

CLASS – X
LESSON PLAN
CHAPTER-10: CIRCLES

Unit	Geometry (Chapter 10: Circles)
Class Transaction	Total: 7 periods (approx. 40 min each)
Pre-requisite for the course	This lesson requires 1. Basic knowledge of Circle and its radius. 2. Knowledge of diameter and secant. 3. Knowledge of chord and longest chord 4. Knowledge of Minor and Major segment. 5. Knowledge of Minor and Major sector. 6. Knowledge of tangent.
Assessment of qualifying knowledge	1. Written test 2. Lab activity 3. HW notebook
Objective	• Students would be able to differentiate between a tangent and a secant of a circle, critically determine the number of tangents to a circle at any given point, determine the angle between tangents to the circle and the radius through the point of contact in collaboration with others, analyze and establish the relationship between the tangents lengths to a given point from a point outside the circle.
Learning Outcomes	KNOWLEDGE- Students will know and define 1. The meaning of a tangent to a circle. 2. The tangent to a circle is perpendicular to the radius through the point of contact. 3. Number of tangents from a point on a circle. <u>SKILLS AND COMPETENCIES</u> - Students would be able to • Examine and understand the difference between secant and tangents to the circle • Understand that tangent touches the circle at one point. • Find that only one tangent can pass through a point which the circle. • Experiment and find that tangent to any point of a circle is perpendicular to the radius through the point of contact and apply it critically • Analyze that a line drawn through the end of a radius and

	perpendicular to it is a tangent to the circle. • Observe that the tangents drawn from an external point to a circle are equal.
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	<u>Strategies Used :</u> Inductive and Deductive learning, Discussion of Muddiest Point, Inquiry Based Learning (Hands On experimentation) Think Pair and Share: In this activity, students think about a particular question individually, then they form pairs to discuss their answers. Following this, the results are shared in a large classroom discussion. Alternatively, two pairs of students can pair up to compare and discuss answers. This process forces students to think individually, and then allows them to analyze and clarify their response collaboratively. Brain Storming: In this activity, students are asked to generate ideas on a certain topic, category or question while facilitator facilitate and record the answers on the board. Inquiry Based Learning: Inquiry-based learning uses different approaches to learning, including small-group discussion and guided learning. Instead of memorizing facts and material, students learn by doing. This allows them to build knowledge through exploration, experience, and discussion. Inductive and Deductive Learning: In Inductive type students proceed from particular to general statement(example to formula) and in Deductive type students proceed from general to particular. Students are given formula and they solve problems using them. Muddiest Point: Check comprehension and identify confusion, what was most confusing about the material? Transaction would proceed in the following manner- <i>Brain Storming</i>-The class would start with a discussion on what the students have already learnt in the previous classes and hence what is it that they would learn now. They would also be told the significance of the topic that they would be studying. <i>Introduction of the topic</i>- ppt and Digital Content would be shared <i>Guided practice followed by Independent Practice</i>- NCERT questions to be discussed in the classroom. Techniques to be used: Quiz Daily Practice Problem MCQ

	Peer Assessment Case Studies Lab Activities Any Other																				
Resources	Text Book: NCERT text book for Mathematics Reference Book CBSE Exemplar																				
Self Study, Home Work, Assignments	Independent Practice: Students would do the questions in their H.W notebooks as mentioned in the monthly planner. HW notebooks to be marked as per the given plan: <i>Assessment Parameters:</i> The total marks for the activity is 5 marks On time submission.....1 mark Presentation/ Neatness.....1 mark Content.....3 marks It is also advised that the students come to the class with proper background knowledge of the topic under discussion. They can refer to the resources stated above.																				
Assessments	<table> <tr> <td>3 UNIT TESTS (20, 30, 30)</td><td>80 Marks</td></tr> <tr> <td>MID TERM EXAMINATION</td><td>80 Marks</td></tr> <tr> <td>HALF YEARLY EXAMINATION</td><td>80 Marks</td></tr> <tr> <td>PRE BOARD-I EXAMINATION</td><td>80 Marks</td></tr> <tr> <td>PRE BOARD-II EXAMINATION</td><td>80 Marks</td></tr> <tr> <td>ANNUAL BOARD EXAMINATION</td><td>80 Marks</td></tr> </table> PERIODIC TEST Average of the best two tests to be taken that will have a weightage of 10 marks. Best 2 Tests out of: Units tests, Midterm examination, Half Yearly examination. <table> <tr> <td>INTERNAL ASSESSMENT</td><td>20 Marks</td></tr> <tr> <td>• Periodical Test</td><td>10 Marks</td></tr> <tr> <td>• Note Book Submission</td><td>05 Marks</td></tr> <tr> <td>• Lab Practical</td><td>05 Marks</td></tr> </table>	3 UNIT TESTS (20, 30, 30)	80 Marks	MID TERM EXAMINATION	80 Marks	HALF YEARLY EXAMINATION	80 Marks	PRE BOARD-I EXAMINATION	80 Marks	PRE BOARD-II EXAMINATION	80 Marks	ANNUAL BOARD EXAMINATION	80 Marks	INTERNAL ASSESSMENT	20 Marks	• Periodical Test	10 Marks	• Note Book Submission	05 Marks	• Lab Practical	05 Marks
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Addressing Classroom Diversity	Due to various social backgrounds and multiple intelligences, the classroom might be a diverse arena. The following techniques can be used for various groups:																				

	<i>For gifted students:</i> • Encouragement for referring other resources <i>For weak students:</i> • Buddy help to be provided • Provide grade-up and remedial classes <i>For differently abled students:</i> • Ignore spelling mistakes and formulae, if not written • Call parents at regular intervals • Provide grade-up classes
Marks	The weightage would be given by CBSE.
Assessment Questions	• From a point P, two tangents PA and PB are drawn to a circle C (O, r). If $OP = 2r$, then name the type of ΔAPB • If PA and PB are two tangents drawn to a circle with centre O, from an external point P such that $PA = 5\text{cm}$ and $\angle APB = 60^\circ$, then find the length of the chord AB. • Prove that a parallelogram circumscribing a circle is a rhombus. • If radii of the two concentric circles are 15cm and 17cm, then find the length of each chord of one circle which is tangent to one other. • Prove that the perpendicular at the point of contact to the tangent to a circle passes through the centre of the circle

DAY	ONE
Objective	Enhance the ability to accurately recognize terms related to circle such as chord, segment, sector, arc, secant and tangents drawn to a circle
Assessment of qualifying knowledge	Quiz and knowledge testing on terms and parts of a circle.
Learning Outcomes	<u>KNOWLEDGE</u>- <i>Students will know and draw circle showing chord, sector, arc, secant and tangent.</i> <u>SKILLS and COMPETENCIES</u> <i>Students would be able to Reason effectively and critically how to correlate between the lines which are secant or tangent.</i>
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	<u>Strategies Used :</u> Inductive and Deductive learning, Discussion of Muddiest Point Transaction would proceed in the following manner- <u>Anticipatory Set: 10 min</u> Facilitator will ask few questions to introduce the topic • What is a circle ? • What is radius? • What is minor & major arc ? • What is minor & major segment ? • What is diameter • What is a chord? • Which is the longest chord of circle? • What is secant? • What is tangent? <u>Discussion of topic through Collaborative Learning: 15 min</u> <u>Inquiry based learning</u> (Critical Thinking and Problem Solving) Students would be asked to draw the circle and mark chord, sector, arc, secant, segment. <u>Guided practice: 10 min</u> The students will solve the questions from NCERT book, solved examples before Ex 1.1 in their notebook in the class with the help of their facilitator. The facilitator would take rounds and help the students in solving the questions. <u>Independent Practice:</u> Students will go through the solved examples before Ex 1.1 of NCERT text book.

	Closure: 5 min A short oral test would be taken to check proper assimilation of the topic discussed.
Resources	Text Book: NCERT text book for Mathematics Reference Book CBSE Exemplar
Self Study, Home Work, Assignments	Independent Practice: Students would do the given questions in their H.W. notebooks as mentioned by the teacher.
Assessments	Oral Test (5 minutes)
DAY	TWO
Objective	Students will be able to prove that the radius joining the Centre to the point of contact of perpendicular to the tangent, in a collaborative manner.
Assessment of qualifying knowledge	Written questions based on the theorem along conceptual understanding of writing Mathematical Vocabulary.
Learning Outcomes	<u>KNOWLEDGE</u>- <i>Students will know and</i> Demonstrate the ability to calculate the length of tangents drawn from an external point. <u>SKILLS and COMPETENCIES</u>- <i>Students will be able to</i> differentiate and classify secant and tangent and their relation with radius at the point of contact in collaboration with each other.
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	<u>Strategies Used</u> : Brain Storming, Discussion of Muddiest Point Transaction would proceed in the following manner- Recapitulation: 5 min Brainstorming on the previously taught concept would be done. Discussion of topic through Collaborative Learning: 15 min (Critical Thinking, Collaboration) The students will be explained about the various theorems like- - tangent to any point of a circle is perpendicular to the radius through the point of contact. - A line drawn through the end of a radius and perpendicular to it is a tangent to the circle. Guided practice: 15 min The students will solve the questions from NCERT book of Exercise – 10.1 in their notebook in the class with the help of their teacher. The teacher would ensure that each student tries to be independent at the work as well as be under the teacher's guidance. Independent Practice: Students will complete the remaining HW parts given in the monthly planner of Exercise 1.1 in their Math HW

	notebook. Students who would difficulty in solving the problem would solve with the help of their buddies. Closure: 5 min A short oral test would be taken to check proper assimilation of the topic discussed.
Resources	Text Book: NCERT text book for Mathematics Reference Book CBSE Exemplar
Self Study, Home Work, Assignments	Independent Practice: Students would do the given questions in their H.W. notebooks as mentioned by the teacher.
Assessments	Oral quiz (5 minutes)
DAY	THREE
Objective	Students will be able to use the theorem that the line containing the radius through the point of contact is also sometimes referred as 'normal' to the circle at the point and solve Ex- 1.1 in collaborative manner.
Assessment of qualifying knowledge	Written test on identifying and using theorem to calculate the distance of the tangent or length of the tangent.
Learning Outcomes	KNOWLEDGE- <i>Students will develop the ability to understand the</i> Use of theorem to calculate the lengths of tangents drawn to circle.. SKILLS and COMPETENCIES - <i>Students would be able to critically apply the concepts in given situations collaboratively.</i>
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	Strategies Used : Brain Storming, Discussion of Muddiest Point Transaction would proceed in the following manner- Recapitulation: 5 min Oral test on the previous concept would be taken up. Discussion of topic through Collaborative Learning: 15 min (Critical thinking) Exercise 10.1 would be discussed and students would solve different questions per group and then the questions would be crosschecked. Digital content would be used. The facilitator would take rounds and help students with their doubts. Guided Practice: 15 min The students will solve the questions from NCERT book of Exercise – 10.1 in their notebook in the class with the help of their teacher. The teacher would ensure that each student tries to be independent at the work as well as be under the teacher's guidance.

	Independent Practice: Students will complete the remaining HW parts given in Exercise 10.1 in their Math HW notebook. Closure: 5 min A short oral test would be taken to check proper assimilation of the topic discussed.
Resources	Text Book: NCERT text book for Mathematics Reference Book CBSE Exemplar
Self Study, Home Work, Assignments	Independent Practice: Students would do the given questions in their H.W. notebooks as mentioned in the NCERT.
Assessments	MCQ (5 minutes)
DAY	FOUR
Objective	To understand the theorem that the lengths of tangents drawn from an external point to a circle are equal and various other parts corresponding to it.
Assessment of qualifying knowledge	Written test on identifying whether the given number is rational or irrational.
Learning Outcomes	<u>Strategies Used :</u> Think pair and Share, Discussion of Muddiest Point <u>KNOWLEDGE-</u> <i>Students will develop the ability to understand the fact that if two tangents are drawn from an external point to circle then-</i> <i>1. They are equal in length.</i> <i>2. They subtend equal angle at the centre</i> <u>SKILLS and COMPETENCIES</u> - <i>Students would be able to</i> <i>1. Critically analyse the congruent triangles made with tangents and radii of circle and collaboratively realize the fact that these tangents subtend equal angle at the centre and making cyclic quadrilateral.</i> <i>2. Comprehend the problems that involve that they are equally inclined to the line joining the centre to the point.</i>
Transaction Methodology (The teacher can use the mentioned techniques, wherever	<u>Strategies Used :</u> Discussion of Muddiest Point Transaction would proceed in the following manner- Recapitulation: 5 min Quick revision on the previous concept would be taken up. Discussion of topic through Collaborative Learning: 15 min

applicable, and can use any other too.)	(Creativity, Collaboration) Simple everyday equipment like geometry box and graph sheet can be used by students to draw circles and tangents to them and realize that the lengths of the two tangents are equal. They can also apply trigonometric concepts to prove certain properties and realize their importance and application. Other equipment like Geo Boards are highly effective here. This would be discussed in detail with vivid examples. Guided Practice: 15 min The students will solve the questions from NCERT book, solved examples before Ex 10.2 in their notebook in the class with the help of their facilitator. The facilitator would take rounds and help the students in solving the questions. Independent Practice: Students will find various ways of representing factors in view of statement of theorem. Closure: 5 min Discussion of muddiest point. .
Resources	Text Book: NCERT text book for Mathematics Reference Book CBSE Exemplar
Self Study, Home Work, Assignments	Independent Practice: Students would do the given questions in their H.W. notebooks as directed by the teacher.
Assessments	Written test (5 minutes)
DAY	FIVE
Objective	To use the concept of tangents to solve Ex-10.2
Assessment of qualifying knowledge	MCQ on lengths of tangents, angle of inclination and supplementary angles.
Learning Outcomes	<u>KNOWLEDGE</u>- To understand the use of concept of tangents from external points, angle of inclination between them and tangents forming cyclic quadrilateral. <u>SKILLS and COMPETENCIES</u> - <i>Students would be able to</i> Comprehend the given situation in statement problems to analyse and calculate through collaborative leaning process.
Transaction Methodology (The teacher can use the mentioned techniques,	<u>Strategies Used</u> : Brain storming, Discussion of Muddiest Point Transaction would proceed in the following manner- Recapitulation: 5 min Quick revision on the previous concept would be taken up.

wherever applicable, and can use any other too.)	Discussion of topic through Collaborative Learning: <u>15 min</u> (Critical Thinking, Collaboration) Various problems involving circles and triangles and quadrilaterals inscribing each other would be discussed which involve the usage of the theorem. This would be discussed in detail with vivid examples. Guided Practice: <u>15 min</u> The students will solve the questions from NCERT book, solved examples before Ex 10.2 in their notebook in the class with the help of their facilitator. The facilitator would take rounds and help the students in solving the questions. Independent Practice: Students will practice questions from Ex 10.2 Closure: <u>5 min</u> Discussion of muddiest point. .
Resources	Text Book: NCERT text book for Mathematics Reference Book CBSE Exemplar
Self Study, Home Work, Assignments	Independent Practice: Students would do the given questions in their H.W. notebooks as mentioned in the monthly planner.
Assessments	MCQ (5 minutes)
DAY	SIX
Objective	Using concept of tangents from external point Solve Exercise 10.2
Assessment of qualifying knowledge	Written test
Learning Outcomes	<u>KNOWLEDGE</u>- <i>Students will know and understand</i> 1. Types of circles circumscribing and inscribing the quadrilaterals and triangles. <u>SKILLS and COMPETENCIES</u> - <i>Students would be able to</i> 1. Apply the given knowledge with 100 % accuracy 2. Critically analyse the situation in the form of given problems and differentiate whether Circle is inscribed or circumscribed.
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	<u>Strategies Used</u> : Inductive and Deductive learning, Discussion of Muddiest Point Transaction would proceed in the following manner- <u>Recapitulation: 5 min</u> Oral test would be taken. Discussion of topic through Collaborative Learning: <u>15 min</u> (Critical Thinking)

	How to analyse the given the situation in the form of given problems and differentiate whether Circle is inscribed or circumscribed Guided Practice: <u>15 min</u> The students will solve the questions from NCERT book of Exercise – 10.2 in their notebook in the class with the help of their facilitator. Independent Practice: Students will complete the remaining HW parts of Exercise 10.2 in their Math HW notebook. Closure: <u>5 min</u> Summarization, preferably by a student, would be taken to check proper assimilation of the topic discussed. .
Resources	Text Book: NCERT text book for Mathematics Reference Book CBSE Exemplar
Self Study, Home Work, Assignments	Independent Practice: Students would do the given questions in their H.W. notebooks as mentioned in the exercise.
Assessments	Written test (5 minutes)
DAY	SEVEN
Objective	To solve the questions from NCERT book of Exercise – 10.2
Assessment of qualifying knowledge	Written test
Learning Outcomes	<u>KNOWLEDGE</u>- <i>Students will know and understand</i> How to apply the concepts of tangents to various inscribed and circumscribed circles. <u>SKILLS and COMPETENCIES</u> - <i>Students would be able to critically analyze situations in which various properties of circles are to be used.</i>
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	<u>Strategies Used</u> : Brain storming ,Think pair share Transaction would proceed in the following manner- Recapitulation: <u>5 min</u> Warming session would be taken. Discussion of topic through Collaborative Learning: <u>15 min</u> (Critical thinking, communication) Solved examples from the book would be taken up. Brainstorming on situation of tangents being formed in given figures. Guided Practice: <u>20 min</u>

	The students will solve the questions from NCERT book of Exercise – 10.2 in their notebook in the class with the help of their facilitator. The facilitator would explain the questions from Ex 10.2 with a collaborative approach towards them. Independent Practice: Students will complete the remaining HW parts given in the monthly planner of Exercise 10.2 in their Math HW notebook. Closure: <u>5 min</u> Summarization, preferably by a student, would be taken to check proper assimilation of the topic discussed. .
Resources	Text Book: NCERT text book for Mathematics Reference Book CBSE Exemplar
Self Study, Home Work, Assignments	Independent Practice: Students would do the given questions in their H.W. notebooks as mentioned in the NCERT.
Assessments	Written test (5 minutes)