

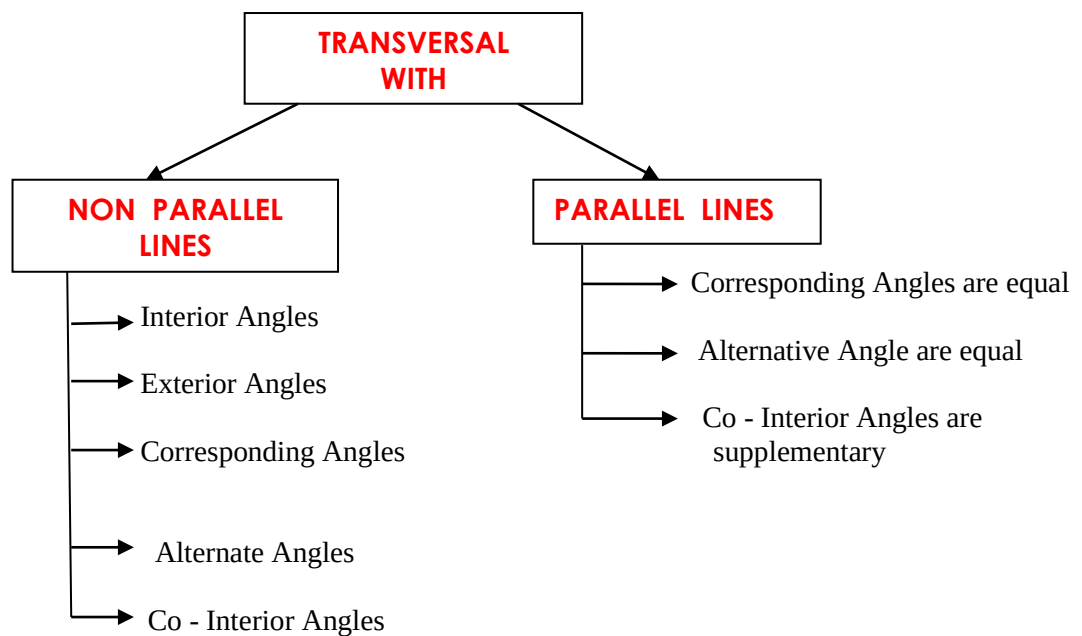
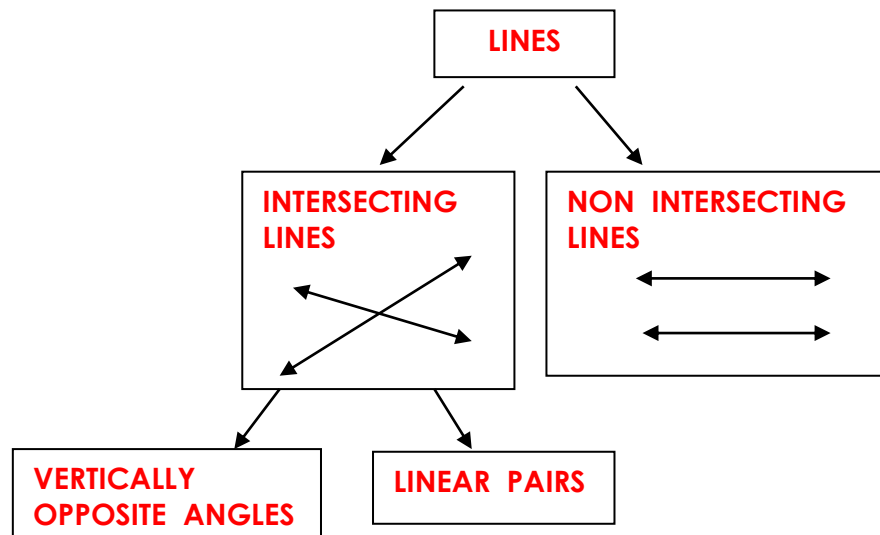
Lesson Plan

2020-2021(CBSE)

Standard : VII		Term : I		Subject : MATHS	
Topic: • Lines and Angles		Sub-topics: • Complementary angles • Supplementary angles • Adjacent angles • Linear pair • Vertically Opposite Angles • Transversal • Angles made by a transversal for non-parallel and parallel lines.			
1. Reference Book(s): • NCERT book of mathematics					
2. Reference Web site(s): www.cbse.nic.in					
3.Technology:					
PPT	1	Video	1	Reference Video https://youtu.be/c0RWBk6wonk	
4. Other Teaching Aids:					
Class work sheet	--	smart class modules	--		

5. Extra:

MIND MAPS



Period 1	Duration: 35 minutes
Sub-topics Related angles: - Complementary angles - Supplementary angles	
Learning outcome(s): - Students will be able to define and identify complementary angles and supplementary angles. - Students will be able to measure the complementary and supplementary angles. - Students will be able to solve and analyze geometrical problems. - Students will be able to draw, define and identify different types of angles.	
Key Vocabulary: Complementary angles – when the sum of the measure of two angles is 90°, the angles are called complementary angles. Supplementary angles - when the sum of the measure of two angles is 180°, the angles are called supplementary angles.	
Skills Developed: understanding, applying	
Opening/set induction	Duration: 5-6 minutes
<u>Opening Strategy(ies)/ Curiosity Questions:</u> Teacher will check the previous knowledge of the students by asking following questions: Q1. What do you mean by a point? Q2. What do you mean by a line?	

Q3. What is a ray?

Q4. What are line segment?

Q5. What do you mean by angle?

Now, teacher will introduce the topic.

Link Statement:

Geometry can be used to model and represent many mathematical and real word situations. This is an important concept to learn because angle is seen in nature, art, many real life applications and us.

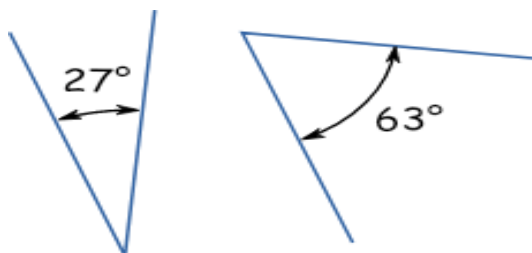
**Instructional
Methodology**

**Duration: 15-18
minutes**

Teaching Strategy (ies): Explanation Discussion:

Tr. explains:

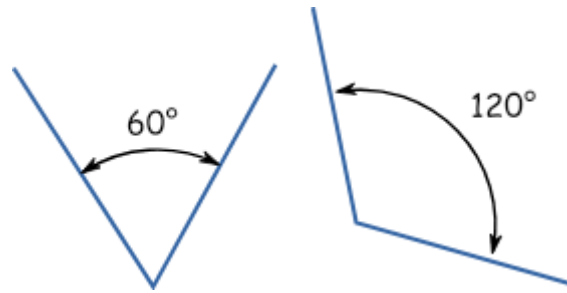
- **Complementary angles** – when the sum of the measure of two angles is 90° , the angles are called complementary angles.



These two angles are complementary.

Whenever two angles are complementary, each angle is said to be complement of the other angle. In these given angles 63° angle is the complement of the 27° angle and vice versa.

- **Supplementary angles** - when the sum of the measure of two angles is 180° , the angles are called supplementary angles.



These two angles are supplementary.

Whenever two angles are supplementary, each angle is said to be supplement of the other angle. In these given angles 60° angle is the supplement of the 120° angle and vice versa.

Closure

Duration: 5 minutes

Closure strategy (ies) : Verification – Think and Answer

1. Can two acute angles be complement to each other?
2. Can two obtuse angles be complement to each other?
3. Can two right angles be complement to each other?
4. Can two acute angles be supplement to each other?
5. Can two obtuse angles be supplement to each other?
6. Can two right angles be complement to each other?

Assignment / To measure the attainment of LO's

- Exercise 5.1 (Q1 to Q 5)

Period 2	Duration: 35 minutes
Sub-topics - Related angles: • Adjacent angles • Linear pair • Intersecting Lines	
Learning outcome(s): • Students will be able to define and identify adjacent angles , linear pair and intersecting lines. • Students will be able to understand intersecting lines. • Students will be able to solve and analyze geometrical problems. • Students will be able to draw, define and identify different types of angles and lines. • Students will be able to solve problems related to adjacent angles and linear pair.	
Key Vocabulary: • Adjacent angles – Adjacent angles have a common vertex and a common arm but no common interior points. • Linear pair – A linear pair is a pair of adjacent angles whose non-common sides are opposite rays. • Intersecting Lines – Two lines intersect if they have a point in common. This common point is called point of intersection.	
Skills Developed: understanding, applying, analyzing, creating	
Opening/set induction	Duration: 5-6 minutes
Opening Strategy(ies)/ Curiosity Questions: Teacher will check the previous knowledge of the students by asking following questions: Q1. What is a line? Q2. What do you mean by parallel lines? Q3. What are perpendicular lines?	

Q4. What is an angle?

Q5. What do you mean by supplementary angles?

Now, teacher will introduce the topic.

Instructional Methodology

**Duration: 15-18
minutes**

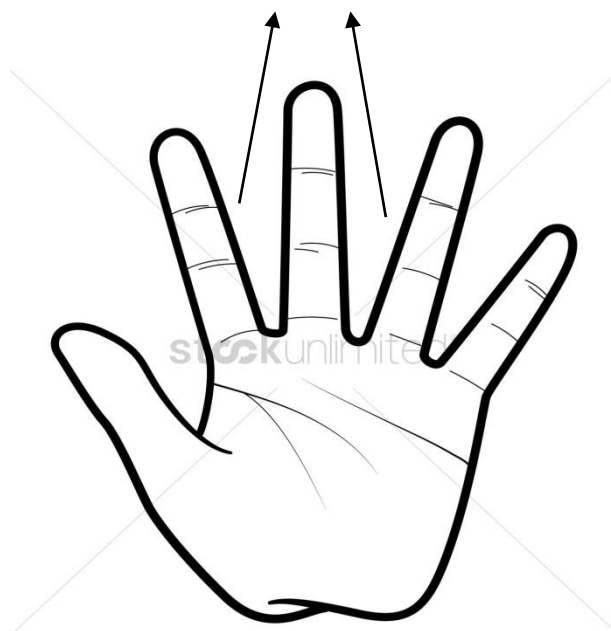
Innovative Explanation of HOTS

Adjacent angles

Teacher will explain the concept of adjacent angles by giving the example of an open hand.

Angle formed between the index finger & middle finger and the angle formed between the middle finger & ring finger are adjacent angles.

Adjacent Angles



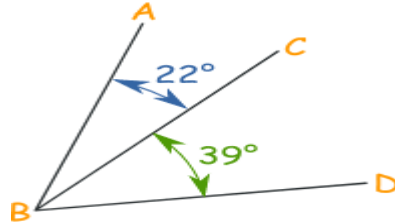
Teaching Strategy (ies): Explanation Discussion:

Tr. explains:

1) **Adjacent angles** – These angles are such that:

- (i) They have a common vertex.
- (ii) They have a common arm and
- (iii) The non common arms are on either side of the common arm.

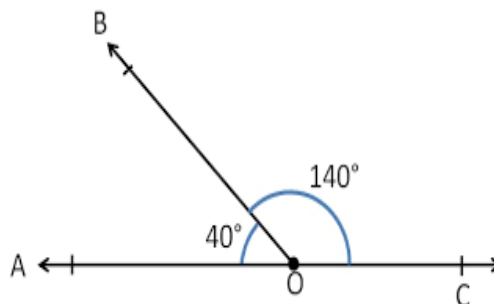
Such pairs of angles are called adjacent angles.



Here, $\angle ABC$ and $\angle CBD$ have a common vertex B , a common arm BC and their non common arms AB and BD are on the either side of BC .

Therefore, $\angle ABC$ and $\angle CBD$ are adjacent angles.

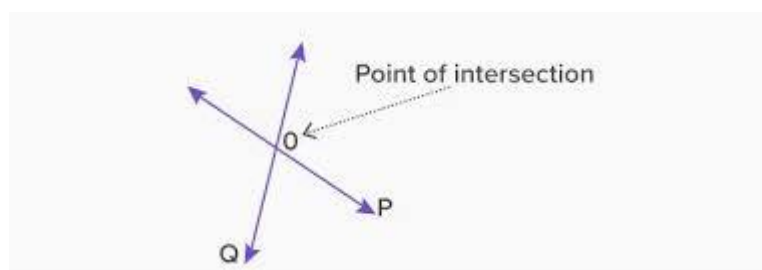
2) **Linear pair** – A linear pair is a pair of adjacent angles whose non-common sides are opposite rays. The angles in a linear pair are supplementary.



Here, angles 40° and 140° are forming a linear pair.

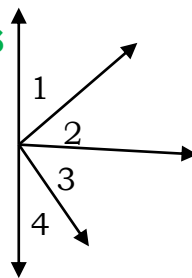
Therefore, $\angle AOB + \angle BOC = 180^\circ$

3) **Intersecting Lines** – Two lines intersect if they have a point in common. This common point is called point of intersection.



Class Assignment: Problem solving questions

- 1) Write any two pairs of adjacent angles.
- 2) Write any two linear pairs.



Closure

**Duration: 5
minutes**

Closure strategy (ies) : Think and Answer

1. Can two adjacent angles be supplementary?
2. Can two adjacent angles be complementary?
3. Can two right angles form a linear pair?
4. Can two obtuse angles be adjacent angles?
5. Can two acute angles form a linear pair?
6. Can two obtuse angles form a linear pair?

Assignment / To measure the attainment of LO's

- Exercise 5.1 (Q6, Q7, Q8)

Period 3	Duration: 35 minutes
Sub-topics - Vertically Opposite Angles - Transversal	
Learning outcome(s): - Students will learn various types of lines recognize them in the natural world. - Students will be able to understand the angles made by the transversal. - Students will develop the ability to understand the identification of angles made by the transversal. - Students will be able to measure the missing value of vertical opposite angle. - Students will be able to apply the knowledge in different situations. - Students will be able to identify and define interior and exterior portion of angles.	
Key Vocabulary: Vertically Opposite Angles - Vertically Opposite Angles are a pair of non-adjacent angles formed when two lines intersect. Transversal – A line that cuts across two or more lines or transversal is a line that intersects two or more lines at distinct points.	
Skills Developed: understanding, applying, analyzing	
Opening/set induction	Duration: 5-6 minutes
Opening Strategy(ies)/ Curiosity Questions: Teacher will check the previous knowledge of the students by asking following questions: Q1. What are intersecting lines.?	

Q2. What do you mean by angles?
Q3. What are adjacent angles?
Q4. Which angles called a linear pair?
Now, teacher will introduce the topic.

Link Statement:

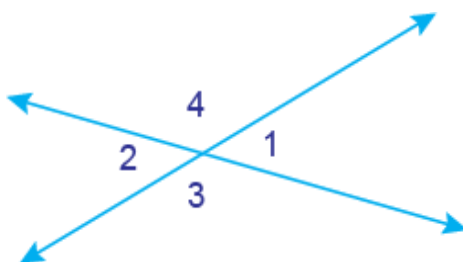
At times, in geometry, the pair of angles is used. There are various kinds of pair of angles, like adjacent angles and linear pair of angles, vertically opposite angle etc. when we see a road crossing two or more roads or a railway line crossing several other lines. These give an idea of a transversal.

Instructional Methodology

Duration: 15-18 minutes

Teaching Strategy (ies): Explanation Tr. explains:

- 1) **Vertically Opposite Angles** - Vertically Opposite Angles are a pair of non-adjacent angles formed when two lines intersect. When two lines intersect, the vertically opposite angles so formed are equal.

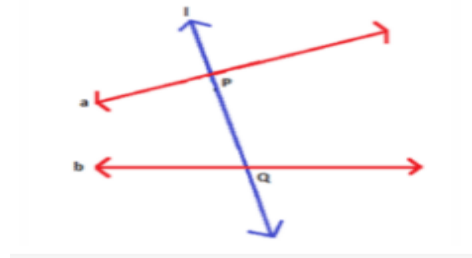


In the figure, two lines are intersecting at a point and the pairs of vertically opposite angles formed are:

($\angle 1$ and $\angle 2$) & ($\angle 3$ and $\angle 4$)

Therefore, $\angle 1 = \angle 2$ and $\angle 3 = \angle 4$

- 2) **Transversal** – A line that cuts across two or more lines or transversal is a line that intersects two or more lines at distinct points.



Here , a and b are two lines and l cuts across given two lines is called transversal.

Innovative Explanation of HOTS

Angles made by a transversal

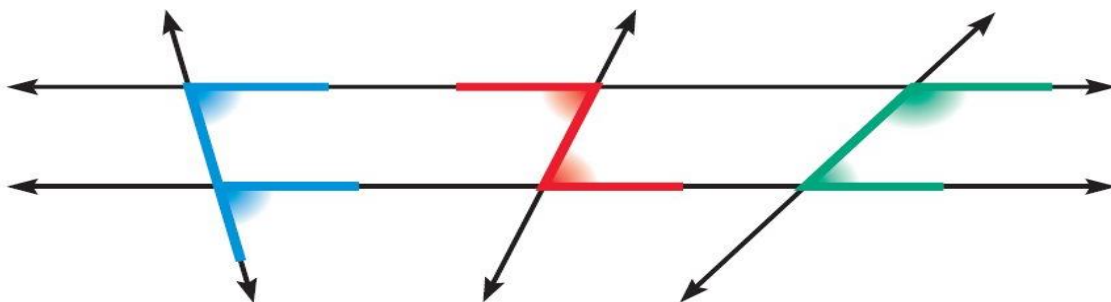
Teacher will explain the concept of corresponding angles, alternate angles, same side interior angles using the letters of English alphabet.

You can use letters of the alphabet to recognize pairs of angles formed by two parallel lines and a transversal.

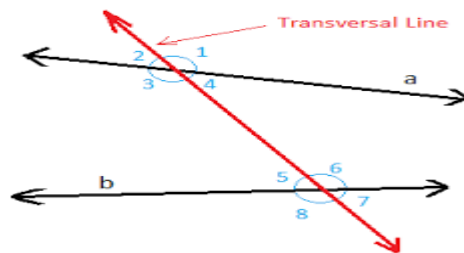
Corresponding angles form an **F**.

Alternate interior angles form a **Z** or an **N**.

Same-side interior angles form a **C**.



Angles made by a transversal

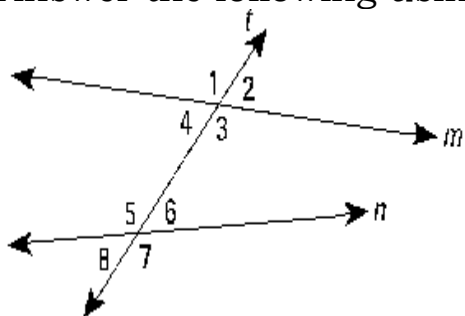


We can see two lines a and b cut by a transversal. The eight angles marked 1 to 8 have their special names.

Interior angle	$\angle 3, \angle 4, \angle 5, \angle 6$
Exterior angle	$\angle 1, \angle 2, \angle 7, \angle 8$
Pairs of corresponding angles	$\angle 2$ and $\angle 5$, $\angle 1$ and $\angle 6$, $\angle 3$ and $\angle 8$, $\angle 4$ and $\angle 7$
Pairs of Alternate interior angles	$\angle 3$ and $\angle 6$, $\angle 4$ and $\angle 5$
Pairs of Alternate exterior angles	$\angle 1$ and $\angle 8$, $\angle 2$ and $\angle 7$
Pairs of interior angles on the same side of transversal	$\angle 3$ and $\angle 5$, $\angle 4$ and $\angle 6$

Class Assignment: Problem solving questions

Answer the following using given figure:



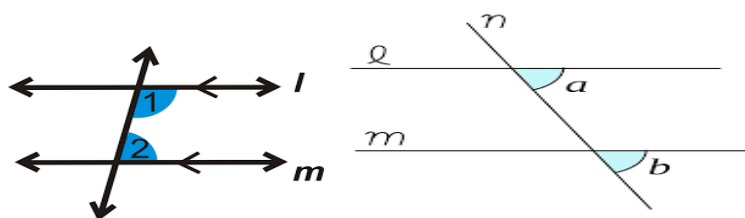
- 1) Name the interior angles
- 2) Name the exterior angles.
- 3) Name the corresponding angles.
- 4) Name the interior alternate angles.

Closure

**Duration: 5
minutes**

Closure strategy (ies) :

- Name the pairs of angles in each figure:



Assignment / To measure the attainment of LO's

- Exercise 5.1 (Q 9 to Q 14)
- Shade the different pairs of angles made by a transversal with different colours.

Sub-topics

- Angles made by a transversal for non-parallel and parallel lines.

Learning outcome(s):

- Students will learn various types of lines recognize them in the natural world.
- Students will be able to find measure of angles using facts about angles made by the transversal.
- Students will be able to use the concept of various angles formed when a transversal intersects two parallel lines and their properties.
- Students will be able to solve complex questions based on the topic.
- Students will be able to apply the knowledge in different situations.
- Students will be able to identify and define interior and exterior portion of angles.

Key Vocabulary:

- **Angles made by a transversal with parallel lines**

If two parallel lines are cut by a transversal, each pair of alternate angles are equal, each pair of corresponding angles are equal and each pair of co-interior angles are supplementary.

- **Checking of parallel lines**

If a pair of alternate angles is equal or a pair of corresponding angles is equal or a pair of co-interior angles is supplementary, then the lines have to be parallel.

Skills Developed: understanding, applying, analyzing

Opening/set induction

Duration: 5-6 minutes

Opening Strategy(ies)/ Curiosity Questions:

Teacher will check the previous knowledge of the students by asking following questions:

Q1. What are interior angles?

Q2. What are exterior angles?

Q3. What alternate angles?

Q4. What are corresponding angles?

Q5. Number of angles made by a transversal?

Now, teacher will introduce the topic.

Link Statement:

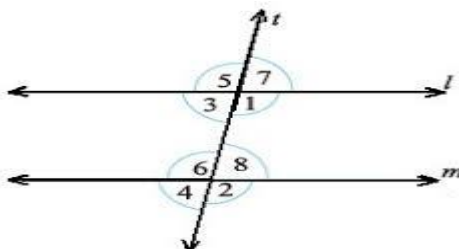
If a transversal intersects two parallel lines, then it give rise to quite interesting results.

Instructional Methodology

Duration: 15-18 minutes

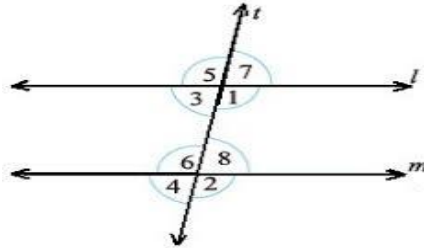
Teaching Strategy (ies): Explanation Discussion:

Transversal of parallel lines



Here, l and m are two parallel lines and line t is transversal. which shows that :

- 1) If two parallel lines are cut by a transversal, each pair of alternate interior angles is equal.



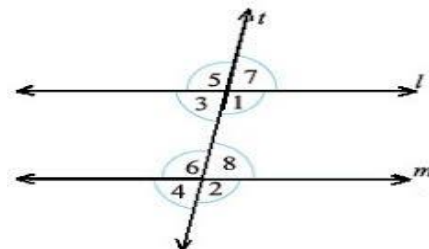
i.e. If $\ell \parallel m$, then $\angle 3 = \angle 8$ and $\angle 1 = \angle 6$

OR

If a transversal intersects two lines such that pairs of alternate interior angles are equal, the lines have to be parallel.

i.e. If $\angle 3 = \angle 8$ and $\angle 1 = \angle 6$, then ℓ is parallel to m

- 2) If two parallel lines are cut by a transversal, each pair of corresponding angles is equal in measure.



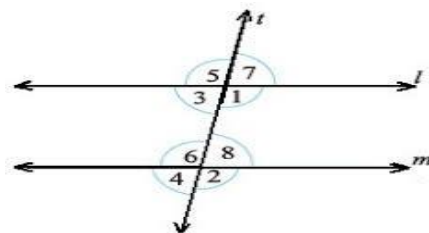
i.e. If $\ell \parallel m$, then $\angle 5 = \angle 6$, $\angle 3 = \angle 4$, $\angle 7 = \angle 8$ and $\angle 1 = \angle 2$

OR

If a transversal intersects two lines such that pairs of corresponding angles are equal, the lines have to be parallel.

i.e. If $\angle 5 = \angle 6$, $\angle 3 = \angle 4$, $\angle 7 = \angle 8$ and $\angle 1 = \angle 2$, then ℓ is parallel to m

3) If two parallel lines are cut by a transversal, each pair of alternate exterior angles is equal.



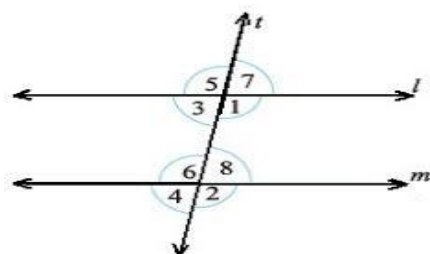
i.e. If $\ell \parallel m$, then $\angle 5 = \angle 2$ and $\angle 7 = \angle 4$

OR

If a transversal intersects two lines such that pairs of alternate exterior angles are equal, then the lines have to be parallel.

i.e. If $\angle 5 = \angle 2$ and $\angle 7 = \angle 4$ then ℓ is parallel to m

4) If two parallel lines cut by a transversal, then each pair of interior angles on the same side of transversal are supplementary.



i.e. If $\ell \parallel m$, then $\angle 3 + \angle 6 = 180^\circ$ and $\angle 1 + \angle 8 = 180^\circ$

OR

If a transversal intersects two lines such that the pairs of interior angles on the same side of transversal are supplementary, then the lines have to be parallel.

i.e. If $\angle 3 + \angle 6 = 180^\circ$ and $\angle 1 + \angle 8 = 180^\circ$, then ℓ is parallel to m

Experiential content:

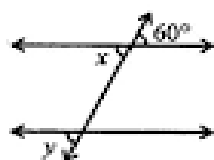
Students would be able to know the importance of geometry in our day to day life. Geometry helps us in deciding what types of shapes are to be used and plays a vital role in the construction works. Parallel lines are of critical importance in landscape design in real life, while laying rail tracks, roads, laying of water supply, sewage lines, sidewalks of roads and the marking on streets. The concepts of angles help to give particular shapes to furniture/fixtures from aesthetic point of view.

Closure

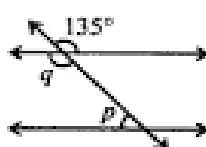
Duration: 5 minutes

Closure strategy (ies) :

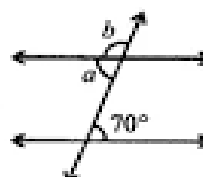
Find the values of variables in the following figures.



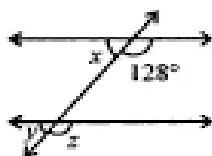
(i)



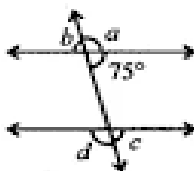
(ii)



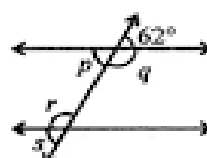
(iii)



(iv)



(v)



(vi)

Math Lab Activity/Art Integration

Verification of the properties of transversal with parallel lines will be done by paper cutting and pasting method.

Assignment/To measure the attainment of LO's

- Exercise 5.2

