bx + c = 0$

$$\text{both} = \frac{-b}{2a}$$

So Therefore we
 can understand

Pupil Activity

B.B.W

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-b}{2a}$$

$$b^2 - 4ac > 0$$

Students
 will list
 carefully
 and under
 stand
 the concept

Pupil Teacher Activity

Quadratic Eq.
 $ax^2 + bx + c = 0$
 has two equal
 real roots
 In this case

if $b^2 - 4ac < 0$
 then there is
 no real no.
 whose sq.
 is $b^2 - 4ac$
 So no real
 roots or not
 $b^2 - 4ac$ is,
 called dis
 crimination
 constant eq.

So quadratic
 equation

$ax^2 + bx + c = 0$
 has distinct real
 roots
 if $b^2 - 4ac > 0$

Pupil Activity

Student will
 listen the
 chapter
 carefully
 and
 understand
 it.

B.B.W

T.A

P.T.A

P.A

B.B.W

Quest
107

A pole has to be at a point on the boundary of circle park of diameter 13 m.

In such a way that diff. of its dis. from two diametrically opposite fixed gates A and B boundary is 7 m.

Is it possible to do so? If yes at what distance from two gates should pole be erected

Let first draw diagram

Let P be required point on the boundary of the circle. Let distance from pole P to gate B be x m.

$BP = x$ m

Now diff. of the distance of pole from the gate $BP - AP$

or $(BP - AP) = 7$

$AP = (x + 7)$ m

$AB = 13$ m

$\angle APB = 90^\circ$

Therefore

$AP^2 + PB^2 = AB^2$

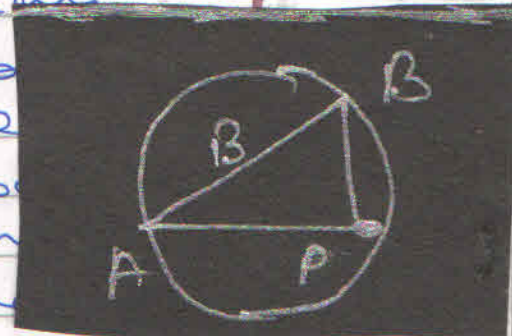
Pythagorean

$(x+7)^2 + x^2 = (13)^2$

$x^2 + 14x + 49 + x^2 = 169$

$2x^2 + 14x + 49 = 169$

$2x^2 + 14x - 120 = 0$



T.P

P.T.A

130

P.A

B.B.W

So it would be possible to place pole then real roots

$$b^2 - 4ac = 7^2 - 4 \times 1 \times (-60)$$

$$x^2 + 7x - 60 = 0$$

$$x = \frac{-7 \pm \sqrt{289}}{2}$$

$$\frac{-7 \pm 17}{2}$$

$$x = 5 \text{ or } -12$$

RECAPITULATION →

- ① How to find out the roots of quadratic equation

HOME WORK →

Find the discrimination of equation

$$3x^2 - 2x + \frac{1}{3} = 0$$

find the value roots

Print them . If they are real.

(131)

LESSON No. 12

(130)

Date

Duration of the period 35-40 min

Pupil Teacher's Name

Pupil Teacher's Roll No.

Class X

Average Age of the pupils

Subject Mathematics

Topic Arithmetic Progression

INSTRUCTIONAL →

Learner will be able to solve AP.

Knowledge →

The learner will be able to understand the sum of AP.

Application →

- (1) Definition of AP
- (2) Random no. of problems

Teaching AIDS →

General → chalk, Blackboard, cluster etc.

Instructional Teaching Objective
Chart, roller, board etc.

PREVIOUS Knowledge Testing

P.T.A

P.A

1) What will come after
1, 2, 3 --

Next no will be
4

10, 70, 130 —

190

2) What is an AP

No reply

ANNOUNCEMENT OF TOPIC →

Well student today we will study about "Arithmetic progression",

PRESENTATION →

T.P

P.T.A

P.A

B.B.W

Term what is term.

1, 2, 3, 4 ---

5, 5, 5, 5 ---

each of which number in the list is called a term

no reply

Arithmetic Progression

An arithmetic progression is a list of numbers in which each term is obtained by adding a fixed no. of preceding term except first term.

Student will listen carefully

Pupil Teacher Activity

Pupil Activity

B.B.W

This is define the number called common difference progression

Study with in the Note

Common diff. can be -ve, +ve or zero

$q, q+d, q+2d$
 $q+3d + \dots$
 $AP + \dots$
 $3/2, 1/2, -1/2, 3/2 +$
 $\dots$

Arithmetic Progression
 An A.P. is a list of numbers in which each term is obtained by adding a fixed no to preceding term and does + term.

for

$$3/2, 1/2, -1/2, -3/2, \dots$$

$$a = 3/2$$

$$d = 1/2 - 3/2 = -2/2$$

$$a = -1$$

difference
 (d)

Once we know the number are in A.P.

(133)

(134)

T.P

Pupil Teacher Activity

This is define the number called common difference progression

Common diff. can be $-ve$, $+ve$ or zero

General term of A.P

The general form of A.P is
 $a, a+d, a+2d, a+3d, \dots$

For the AP $3\frac{1}{2}, 1\frac{1}{2}, -1\frac{1}{2}, -3\frac{1}{2}, \dots$

write first term a and the common difference.

(d)

Once we know the number are in A.P

Pupil Activity

B.B.W

Study with in the Note

$a, a+d, a+2d, a+3d, \dots$

A.P. $\dots$

$3\frac{1}{2}, 1\frac{1}{2}, -1\frac{1}{2}, -3\frac{1}{2}, \dots$

$3\frac{1}{2}, 1\frac{1}{2}, -1\frac{1}{2}, -3\frac{1}{2}, \dots$

$$a = 3\frac{1}{2}$$

$$d = 1\frac{1}{2} - 3\frac{1}{2} = -2\frac{1}{2}$$

$$a = -1$$

T.P.	P.T.A.	P.A.	B.B.N.
------	--------	------	--------

Problem

Which of the following number form an A.P. write the next two term.

- (i) 4, 10, 16, 22
- (ii) 1, -1, -3, -5, ...
- (iii) -2, 2, -2, 2, -2, ...
- (iv) 1, 1, 2, 2, 2, 3, 3, 3

we have

$$a_2 - a_1 = 10 - 4 = 6$$
$$a_3 - a_2 = 16 - 10 = 6$$
$$a_4 - a_3 = 22 - 16 = 6$$

4, 10, 16
same

$a_{n+1} = a_n + d$
same the every time so the given list of number form an A.P. with common difference $d = -2$
next two term are
 $-5 + (-2) = -7$
 $-7 + (-2) = -9$

135

134

F.P

P.T.A

P.A

B.B.W

$$(II) a_2 - a_1 = 2(-2) = 4$$

$$(III) a_3 - a_2 =$$

$$\text{As } a_2 - a_1 =$$

given list of
does not
A.P

$$(V) a_2 - a_1 =$$

$$a_3 - a_2 = 1 - 1$$

$$= 0$$

$$a_4 - a_3 = 2 - 1$$

$$= 1$$

Here $a_2 - a_1$

$$\neq a_4 - a_3$$

So the given
of no. does
form of A.P

① 4, 10, 16, 22 -
② 1, -1, -3, -5 -
③ -2, 2, -2, 2, -2 -
④ 1, 1, 1, 2, 2, 2, 3, 3
5 -

$a_3 = a_2 + d$
 $= a + (3-1)d$
 $a_4 = a_3 + d$
 $= a + (4-1)d$

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RECAPITULATION →

- ① What is an A.P
- ② What is the next number
2, 4, 6, 8, ---
- ③ Complete the A.P
2, 4, 6, 8, ---, 12, 16

HOME WORK →

- ① For the difference A.P write the first term and common difference
- ② 3, 1, -1, -3
- ③ $\frac{1}{3}$, 1, $\frac{5}{3}$, $\frac{9}{3}$, $\frac{13}{3}$

137

LESSON No. ...13...

136

Date

Duration of the period... 35-40 min

Pupil Teacher's Name

Pupil Teacher's Roll No.

Class... ~~X~~

Average Age of the pupils... 15

Subject... Mathematics

Topic... Arithmetic Progression

Instructional Objective →

Knowledge → Learner will be able to solve A.P

Understanding →

The learner will be able to understand the sum of A.P

Application →

① Definition of A.P

② Random, number problem solving

Teaching AIDS →

General → Chalk, blackboard, cluster etc

Instructional Teaching Aids →

Chalk, Rollal, board etc.

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PREVIOUS Knowledge TESTING

Pupil Teacher Activity

Pupil Activity

①

What is A.P.

An A.P. is a list of no. in which each term is obtained by adding a fixed no. to the pre. term except 1st term

Announcement of the Topic

We ~~start~~ Student today we will study the nth term of an arithmetic progression

PRESENTATION →

(139)

138

T.P

Pupil Teacher
Activity

Pupil Act
vity

B.B.N

th
sum
of
A.P

Let us consider
the situation
in which Reena
applied for a
job and got
selected. She
has been offered
the job with
new starting
Monthly salary
of Rs 8000,
with an annual
Investment of
Rs 500 what
would be the
monthly salary
for the fifth
year

Student
will copy
the problem

It would be
Rs
(8000 + 500)
8500 Rs

In same way

$$8000 + 500$$
$$Rs 8500$$

140

T.P

Pupil Teacher Activity

Pupil Activity

B.B.W

We can find the monthly salary for the 3rd, 4th and 5th year by adding Rs 500 to the salary of the previous year.

So the salary for the 3rd year

$$= \text{Rs} (8500 + 500)$$

$$= \text{Rs} (8000 + 500 + 500)$$

$$= \text{Rs} (8000 + 2 \times 500)$$

$$= \text{Rs} (8000 + (3-1) \times 500)$$

$$= \text{Rs} 9000$$

Salary for the 4th year

$$\text{Rs} (9000 + 500)$$

$$\text{Rs} (8000 + 3 \times 500)$$

$$\text{Rs} (8000 + (4-1) \times 500)$$

For 3rd year

$$\text{Rs} (8000 + 500)$$

$$= \text{Rs} (8000 + 500 + 500)$$

$$= \text{Rs} (8000 + 2 \times 500)$$

$$= \text{Rs} (8000 + (3-1) \times 500)$$

$$= \text{Rs} 9000$$

For 4th year

$$(9000 + 500)$$

$$(8000 + 500 + 500 + 500)$$

$$= 8000 + 3 \times 500$$

$$\text{Rs} 9000$$

9500

(141)

148

Lupil Teacher Activity

Lupil Activity

B.B.W.

T.P

Rs 9500

For the 5th year
Rs (9500 + 500)

$$= \text{Rs } (8000 + 500 + 500 + 500)$$

$$= \text{Rs } (8000 + (5-1) \times 500)$$

$$= \text{Rs } (10,000)$$

observe that we are getting a list of numbers 8000, 8500, 9000, 9500, 10,000. These numbers are in A.P

Salary for the 15th year

$$= \text{Salary for the 14th year} + \text{Rs } 500$$

$$\text{Rs } (8000 + 500 + 500 + \dots + 500) + 500$$

$$\text{Rs } (8000 + 14 \times 500)$$

$$\text{Rs } 15000$$

is first salary

$$a_2 = a + d = a + (2-1)d$$

8th term

$$9500 + 500$$

$$\text{Rs } 800 + 500 + 500 + 500$$

$$\text{Rs } [8000 + 4 \times 500]$$

$$= \text{Rs } [8000 + (5-1) \times 500]$$

$$= \text{Rs } 10,000$$

AP series

8000, 8500, 9000, 9500, 10,000 and

$$8000 + 500 + 500 + \dots + 500$$

$$= [8000 + 14 \times 500]$$

$$= \text{Rs } 15000$$

$$8000 + 500 + 500$$

$$a_2 = a + d$$

$$= a + (2-1)d$$

142

P.T.A

T.P

$$\begin{array}{|l} a_3 = a_2 + d \\ (a+d) + d \\ a + 2d \end{array}$$

$$a(n-1)d + a$$

RECAPITULATION-

nth term of the A.P. = ?

Home work $\Rightarrow$

Find the 10th term of

the A.P. 2, 7, 12, ...

143

LESSON No. 14

142

Date

Duration of the period 35 - 40 mins

Pupil Teacher's Name

Pupil Teacher's Roll No.

Class X

Average Age of the pupils 15

Subject Mathematics

Topic Arithmetic Progression

Instruction $\Rightarrow$

Knowledge $\Rightarrow$ learner will be able to solve
A.P

UNDERSTANDING $\Rightarrow$ The learner will be able to understand the sum of the A.P

Applications $\Rightarrow$ ① Refination of the A.P
② Random number problem solving

Teaching Aids $\Rightarrow$

General $\Rightarrow$ charts, blackboard, Poster

Instructional Teaching Aids $\Rightarrow$ chart
Roller, board etc

(144)

T.P

Pupil Teacher Activity

Pupil Activity

B.B.W

Determine the

$$a_3 = a + (3-1)d$$

A.P whose 3rd

$$a + 2d$$

$$= 5$$

problem

term is 5 and
7th term is

$$a_7 = a + (7-1)d$$

$$a + 6d$$

$$= 9$$

$$= 9$$

$$a + 2d = 5$$

$$a + 6d = -9$$

$$\underline{\quad\quad\quad}$$
$$-4d = -4$$

$$d = 1$$

$$5 = a + 2$$

$$a = 3$$

$$a = 3$$

$$a = 1$$

Hence, the series

$$A.P =$$

$$3, 4, 6, 7$$

3rd term
 $= 5$
7th term
 $= 9$

145

14

Pupil Teacher
Activity

Pupil Activity

B B W

check whether
301 is the
term of the
list of
no

we have.

$$a_2 - a_1 = 11 - 5 \\ = 6$$

5, 11, 17, 23

$$a_3 - a_2 = 17 - 11 \\ = 6$$

$$a_4 - a_3 = 23 - 17 \\ = 6$$

At $a_{k+1} - a_k$ is
the same for

$k = 1, 2, 3$ etc
the given list
of the no of
the A.P

Now $a = 5$ and $d = 6$

let 301 be the term
 n th term.

5, 11, 17

23, ---

(X46)

T.P

Pupil Teacher Activity

Pupil Activity

B. B. W.

We know that

$$a_n = a + (n-1)d$$

$$301 = 5 + (n-1) \times 6$$

$$301 = 6n - 1$$

$$6n = 302$$

$$n = \frac{302}{6}$$

$$n = \frac{151}{3}$$

But n should be a positive integer. So, 301 is not a term of the given list of number.

Problem

How many two digit numbers are divisible by 3?

The list of two digit numbers divisible by 3 is 12, 15, 18, ..., 99.

This is in A.P

$$a = 12$$

$$a = 15 - 12$$

$$a = 3$$

(147)

(146)

Pupil Teacher Activity

Pupil Activity

B.B.W

$$a_n = a + (n-1)d$$

$$99 + (2 + (n-1))3$$

$$99 - 12 = (n-1)3$$

$$87 = (n-1)3$$

$$\frac{87}{3} = n-1$$

$$n = 29 + 1$$

$$n = 30$$

So there are 30 two digit numbers divisible by 3.

Find the 11th term from the last term of the A.P.

10, 7, 4, ..., -62

there are $a = 10$

$$d = 7 - 10$$

$$= -3$$

$$l = -62$$

$$l = a + (n-1)d$$

$$-62 = 10 + (n-1)(-3)$$

$$-62 = 10 + (n-1)(-3)$$

$$n-1 = 24$$

$$n = 25$$

So there are 25 terms in A.P.

(47)

(146)

T.P

Pupil Teacher Activity

Pupil Activity

B.B.W

Problem

Find the 11th term from the last term of the A.P.

10, 7, 4, ..., -62

$$a_n = a + (n-1)d$$

$$99 + (2 + (n-1) \times 3)$$

$$99 - 12 = (n-1) \times 3$$

$$87 = (n-1) \times 3$$

$$\frac{87}{3} = n-1$$

$$n = 29 + 1$$

$$n = 30$$

So there are 30 two digit numbers divisible by 3.

there are $a = 10$

$$d = 7 - 10$$

$$= -3$$

$$l = -62$$

$$l = a + (n-1)d$$

$$-62 = 10 + (n-1)(-3)$$

$$-62 = 10 + (n-1)(-3)$$

$$n-1 = 24$$

$$n = 25$$

So there are 25 terms in A.P.

RECAPITULATION →

Formula for finding the last term.

Formula for finding the n th term.

How to find out an A.P.

if a series having a different
Common difference then it will
form an A.P or not?

HOME Work →

①

if the 3rd term and 9th term of A.P
are 4 & -8 resp which term of
this A.P = 0

if the 5th term and 11th term of
A.P of $a = 2$ and -8

149

LESSON No. 16

148

Date

Duration of the period 35-40 min

Pupil Teacher's Name Ramani

Pupil Teacher's Roll No.

Class X

Average Age of the pupils 15

Subject Mathematics

Topic Triangle

INSTRUCTIONAL objectives →

Knowledge → Problem related to similarity
Can be done.

Understanding → learner will be able
to solve the A-P triangle.

Application → (i) learner can analyse the
triangle.

(ii) learner can evaluate the facts of triangle

Teaching Aids → Black board, Chalk,
Rallar etc.

Instruction Teaching → A chart with
the fig of triangle.

150

PNY

T.P

Pupil Teacher Activity

Pupil Activity

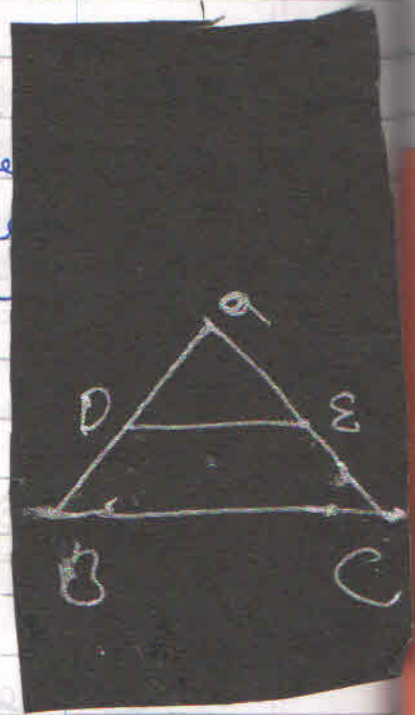
B.B.W

Two triangles
are similar if

their corresponding
sides are equal.

There corresponding sides
are in the
same Ratio

student can
draw a line
parallel to the base
and the
theorem
applies



if a line
is drawn $\parallel$ to
one side of a
triangle to
intersections

We are given
 $\triangle ABC$ in
which

T-P pupil teacher Activity Pupil Activity

line parallel to side

We need to prove that

Similar Triangles

two triangles are similar

Then corresponding angles are equal

② Their corresponding sides are in same ratio



$$\frac{1}{2} (CD \times DC)$$

student down d

student will understand the theorem

To Prove

$$\frac{AD}{DB} = \frac{AE}{EC}$$

$$A_1(ADE) =$$

$$\frac{1}{2} AD \times EN$$

$$A_1(BDE)$$

$$= \frac{1}{2} (DB \times EN)$$

$$A_1(ADE)$$

$$\frac{1}{2} AE \times DM = A_1(DEC)$$

$$\frac{1}{2} EE \times DM$$

$$= \frac{A_1(ADE)}{A_1(BDE)}$$

$$\frac{\frac{1}{2} AD \times EN}{\frac{1}{2} DB \times EN}$$

$$= \frac{AD}{DB}$$

$$= \frac{AD}{DB}$$

$$\frac{A_1(ADE)}{A_1(BDE)}$$

$$= \frac{AE}{EC}$$

7-P Pupil teaches Activity Pupil Activity

line parallel to side

We need to prove that

$$\frac{AD}{DB} = \frac{AE}{EC}$$

$$\frac{1}{2} \times (b \times h)$$

$$= \frac{1}{2} \times AD \times EN$$

$$A_2 (ADE) = \frac{1}{2}$$

$$AD \times EN$$

$$A_2 (BDE) =$$

$$\frac{1}{2} BE$$

and

$$As DEC =$$

$$\frac{1}{2} CD \times DE$$

student down the area

Student will understand the theorem

To Prove

$$\frac{AD}{DB} = \frac{AE}{EC}$$

$$A_2 (ADE) =$$

$$\frac{1}{2} AD \times EN$$

$$A_2 (BDE) =$$

$$\frac{1}{2} (DB \times EN)$$

$$A_2 (ADE) =$$

$$\frac{1}{2} AD \times EN$$

$$\frac{1}{2} EC \times DM$$

$$= \frac{A_2 (ADE)}{A_2 (BDE)}$$

$$\frac{\frac{1}{2} AD \times EN}{\frac{1}{2} DB \times EN}$$

$$= \frac{AD}{DB}$$

$$= \frac{AD}{DB}$$

$$\frac{A_2 (ADE)}{A_2 (BDE)}$$

$$= \frac{AE}{EC}$$

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T.P

Pupil Teacher
Activity

Pupil Activity

S.B.W

Therefore

$$\frac{A_2 (APE)}{A_2 (CBDE)}$$

$$= \frac{\frac{1}{2} AD \times EN}{\frac{1}{2} BD \times EN}$$

$$= \frac{\frac{1}{2} AD \times EN}{\frac{1}{2} BD \times EN}$$

$$\frac{A_2 (APE)}{A_2 (CBDE)} = \frac{AD}{BD}$$

$$\frac{A_2 (APE)}{A_2 (CBDE)} = \frac{AD}{BD}$$

$$\frac{A_2 (APE)}{A_2 (CBDE)} = \frac{AD}{BD}$$

$$\frac{1}{2} \times \frac{AE \times DM}{EC \times DM}$$

$$\frac{1}{2} \times \frac{AE \times DM}{EC \times DM}$$

$$\frac{A_2 (APE)}{A_2 (CBDE)} = \frac{AE}{EC}$$

$\triangle ABE$ and $\triangle CDE$
have same
parallel.

$$\triangle BDE$$

$$\triangle DEC$$

$$\frac{A_2 (ADE)}{A_2 (BDE)}$$

$$\frac{A_2 (ADE)}{A_2 (BDE)}$$

$$\frac{A_2 (ADE)}{A_2 (BDE)}$$

$$\frac{AD}{BD} = \frac{AE}{EC}$$

$$\frac{AD}{BD} = \frac{AE}{EC}$$

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152

Pupil Activity

B.B.W

$$\text{So as } (CBDE) \\ = \text{or } (CDEC)$$

$$\text{But } \underline{ADE} = \\ \text{or } BOC$$

$$\underline{AD} \\ PB$$

$$\text{Also } \underline{ADE} = \\ DEC$$

students will note
in their copies

$$\underline{AE} \\ EC$$

$$\text{Also as } \underline{ADE} = \underline{AE} \\ DEC EC$$

So we can
say that

$$\underline{AD} = \underline{AE} \\ PB EC$$

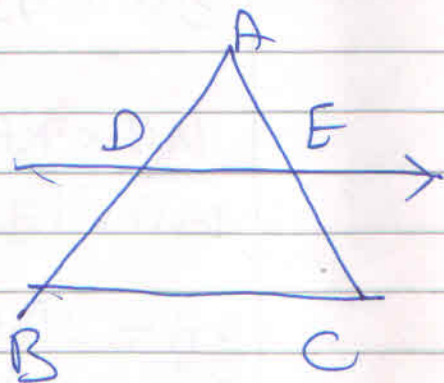
Hence
proved

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RECAPITULATION →

- ① What are similar triangles
- ② Draw shape to explain similar triangles

Home Work →



$$\frac{AD}{AB} = \frac{AE}{AC}$$

155

LESSON No. 18

156

Date.....

Duration of the period..... 35-40 min

Pupil Teacher's Name Kamani

Pupil Teacher's Roll No.

Class..... 8th

Average Age of the pupils..... 15 yrs

Subject..... mathematics

Topic..... Circles

INSTRUCTIONAL →

OBJECTIVE →

Knowledge → About the different condition.

Understanding → To be able to distinguish.

Application → To analyse the facts
(2) To solve the problem related to the circle.

Teaching Aids →

General → Black board chalk, duster, etc.

Instructional Teaching aids →
chart related to figs and theorem of circle

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PREVIOUS knowledge TESTING

PTA

PA

① what is the area of circle

$$\text{Area} = \pi r^2$$

② what is the perimeter

$$\text{Perimeter} = 2\pi R \text{ of a circle}$$

ANNOUNCEment OF the Topic

Today we will study the application of circle.

PRESENTATION →

157

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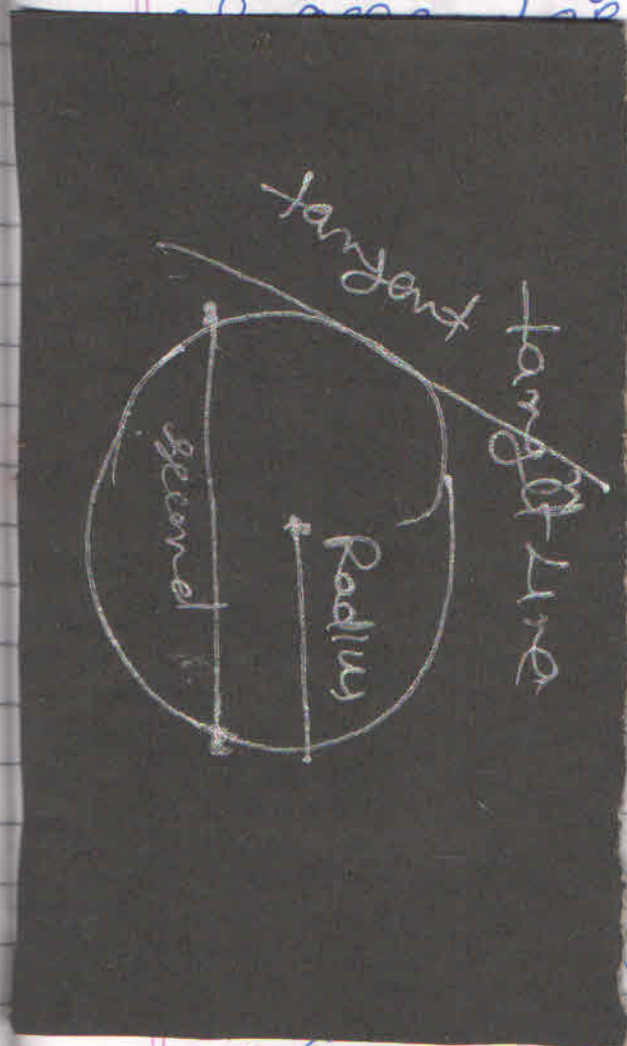
Ng T.P

Pupil Teacher
Activity

Pupil
Activity

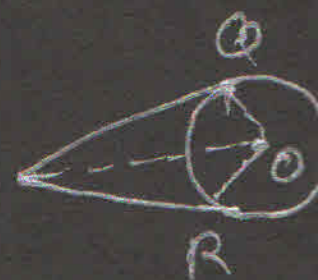
Block
level
work

For this we join



Student
will copy

the theorem
and try to
understand
it



$$OO = OR$$

$$OP = OP$$

$$\Rightarrow \triangle OOP \cong \triangle ORP$$

$$\Rightarrow PO = PR$$

i.e. (the two triangles
are congruent)

(R.H.S)

$$\Rightarrow PO = PR$$

(G.P.C.T)

-P

Pupil Teacher Activity

For this we join OP , OQ and OR , then $\angle OQP$ and $\angle ORP$ are right angles b/w the radius and tangent accor to the theorem. they are right angles. Now in right triangles OQP and ORP

$$OQ = OR$$

Radius of same circle

$$OP = OP \quad (\text{Common})$$

i.e. (the two triangles are congruent)
(R.H.S)

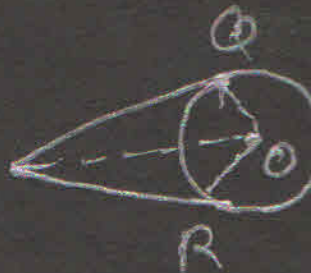
$$\Rightarrow PQ = PR \quad (\text{C.P.C.T})$$

Pupil Activity

Student will copy.

the theorem and try to understand it

Block
board
work



$$OQ = OR$$

$$OP = OP$$

$$\Rightarrow \triangle OQP \cong \triangle ORP$$

$$\Rightarrow PQ = PR$$

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Teaching point

P.T.A

Pupil Activity

B. Board work

Remarks

The theorem can also be proved by pythagoras theorem as follow

$$PO^2 = OP^2 - OO^2$$

$$OP^2 - OR^2$$

$$= PR^2$$

$\Rightarrow (OO = OR)$
which gives

$$PO = PR$$

Note also that

$\angle OPC = \angle OPR$
therefor OR
is angle b/w
 $\angle OPR$.

Question

Two tangent TP and TQ are drawn to a circle with centre

$$\begin{aligned} PO^2 &= OP^2 - OO^2 \\ \Rightarrow OP^2 - OR^2 &= PR^2 \\ \text{As } (OO &= OR) \\ \Rightarrow PO &= PR \end{aligned}$$

159

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T. P

P. T. A

Pupil Activity

B. Borel
work

O form an
exterior
Point T, Prove
that
 $\angle PTC = 2\angle OPC$

$\angle PTC = 2\angle OPC$
to prove Let

$$\angle PTC = 2\angle OPC$$

Now the the sum
length of tangent
drawn from one
exterior point
to a circle are
equal

$$TP = TC$$

So TPC is an
Isosceles Δ

Therefore

$$\angle TPC = \angle TCP = \frac{1}{2}(180 - \angle C)$$

$$90 - \frac{1}{2}\angle C$$

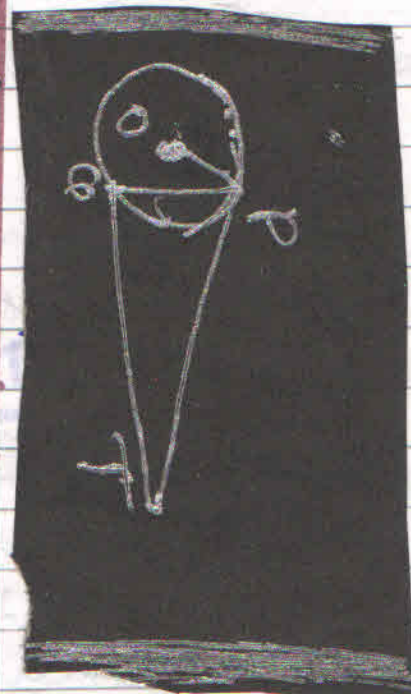
$$\angle OPT = 90$$

$$\angle OPC = \angle OPT - \angle TPC$$

$$\angle OPC = 90 - (90 - \frac{1}{2}\angle C)$$

This gives

$$\angle PTC = 2\angle OPC$$

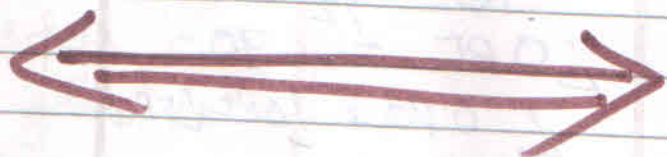


RECAPITULATION →

- (1) What is the tangent of a circle

HOME WORK →

Prove that two concentric circles the chord of the larger circle is bisected at the point of contact



(161)

LESSON No. 19

(162)

Date.....

Duration of the period..... 35-40 min

Pupil Teacher's Name Kamani

Pupil Teacher's Roll No.

Class.....

Average Age of the pupils..... 15 years

Subject..... Mathematics

Topic..... Triangles

Instructional objectives →About the theorem related
trianglesUnderstanding → learner will be
able to learn or understand criteria

Application →

- ① Analyse the facts
- ② Evaluate the facts of similar triangles

Teaching AIDS →

General → Blackboard, Chalk
cluster, pointer

Instructional teaching aids →

A chart figs of similar
D.

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PREVIOUS Knowledge Testing → T.P

P.T.A

What is the condition for a similarity of triangles.

S.A

① Their corresponding angles are equal

② Their corresponding sides are in the same ratio

ANNOUNCEMENT OF The TOPIC

Well today we will study about the criteria for the similarity of triangles.

PRESENTATION →

(163)

(164)

T.P

Pupil Teacher
Activity

$\triangle ABC$ and $\triangle DEF$
if

$$\angle A = \angle D$$

$$\angle B = \angle E$$

$$\angle C = \angle F$$

$$(ii) \frac{AB}{DE} = \frac{BC}{EF} \\ = \frac{CA}{FD}$$

Then the two triangles

of two triangles
corresponding angles
are equal & then
their sides are in
the same ratio

and hence the
two triangles
are similar

This criterion is
referred to as
AA (angle-angle)
criterion of similarity

Pup
Activity



Students
will use
compass
and
ruler
to
construct
these
triangles

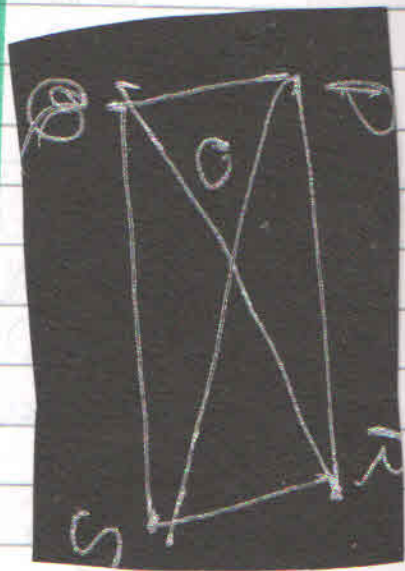
Pupil Teacher Activity

Pupil Activity

B.B.W

This Theorem can be proved by taking two triangles ABC and DEF such that $\angle A = \angle D$, $\angle B = \angle E$ and $\angle C = \angle F$. Cut $DP = AB$ and $DQ = AC$ and join PQ . $\triangle ABC \cong \triangle DPQ$. This gives $\angle B = \angle P = \angle E$ and $PQ \parallel ER$.

Students will listen carefully and note down on their Note work.



Problem

Therefore $\frac{DP}{PE} = \frac{DQ}{QR}$

1-
AB
DE
Sim
AB
DE
an
AB
DE
Prob
m.
g
f
P
Pre
 $\triangle P$

165

$$\text{i.e.} \\ \frac{AB}{DE} = \frac{AC}{DF}$$

similarly

$$\frac{AB}{DE} = \frac{BC}{BF}$$

and so

$$\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$$

Given that

$$PO \parallel RS$$

$$\angle P = \angle S$$

(Alternate angles)

$$\angle O = \angle R$$

(Alternate angles)

Also

$$\angle POO = \angle SOR$$

Vertically
opp = $\angle$'s

Therefore

$$\triangle POO \sim \triangle SOR$$

$\therefore$ two triangles
are similar
by AAA property
of similar.

Problem on the
fig 1f

PO $\parallel$ RS,

Prove that

$$\triangle POO \sim \triangle SOR$$

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RECAPITULATION →

- ① Criteria for similarity of triangles

HOME WORK →

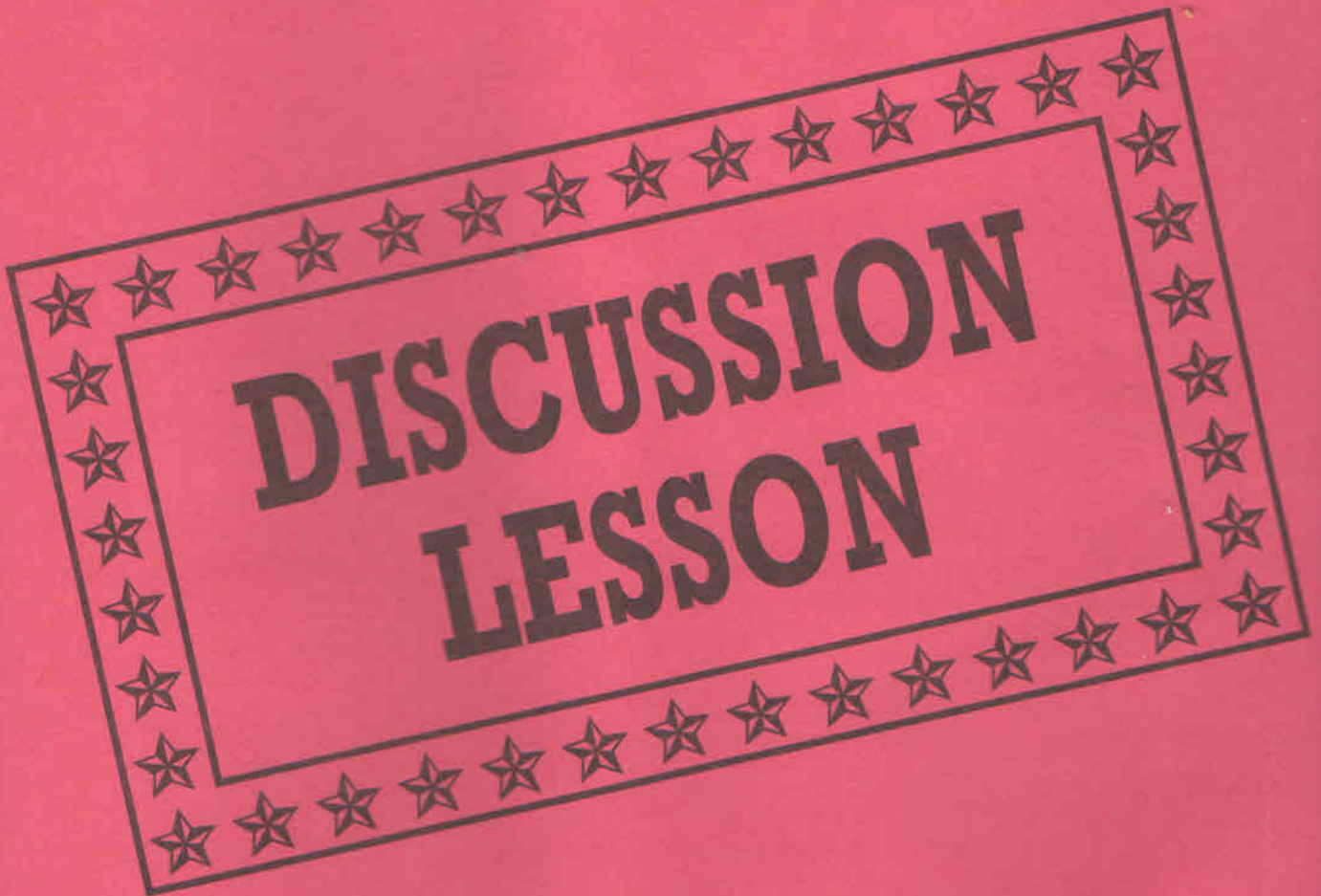
In a triangle the median are given

Prove that

$$\frac{cm}{RN} = \frac{AB}{PQ}$$

167

168



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LESSON No.

169

Date.....

Duration of the period..... 35-40 min.

Pupil Teacher's Name

Pupil Teacher's Roll No.

Class..... X

Average Age of the pupils..... 15

Subject..... Mathematics

Topic..... Quadratic Equation

INSTRUCTIONAL OBJECTIVES →

Knowledge → Learner will be able to solve quadratic equation

Understanding → The learner will be able to understand the nature of roots.

Applications →
① Define Quadratic equation
② Give example related to different roots.

Teaching AIDS →

General → Chalk, black board, duster etc.

Instructional Teaching Aids → chart, roller, board,

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PREVIOUS Knowledge Testing

Pupil Teacher
Activity

Student
Activity

①

What are the
Quadratic
Equation

Equation which
have highest
power

②

Standard form

$$ax^2 + bx + c = 0$$

$$a \neq 0$$

Announcement OF TOPIC

well student today we will
see some application of
Quadratic Equation

PRESENTATION

T. Point

Pupil Teacher
Activity

Student
Activity

Black
Boale

(170)

(170)

T.
PmtPupil Teacher
activityStudent
ActivityBlack
Board

Problem

Find the
roots of quadratic equation

$$6x^2 - x - 2 = 0$$

$$6x^2 - 3x - 4x$$

$$6x^2 - 3x - 4x$$

$$3x(2x+1) = 2(2x+1)$$

$$(3x-2)(2x+1)$$

$$= 6x^2 - x - 2$$

$$(3x-2)(2x+1)$$

$$\Rightarrow (3x-2)(2x+1)$$

$$3x-2 = 0$$

$$2x+1 = 0$$

$$3x = 2 \quad \boxed{x = \frac{2}{3}}$$

$$2x+1 = 0$$

$$2x = -1$$

$$x = -\frac{1}{2}$$

So the roots of
Equation

$$\boxed{x = \frac{2}{3}, -\frac{1}{2}}$$

$$6x^2 - x - 2 = 0$$

$$-2 = 0$$

$$3x^2 - 2x$$

$$+ 2 = 0$$

(171)

T. Point

Pupil's Teacher
Activity

Student
Activity

Black
Board
work

T.
Po

Prob
Lem

Find the
roots of the
quadratic
equation

$$3x^2 - 2\sqrt{3}x + 2 = 0$$

$$3x^2 - 2\sqrt{3}x + 2 = 0$$

$$3x^2 - \sqrt{3}x - \sqrt{3}x + 2 = 0$$

$$\sqrt{3}x(\sqrt{3}x - \sqrt{2})$$

$$\sqrt{3}x(\sqrt{3}x - \sqrt{2}) - \sqrt{2}(\sqrt{3}x - \sqrt{2})$$

∴ So the roots
of equation
are the value
of x for which
which

$$(\sqrt{3}x - \sqrt{2})(\sqrt{3}x - \sqrt{2}) = 0$$

$$\text{No } \sqrt{3}x - \sqrt{2} = 0$$

$$x = \sqrt{2}/3$$

Therefore the roots
of $3x^2 - 2\sqrt{3}x + 2 = 0$

$$\sqrt{2}/3 \text{ and } \sqrt{2}/3$$

Prob
Lem

172

173

T.
Point

Pupil's Task
Activity

Student
Activity

B. Barel
work

Problem

Find the dimension of the play hall where the breadth of the hall is x m & the quadratic equation is

$$2x^2 + x - 300 = 0$$

Then x satisfy the equation
 $2x^2 + x - 300 = 0$
Applying the method of factorization we get

$$2x^2 + x - 300 = 0$$

$$2x^2 - 24x + 25x - 300 = 0$$

$$2x(x - 12) + 25(x - 12) = 0$$

$$(2x + 25)(x - 12) = 0$$

$$2x + 25 = 0$$

$$x - 12 = 0$$

$$2x = \frac{-25}{2} \times 2$$

$$x = -25/2$$

$$x = 12$$

Since x breadth of hall is cannot be negative

$$2x^2 + x - 300 = 0$$

172

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Pupil's Task	Activity	Student Activity	B. Barell work
--------------	----------	------------------	----------------

2b 2em

Find the dimension of the play hall where the breadth of the hall is x m & the quadratic equation is

$$2x^2 + x - 300 = 0$$

Then x satisfy the equation

$$2x^2 + x - 300 = 0$$

Applying the method of factorization

we get

$$2x^2 + x - 300 = 0$$

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$$(2x + 25)(x - 12) = 0$$

$$2x + 25 = 0$$

$$x - 12 = 0$$

$$2x = \frac{-25}{2} \times 2$$

$$x = -25/2$$

$$x = 12$$

Since x breadth of hall is cannot be negative

$2x^2 + x - 300 = 0$
 $(2x + 25)(x - 12) = 0$

(173)

T. Bint

P.T.A

Student
Activity

B.B.
Walk

hence

$$2C = 12$$

breadth of the
project hall
is 12 cm

Problem
2

A motor
boat whose
speed is
 18 km/h
still water
takes 1
hour more
to go 24 km
up stream
than to
return down

Find the
speed
of the
stream.

Let the speed
of the stream
be $x \text{ km/h}$

Therefore, the
speed of the
boat upstream
 $(18 - x) \text{ km/h}$
and speed
of boat
down
 $(18 + x) \text{ km/h}$

The time taken
to go upstream

$$\frac{\text{distance}}{\text{speed}}$$

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T.P

P.T.A

Student Activity

B.B.V

$$\frac{24}{18-x} \text{ hrs}$$

Similarly the time taken to go down stream

$$\frac{24}{18+x} \text{ hrs}$$

$$\frac{24}{18-x} - \frac{24}{18+x} = 1$$

$$24(18+x) - 24(18-x)$$

$$x^2 + 48x - 324 = 0$$

Using the quadratic eq. formula

$$x = \frac{-48 \pm \sqrt{48^2 + 1296}}{2}$$

$$\frac{-48 \pm 60}{2}$$

$$= 6 \text{ or } -54$$

So $x=6$ gives the speed of the stream
km/h

174

175

P

P.T.A

Student Activity

B.B.W

$$\frac{24}{18-x} \text{ hrs}$$

Similarly the time taken to go down stream

$$\frac{24}{18+x} \text{ hrs}$$

$$\frac{24}{18-x} - \frac{24}{18+x} = 1$$

$$24(18+x) - 24(18-x)$$

$$x^2 + 48x - 324 = 0$$

Using the quadratic eq. formula

$$x = \frac{-48 \pm \sqrt{48^2 + 1296}}{2}$$

$$\frac{-48 \pm 60}{2}$$

$$= 6 \text{ or } -54$$

So $x=6$ gives the speed of the stream km/h

PFI 178

RECAPITULATION →

- Q1 What is the quadratic equation formula.
- Q2 Can the length of the Plot be negative
- Q3 Can the roots of the eq. be negative

HOME WORK →

Find the roots of the quadratic equation.

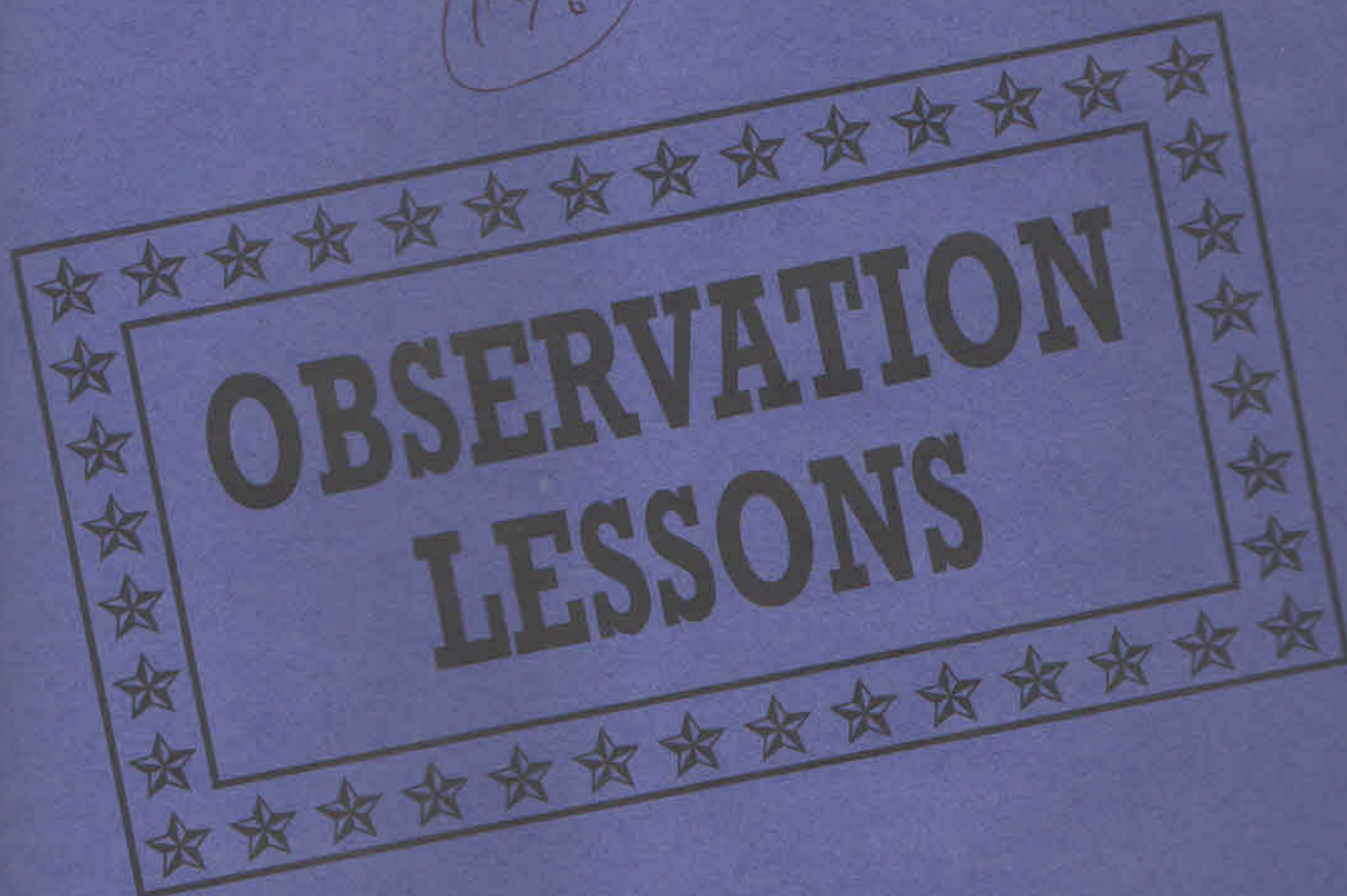
Q1 $2x^2 - 7x + 3 = 0$

Q2 $2x^2 + x + 4 = 0$

177

~~176~~

176



(177)

Observation Lesson No. 1

(179)

Date.....

Duration of the period..... 45 min.

Pupil Teacher's Name.....

Pupil Teacher's Roll No.

Class..... 9th

Average Age of the pupils..... 14+

Subject..... Home Science

Topic..... Cleanliness

- ① Previous Knowledge testing was relevant.
- ② Voice is clear
- ③ Teaching aids was used.
- ④ Blackboard work was satisfactory
- ⑤ Class was taking interest
- ⑥ H.w given.

Kamul

Sign. of Pupil Teacher

Sign. of Supervisor

Observation Lesson No. 2

Date.....

Duration of the period..... 45 min.

Pupil Teacher's Name.....

Pupil Teacher's Roll No.

Class..... 10th

Average Age of the pupils..... 15+

Subject..... Hindi

Topic..... कविता

- ① PIC. testing was relevant
- ② Announce sent of topic is good.
- ③ Blackboard work is satisfactory
- ④ Teaching aids used
- ⑤ Home work is also given

Kamul

Sign. of Pupil Teacher

Sign. of Supervisor

178

Observation Lesson No.

Date.....

Duration of the period.....

Pupil Teacher's Name Sapna Yadav

Pupil Teacher's Roll No. 05

Class VIA

Average Age of the pupils 10th

Subject English

Topic Verb

Previous Knowledge testing is impressive
Good command on topic
Teaching aid used effectively
Black & B work was satisfactory
Home work was given

Kamul

Sign. of Pupil Teacher

Sign. of Supervisor

Observation Lesson No.

Date.....

Duration of the period 45 min

Pupil Teacher's Name.....

Pupil Teacher's Roll No. 21

Class 9th

Average Age of the pupils 14+

Subject Hindi

Topic सर्वोत्तम सपना की याद

PIT was Confident
Class is in discipline
Students are taking interest
Teaching aid was used
Evaluation was done
Home work was given

Kamul

Sign. of Pupil Teacher

Sign. of Supervisor

(179)

Observation Lesson No.

5

(181)

Date.....

Duration of the period..... 45 min

Pupil Teacher's Name.....

Pupil Teacher's Roll No. 63

Class 8th

Average Age of the pupils 13+

Subject S.S.T

Topic Parliament

①
②
③
④
⑤

Blackboard work was good.
Class was in discipline.
Voice is clear.
Teaching aid was used.
Evaluation was also done.

Kennel

Sign. of Pupil Teacher

Sign. of Supervisor

Observation Lesson No. 6

Date.....

Duration of the period..... 45 min

Pupil Teacher's Name.....

Pupil Teacher's Roll No. 08

Class A.A

Average Age of the pupils 10+

Subject Hindi

Topic अक्षरों का प्रयोग

① Previous knowledge testing was relevant.
② Voice of pupil teacher was effective.
③ Black board work is satisfactory.
④ Evaluation was done.
⑤ Home work was given.

Kennel

Sign. of Pupil Teacher

Sign. of Supervisor

(180)

Observation Lesson No. 7

Date.....

Duration of the period..... 45

Pupil Teacher's Name

Pupil Teacher's Roll No.

Class..... 10th

Average Age of the pupils..... 15 +

Subject..... Math

Topic..... Trigonometry

- ①
- ②
- ③
- ④
- ⑤
- ⑥

Black board work was good
children are taking interest
Good command on topic
Voice was clear and effective
Evaluation skill was good.
Home work was given

Kamul

Sign. of Pupil Teacher

Sign. of Supervisor

Observation Lesson No. 8

Date.....

Duration of the period..... 45 min

Pupil Teacher's Name

Pupil Teacher's Roll No.

Class..... 8th

Average Age of the pupils..... 15 +

Subject..... S.S.T

Topic..... Natural Vegetation

- ①
- ②
- ③
- ④
- ⑤
- ⑥

Previous knowledge testing was relevant
Voice of pupil teacher was confident
Teaching aid was used
Evaluation was done
Home work was given

Kamul

Sign. of Pupil Teacher

Sign. of Supervisor

(181)

Observation Lesson No.

9

(183)

Date.....

Duration of the period..... 45 min

Pupil Teacher's Name

Pupil Teacher's Roll No. 10

Class..... 9th

Average Age of the pupils..... 14+

Subject..... S.S.T

Topic..... French Revolution

- (1) Teaching aids was used
- (2) pupil teacher was confident
- (3) Black board work is effective
- (4) explaining skill was good
- (5) Evaluation was done

Kamul

Sign. of Pupil Teacher

Sign. of Supervisor

Observation Lesson No.

10

Date.....

Duration of the period..... 45 min

Pupil Teacher's Name

Pupil Teacher's Roll No. 40

Class..... VI

Average Age of the pupils..... 11+

Subject..... S.S.T

Topic..... Maps

- (1) Previous knowledge testing was good
- (2) good question were asked.
- (3) Black board work good.
- (4) voice of teacher is very clear and confident.
- (5) Student are taking Interest.

Kamul

Sign. of Pupil Teacher

Sign. of Supervisor

(181)

Observation Lesson No. 9

(183)

Date

Duration of the period..... 45 min

Pupil Teacher's Name

Pupil Teacher's Roll No. 10

Class 9th

Average Age of the pupils 14+

Subject S.S.T

Topic French Revolution

Teaching aids was used
pupil teacher was confident
black board work is effective
explaining skill was good
evaluation was done

Kamul

Sign. of Pupil Teacher

Sign. of Supervisor

Observation Lesson No. 10

Date

Duration of the period..... 45 min

Pupil Teacher's Name

Pupil Teacher's Roll No. 40

Class VI

Average Age of the pupils 11+

Subject S.S.T

Topic Maps

Previous knowledge testing was good
good question were asked.
black board work good.
voice of teacher is very clear
and confident.
Students are taking interest.

Kamul

Sign. of Pupil Teacher

Sign. of Supervisor

SCHOOL REPORT

(185)

(182)

CHARACTERISTICS OF THE SCHOOL

- (1) Discipline of school is very good
- (2) Teachers are helpful and co-operative.
- (3) Students are disciplined and obedient.
- (4) Playground is enough in space.
- (5) Principal of the school is co-operative and energetic.

