

Brief Description (Objective): The student will be able to conclude that if the sum of a pair of opposite angles in a quadrilateral is 180, the quadrilateral is cyclic.

Teaching Aids Provided: NA

Notes to the Teacher: The teacher may use this TRD to interactively guide the students to arrive at the conclusion.

What is the main property of a cyclic quadrilateral?

The sum of either pair of opposite angles of a cyclic quadrilateral is 180 degrees.

Let us now try to prove the converse of the above statement.

Theorem:

If the sum of a pair of opposite angles in a quadrilateral is 180, the quadrilateral is cyclic.

Given:

A quadrilateral PQRS in which $\angle Q + \angle S = 180^\circ$

To Prove:

PQRS is a cyclic quadrilateral

Figure:

Let us assume that PQRS is not cyclic.

We know that it is possible to have a unique circle passing through non-collinear points P, Q and R.

As we have assumed that PQRS is not cyclic, this circle will not pass through S. There are two cases:

Case 1: The point S lies outside the circle.

Case 2: The point S lies inside the circle.

Let this circle meet RS or RS produced at S'. Join S'S.

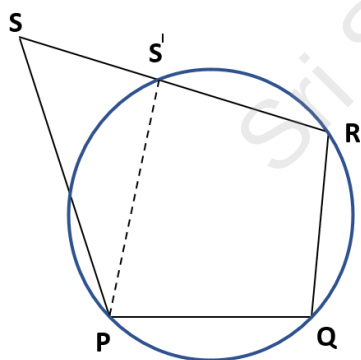


Fig: Case 1

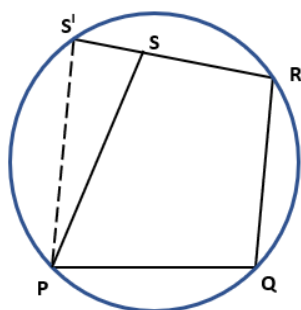


Fig: Case 2

Proof:

$$\angle PQR + \angle PSR = 180^\circ \text{ [Given]}$$

$$\angle PQR + \angle PS'R = 180^\circ \text{ [Opposite angles of a cyclic quadrilateral]}$$

$$\therefore \angle PQR + \angle PSR = \angle PQR + \angle PS'R$$

$$\Rightarrow \angle PSR = \angle PS'R$$

This is not possible since the exterior angle of a triangle can never be equal to its interior opposite angle.

[Notes to the teacher: The teacher may elicit from the students that in case 1, $\angle PSR$ is the interior angle of the triangle and $\angle PS'R$ is the exterior angle. In case 2, $\angle PS'R$ is the interior angle of the triangle and $\angle PSR$ is the exterior angle.]

$\angle PSR = \angle PS'R$ is possible only when S' coincides with S .

Hence the circle passing through P , Q and R must pass through S also.

Hence, $PQRS$ is a cyclic quadrilateral.

Sri Sathya Sai Central Trust



Sri Sathya Sai
VIDYA VAHINI
श्री सत्यसाई विद्या वाहिनी

Sri Sathya Sai Central Trust

Annexure to Master Lesson Plan

What is the purpose of this Master lesson Plan?	This Master Lesson Plan (MLP) prepared by Sri Sathya Sai Vidya Vahini (SSSVV), covers the entire chapter for the given board. The MLP for the chapter given in the textbook is broken down into smaller modules known as assets. Any chapter can be taught using the 7 asset types in SSSVV methodology. Several different assets together complete the entire chapter. Depending on the requirement, each asset is supported by teaching aids such as animated presentation, audio, video, and learning aids such as worksheets. The MLP is for the teacher's preparation and the teaching aids are for use in the classroom.
How to use it?	You can prepare for your class with this MLP by following 3 simple steps: 1. Read your textbook; 2. Go through the information given in the assets (document & multimedia); 3. Prepare your teaching notes. Great! Now you are ready to transact the chapter.
Duration	Kindly note the duration given for each asset. Due care has been taken in planning the assets, to ensure the chapter is completed within the time specified by the Board. Note: Preparation time is not included in the asset duration. The teaching time depends on the duration of the teaching aids and is not impacted by the length of the MLP.
What is a 'Main Script' (MS) Asset?	The Main Script asset is there for explaining the main concepts of the chapter clearly. The information given in the textbook is simplified, organised and structured to give more clarity. Additionally, you may find a video or mnemonics or a graphic organiser to deepen the understanding of the concept.
How to teach using the MS asset?	Please use the blackboard, slides and interaction to develop the concept.
What is an 'Inquisitive Questions' (IQ) asset?	The Inquisitive Questions asset uses questions to promote higher order thinking like the n th why, what-if, new perspectives, cause-effect, and others, creating curiosity.
How to teach using the IQ asset?	You may use the questions to connect with the students, encourage exploration to engage them in the learning process. You may allow multiple responses and instead of rejecting any of the responses, ask why, before revealing the suggested answer or hints.
What is a 'Day to day Relevance' (DD) Asset?	The Day to Day Relevance asset helps students understand the practical relevance of every topic, making them eager participants in the classroom. If students connect the concepts to their environment, they would learn meaningfully without dislike or simply memorizing for exams.
How to teach using the DD	You may use the asset by asking questions about their experience and use it to establish why they are learning the topic. If necessary you may substitute with a

asset?	recent or local example.
What is an 'Interesting Aside' (IA) asset?	The Interesting Aside asset uses attention grabbing tidbits or anecdotes to bring joy and satisfy the child's hunger to know more. This is a quick/short asset intended to bring attention back to the main concept being taught.
How to teach using the IA asset?	You may use this asset to give a piece of interesting information relevant to the topic, without prolonged explanation/discussion. You may suggest appropriate books for further reading.
What is a 'Suggested Activity' (SA) Asset?	The Suggested Activity asset provides a detailed step by step procedure for the teacher to conduct a hands-on activity. This promotes Activity Based Learning.
How to teach using the SA asset?	You may use this asset to energise your students to learn by doing simple, fun-filled activities based on the topic. The asset includes - preparation, activity, and follow-up. You may engage the students in the preparation and follow-up stages to develop collaboration and responsibility. You could try it once, yourself, before the actual delivery to be more comfortable with it. Note: The duration mentioned in the asset is usually for the activity part only.
What is a 'Value Content' (VC) Asset?	The Value Content asset integrates Universal Human Values (such as empathy, inclusivity, respect for nature that translates into responsible behaviour) seamlessly into the curriculum, as the "End of education is character".
How to teach using the VC asset?	You may use this asset to engage with the students to bring out their innate values and connect with the intrinsic values in the topic/concept. The asset includes pointers on the specific pedagogical technique followed.
What is a 'Questions to Assess' (QA) asset?	The Questions to Assess asset uses an interactive approach to check learning of different types of learners, and provides feedback to the teacher for appropriate action. The questions cater to all the levels of Bloom's Taxonomy. Questions from 'Apply' level and above enable students to reflect on their learning.
How to teach using the QA asset?	You may go through the slides to understand its flow and know when to click for the answer (slides include suggested answers). While presenting in the class, you may display the question and encourage multiple responses, before revealing the answer. In some cases, this asset may include extra questions/worksheet that can be given as homework.