



**Class VII: Mathematics**

**CYCLE: 5 (3<sup>rd</sup> August 2021 – 23<sup>rd</sup> August 2021)**

<b>CHAPTER</b>	<b>CH 05: LINES AND ANGLES</b>
<b>BULLET POINTS</b>	<ul style="list-style-type: none"><li>➤ An angle is formed when two lines or rays or line segments meet or intersect.</li><li>➤ When the sum of the measures of two angles is <math>90^\circ</math>, the angles are called complementary angles. Each of them is called complement of the other.</li><li>➤ When the sum of the measures of two angles is <math>180^\circ</math>, the angles are called supplementary angles. Each of them is called supplement of the other.</li><li>➤ Two angles are called adjacent angles, if they have a common vertex and a common arm but no common interior points.</li><li>➤ A linear pair is a pair of adjacent angles whose non-common sides are opposite rays. The angles in a linear pair are supplementary.</li><li>➤ When two lines intersect, two pairs of opposite angles formed is called the vertically opposite angles. They are equal in measure.</li><li>➤ When two lines meet at a point are called intersecting lines and the meeting point is called the point of intersection.</li><li>➤ When two lines drawn on a sheet of paper do no meet, however far produced, are called parallel lines. The symbol '<math>\parallel</math>' is used to denote parallel lines which means “is parallel to”. Eg <math>l \parallel m</math>. The line <math>l</math> is parallel to <math>m</math>.</li><li>➤ When two lines are intersected by a transversal, eight angles are formed. These angles can be classified as 4 interior angles, 4 exterior angles, 4 pairs of corresponding angles, 2 pairs of alternate interior angles, 2 pairs of alternate exterior angles and two pairs of interior angles on the same side of the transversal. • If two parallel lines are intersected by a transversal,<ul style="list-style-type: none"><li>(i) each pair of corresponding angles is equal.</li><li>(ii) each pair of alternate interior angles is equal.</li><li>(iii) each pair of interior angles on the same side of the transversal is supplementary.</li></ul></li></ul>
	<b>CH 06 : THE TRIANGLES AND ITS PROPERTIES</b>
	<ul style="list-style-type: none"><li>➤ A triangle is a simple closed curve made up of three line segments. It has three vertices, three sides and three angles.</li><li>➤ The six elements of a triangle are its three angles and the three sides.</li><li>➤ The line segment which joins a vertex of the triangle to the midpoint of the opposite side is called a median of the triangle. A triangle has 3 medians. All the medians lie wholly in the interior of the triangle.</li><li>➤ The perpendicular line segment from a vertex of the triangle to the opposite side is called an altitude of the triangle. A triangle has 3 altitudes. An altitude may not always lie in the interior of a triangle.</li></ul>

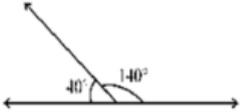
	<ul style="list-style-type: none"> <li>➤ An exterior angle of a triangle is formed, when a side of a triangle is produced.</li> <li>➤ Exterior angle property of a triangle: The measure of an exterior angle of the triangle is equal to the sum of the interior opposite angles.</li> <li>➤ Angle sum property of a triangle: The total measure of the three angles of a triangle is <math>180^\circ</math>.</li> <li>➤ The sum of the lengths of any two sides of a triangle is greater than the length of the third side.</li> <li>➤ The difference of the lengths of any two sides of a triangle is always smaller than the length of the third side.</li> <li>➤ In a right-angled triangle, the side opposite to the right angle is called the hypotenuse and the other two sides are called its legs or arms. The hypotenuse is the longest side in a right triangle.</li> <li>➤ Pythagoras Property: In a right-angled triangle, the square on the hypotenuse is equal to the sum of the squares on its legs.</li> <li>➤ If the Pythagoras property holds, the triangle must be right-angled.</li> </ul>
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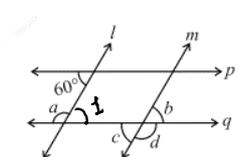
<b>E-book/ Video link</b>	<ol style="list-style-type: none"> <li>1. <a href="https://diksha.gov.in/cbse/explore">https://diksha.gov.in/cbse/explore</a></li> <li>2. <a href="https://www.learncbse.in/ncert-solutions-for-class-7-maths/">https://www.learncbse.in/ncert-solutions-for-class-7-maths/</a></li> <li>3. <a href="http://www.tiwariacademy.com">www.tiwariacademy.com</a></li> <li>4. <a href="http://ncert.nic.in/textbook.php?gemh1=0-15">http://ncert.nic.in/textbook.php?gemh1=0-15</a></li> <li>5. <a href="https://ncert.nic.in/exemplar-problems.php?ln=">https://ncert.nic.in/exemplar-problems.php?ln=</a></li> </ol>
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**DAY WISE PLANNING: CH 05: LINES AND ANGLES**

<b>PERIODS</b>	<b>TOPIC</b>
<b>PERIOD 1</b>	<p>Page no.93-97</p> <p>5.1 Introduction</p> <p>5.2 Related Angles</p> <p>Go through the bullet points and understand complementary and supplementary angles</p> <p><b>Video:</b> Complementary and supplementary angles  <a href="https://diksha.gov.in/play/collection/do_31310347511816192011453?contentId=do_3130394136534876161714">https://diksha.gov.in/play/collection/do_31310347511816192011453?contentId=do_3130394136534876161714</a></p> <p><b>Class Work:</b>            Try these: (Pge no. 95) : Q1 ( i ,ii ), Q2 ( i ,ii ), Q3            Try these: (Pge no. 96) : Q1 ( i ,ii ), Q2 ( i ,ii ), Q3</p> <p><b>HW :</b>            Try these: (Pge no. 95) : Q1 ( iii ,iv ), Q2 ( iii ,iv )            Try these: (Pge no. 96) : Q1 ( iii ,iv ), Q2 ( iii ,iv )</p>

	<p><b>Solution:</b> Q1 (i)  Measures of the two angles are <math>70^\circ</math> and <math>20^\circ</math>.  Sum of the measures of the two angles = <math>70^\circ + 20^\circ = 90^\circ</math>  Therefore, the given pair of angles is complementary.  Q2(i) Solution:  The complement of <math>45^\circ = 90^\circ - 45^\circ = 45^\circ</math>  <b>Solution:</b> Q3(Pg no. 97)  Let the measure of the smaller angle be <math>x</math> (in degree).  Therefore, the measure of the larger angle = <math>x + 44^\circ</math>  A/Q,  <math>x + (x + 44^\circ) = 180^\circ</math> ( since the angles are supplementary)  <math>\Rightarrow 2x = 180^\circ - 44^\circ</math>  <math>\Rightarrow 2x = 136</math>  <math>\Rightarrow x = \frac{136}{2} = 68^\circ</math>  Therefore, the measures of the two angles are <math>68^\circ</math> and <math>(68 + 44) = 112^\circ</math></p>
<p>PERIOD 2</p>	<p>Page no. 97-99  5.2.3 Adjacent Angles  5.2.4 Linear Pair</p> <p><b>Video :</b>  <b>1. Adjacent Angles</b>  <a href="https://diksha.gov.in/play/collection/do_31310347511816192011453?contentId=do_313079672929869824112050">https://diksha.gov.in/play/collection/do_31310347511816192011453?contentId=do_313079672929869824112050</a>  <b>2.Linear Pair</b>  <a href="https://diksha.gov.in/play/collection/do_31310347511816192011453?contentId=do_313079673039110144112051">https://diksha.gov.in/play/collection/do_31310347511816192011453?contentId=do_313079673039110144112051</a></p> <p><b>Class Work:</b>  Try These (page no .97) :Q1 (i,ii,iii,iv,v) and Q2  Try These (page no. 99) Q (i, ii)</p> <p><b>HW:</b> Try These: (Pg. no. 8) Q.1(b, d)  Try These (page no. 99) Q (iii, iv ,v)</p> <p><b>Solution:</b> Q.2</p> <p>(i) Yes, <math>\angle AOB</math> and <math>\angle BOC</math> are adjacent angles since they have a common vertex O, a common arm OB and the non-common arms are on either side of the common arm.</p> <p>(ii) No, <math>\angle BOD</math> and <math>\angle BOC</math> are not adjacent angles since the non-common arms OC and OD are not on either side of the common arm OB</p>

	<p><b>Solution:</b> Try these (pg no.99) (i)</p> <p>Yes, the given pair of angles form a linear pair as they are adjacent angles and also, sum of the angles = <math>40^\circ + 140^\circ = 180^\circ</math></p> <p>Therefore, they are linear pair.</p> 
<p>PERIOD 3</p>	<p>Page no. 100-102 5.2.5 Vertically Opposite Angles Go through the bullet points and understand the properties.</p> <p><b>Video: Vertically opposite angles</b> <a href="https://diksha.gov.in/play/collection/do_31310347511816192011453?contentId=do_313078853627125760111715">https://diksha.gov.in/play/collection/do_31310347511816192011453?contentId=do_313078853627125760111715</a></p> <p><b>Class Work:</b> Try These: (page no.101) Q1 and Q2 Ex5.1 Q1 (i,ii) , Q2 ( i,ii), Q3 ( i,ii,iii) Q4 Solution Q.4: Let the measure of each equal complementary angles be <math>x</math> (in degree) A/Q <math>x + x = 90^\circ</math> <math>\Rightarrow 2x = 90^\circ</math> <math>\Rightarrow x = \frac{90^\circ}{2} = 45^\circ</math> Therefore, the required angle is <math>45^\circ</math>. HW <b>HW:</b> Ex5.1 Q1 (iii), Q2 (iii),Q3 (iv,v,vi) and Q5</p>
<p>PERIOD 4</p>	<p>Page no. 102-103 <b>Class Work:</b> Ex.: 5.1 Q.( 6,7,8,9,12,14) Solution Q12(b): <math>40^\circ + x + 25^\circ = 180^\circ</math> (straight angle) <math>\Rightarrow x + 65^\circ = 180^\circ</math> <math>\Rightarrow x = 180^\circ - 65^\circ</math> <math>\Rightarrow x = 115^\circ</math> Also, <math>40^\circ + y = 180^\circ</math> (linear pair of angles) <math>\Rightarrow y = 180^\circ - 40^\circ</math> <math>\Rightarrow y = 140^\circ</math> And, <math>z = 40^\circ</math> (vertically opposite angles) <b>HW:</b> Ex:5.1 Q.(10,11,13)</p>

<p>PERIOD 5</p>	<p>Page no. 103-108  5.3.1 Intersecting Lines  5.3.2 Transversal  5.3.3 Angles made by a transversal  Go through the bullet points to understand the concept</p> <p><b>Video: 1. Intersecting and parallel lines</b></p> <p><a href="https://diksha.gov.in/play/collection/do_31310347511816192011453?contentId=do_31307885350538444817863">https://diksha.gov.in/play/collection/do_31310347511816192011453?contentId=do_31307885350538444817863</a></p> <p><b>2. Transversal</b></p> <p><a href="https://diksha.gov.in/play/collection/do_31310347511816192011453?contentId=do_31307451446302310418071">https://diksha.gov.in/play/collection/do_31310347511816192011453?contentId=do_31307451446302310418071</a></p> <p><b>3. Angles made by a transversal</b></p> <p><a href="https://diksha.gov.in/play/collection/do_31310347511816192011453?contentId=do_31307885373251584019772">https://diksha.gov.in/play/collection/do_31310347511816192011453?contentId=do_31307885373251584019772</a></p> <p><b>4. Angles made by a transversal on parallel lines</b></p> <p><a href="https://diksha.gov.in/play/collection/do_31310347511816192011453?contentId=do_313079673110929408112052">https://diksha.gov.in/play/collection/do_31310347511816192011453?contentId=do_313079673110929408112052</a></p> <p><b>Class Work:</b></p> <p>Try These (Pg.No.106)</p> <p><b>HW:</b></p> <p>Try These (Pg.No. 105)</p> <p>Do This (Page no. 108)</p>
<p>PERIOD 6</p>	<p>Page no. 109-111  5.3.4 Transversal of parallel lines</p> <p><b>Class Work:</b></p> <p>Try These (Pg. No. 109)</p> <p>Ex.: 5.2 Q1(i,ii,iii), Q3, Q5</p> <p><b>Solution:</b> (Try these Q vi):</p> <p>Lines <math>p \parallel q</math> and <math>l</math> is a transversal</p> <p><math>\therefore \angle a + 60^\circ = 180^\circ</math> (co-interior angles)</p> <p><math>\Rightarrow \angle a = 180^\circ - 60^\circ = 120^\circ</math></p> <p>Also, <math>\angle a + \angle 1 = 180^\circ</math> (Linear Pair)</p> <p><math>\Rightarrow 120^\circ + \angle 1 = 180^\circ</math></p> 

$$\Rightarrow \angle 1 = 180^\circ - 120^\circ = 60^\circ$$

Now, lines  $l \parallel m$  and  $q$  is a transversal

$$\therefore \angle b = \angle 1 = 60^\circ \text{ ( Corresponding angles)}$$

Also,  $\angle c = \angle b = 60^\circ$  ( Vertically opposite angles)

And,  $\angle b + \angle d = 180^\circ$  (Linear Pair)

$$\Rightarrow 60^\circ + \angle d = 180^\circ$$

$$\Rightarrow \angle d = 180^\circ - 60^\circ = 120^\circ$$

Try These (Pg. No. 19)

**HW:**

Ex.:5.2 Q2

## DAY WISE PLANNING:: CH 06: THE TRIANGLE AND ITS PROPERTIES

Page no. 113-114

6.1 Introduction

6.2 Medians of a Triangle

Go through the bullet points and discuss on “what is triangle”, its sides, angles and vertices, classification of a triangle based on its sides and angles and also medians of a triangle

**Video:**

**1. Triangles, its parts and types**

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**2. Medians of a triangle**

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**Class Work:**

Try these Pg no. 113 Q. 1, 2, and 3(i,ii,iii).

Solution: Q.3.

(i) (a) Isosceles triangle (b) Acute angled triangle

(ii) (a) Scalene triangle (b) Right angled triangle

Think, Discuss and Write (Page no. 114)

**HW:**

Try these Pg no. 113 Q. 3(iv,v,vi).

PERIOD 7

<p>PERIOD 8</p>	<p>Page no.115-116          6.3 Altitudes of a Triangle          Go through the bullet points and discuss on “altitudes of a triangle”          Video: <b>Altitudes of a triangle</b>  <a href="https://diksha.gov.in/play/collection/do_31310347511816192011453?contentId=do_31307967385622937618341">https://diksha.gov.in/play/collection/do_31310347511816192011453?contentId=do_31307967385622937618341</a></p> <p><b>Class Work:</b></p> <p>Ex. 6.1 Q. 1, 2, 3</p> <p>Solution: Q1.</p> <p>PM is the altitude; PD is the median and QM is not equal to MR.</p> <p><b>HW:</b>          Think, Discuss and Write (Page no. 115)</p>
<p>PERIOD 9</p>	<p>Page no.116-118          6.4 Exterior Angle of a Triangle and its Property          Go through the bullet points and discuss on the exterior angles of a triangle, its different ways of writing and its property</p> <p>Video: <b>Exterior Angles</b>  <a href="https://diksha.gov.in/play/collection/do_31310347511816192011453?contentId=do_3130394137542819841705">https://diksha.gov.in/play/collection/do_31310347511816192011453?contentId=do_3130394137542819841705</a></p> <p><b>Class Work:</b></p> <p>Try these (Pg.no. 118 ) Q.1,2,3</p> <p><b>Ex: 6.2 Q. Q.1(i, iii, v), Q2(i, iv, vi)</b></p> <p><b>Solution: Q.1</b></p> <p>(i) <math>x = 50^\circ + 70^\circ</math> (Exterior angle property)  <math>\Rightarrow x = 120^\circ</math> (Ans)</p> <p><b>Solution :Q. 2</b></p> <p>(i) <math>x + 50^\circ = 115^\circ</math> (Exterior angle property)  <math>\Rightarrow x = 115^\circ - 50^\circ</math>  <math>\Rightarrow x = 65^\circ</math> (Ans)</p>

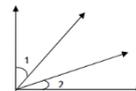
	<p><b>Solution:</b> Try these (pg.no.118) Q.1</p> <p>Let the other interior opposite angle be <math>x</math>(in degree).</p> <p>A/Q,</p> $x + 25^\circ = 70^\circ$ $\Rightarrow x = 70^\circ - 25^\circ$ $\Rightarrow x = 45^\circ \quad (\text{Ans})$ <p><b>HW:</b></p> <p><b>Ex. 6.2:</b> Q.1 (ii, iv, vi), 2(ii, iii, v)</p> <p><b>Think, Discuss and Write</b> (Page no.117 and 118)</p>
<p>PERIOD 10</p>	<p>Page no. 119-121</p> <p>6.5 Angle Sum property of a Triangle</p> <p>Go through the bullet points and discuss on the angle sum property of a triangle.</p> <p><b>Video: Angle sum property of a triangle</b>  <a href="https://diksha.gov.in/play/collection/do_31310347511816192011453?contentId=do_31310505927033651212426">https://diksha.gov.in/play/collection/do_31310347511816192011453?contentId=do_31310505927033651212426</a></p> <p><b>Class Work:</b></p> <p>Ex. 6.3: Q.1(i, iii, v)</p> <p><b>Solution:</b> Q1(i)</p> <p>By angle sum property of a triangle,</p> $m\angle A + 50^\circ + 60^\circ = 180^\circ$ $\Rightarrow x + 110^\circ = 180^\circ$ $\Rightarrow x = 180^\circ - 110^\circ$ $\Rightarrow x = 70^\circ \quad (\text{Ans})$ <p><b>HW:</b></p> <p>Ex.6.3 Q1(ii,iv,vi)</p>
<p>PERIOD 11</p>	<p>Page No. 121-122</p> <p>Continuation with the same property</p> <p><b>Class Work:</b></p> <p>Ex. 6.3 2(i, ii, v,vi )</p> <p>Try these (page no. 122) Q2,3</p>

	<p><b>Solution:</b></p> <p>Let the measure of each equal angle be <math>x</math>(in degree).</p> <p>By angle sum property of a triangle,</p> $x + x + 80^\circ = 180^\circ$ $\Rightarrow 2x = 180^\circ - 80^\circ$ $\Rightarrow x = 100 \div 2$ $\Rightarrow x = 50^\circ$ <p><math>\therefore</math> The measure of each of the equal angles is <math>50^\circ</math>.</p> <p><b>HW:</b></p> <p>Ex. 6.3 2(iii, iv)</p> <p>Try these (page no. 122) Q1</p>
<p>PERIOD 12</p>	<p>Page No. 124- 126</p> <p>6.7 Sum of the lengths of two sides of a Triangle</p> <p>Go through the bullet point and discuss with examples that the sum of the lengths of any two sides of a triangle is greater than the third side.</p> <p><b>Video: Inequality property of a triangle</b></p> <p><a href="https://diksha.gov.in/play/collection/do_31310347511816192011453?contentId=do_31310505995636736012266">https://diksha.gov.in/play/collection/do_31310347511816192011453?contentId=do_31310505995636736012266</a></p> <p><b>Class Work:</b></p> <p>Ex. 6.4 Q1 (i,ii) ,Q2, Q3</p> <p>Solution: Q1(i)</p> $3 + 5 = 8 > 2$ $2 + 5 = 7 > 3$ <p>But, <math>2+3 =5</math></p> <p>Since, the sum of the lengths of any two sides of a triangle is not greater than the third side.</p> <p>Therefore, the triangle is not possible with the given sides.</p> <p><b>HW:</b> Practice Questions</p>

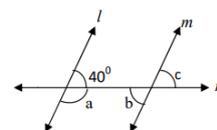
# PRACTICE QUESTIONS

## Chapter 05: Lines and angles

1. What is the maximum number of points of intersection of three lines in a plane?
2. By what other name do we call the pair of angles which are both adjacent and supplementary?
3. Can two acute angles form a pair linear pair of angles? Give reason in support of your answer.
4. Are the angles,  $\angle 1$  and  $\angle 2$  adjacent? Give reason for your answer.

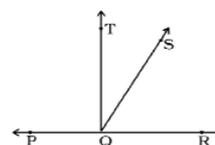


5. Two interior angles on the same side of the transversal measure  $(x - 8)^\circ$  and  $(5x - 4)^\circ$ . Find the measure of each angle.
6. If a transversal intersects two parallel lines, and the difference of two interior angles on the same side of a transversal is  $20^\circ$ , find the angles.
7. Find the measure of the unknown angles in the given figure where  $l \parallel m$

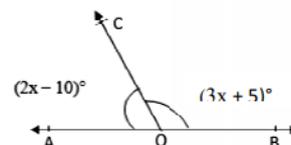


8. In the given figure, P, Q and R are collinear points and  $TQ \perp PR$ , name

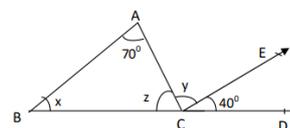
- (a) pair of complementary angles
- (b) two pairs of supplementary angles.
- (c) four pairs of adjacent angles.



9. In the figure, AOB is a straight line and the ray OC stands on it. If  $\angle AOC = (2x - 10)^\circ$  and  $\angle BOC = (3x + 5)^\circ$ , find the value of  $x$ . Also find  $\angle AOC$  and  $\angle BOC$

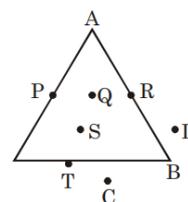
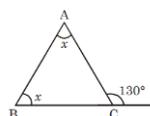


10. In the figure,  $CE \parallel BA$ ,  $\angle BAC = 70^\circ$  and  $\angle ECD = 40^\circ$ . Determine the values of  $x$ ,  $y$  and  $z$ .



## Chapter 06: The Triangle and its Properties

1. What are the points that lie on the given triangle?
2. Write the six elements of  $\triangle ABC$ .
3. In the given figure find the value of  $x$ .
4. Draw all the altitudes and name the location of the point of concurrence of altitudes in an acute angled triangle?
5. Two angles of a triangle are equal and third angle is smaller than others by  $15^\circ$ . Find the angles.
6. Three angles of a triangle are  $(x - 10)^\circ$ ,  $(x + 20)^\circ$ ,  $(2x - 30)^\circ$ . Find each angle.
7. Angles of a triangle are in the ratio 8: 12: 16. Find the angles.
8. Triangle  $ABC$  is an isosceles right triangle. Find all the angles of the triangle.
9.  $AM$  is a median of a triangle  $ABC$ . Is  $AB + BC + CA > 2 AM$ ? Explain with diagram



10. In the given figure find the value of  $a$  and  $b$ .

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