



QA LA Solve using Mid-point theorem

- 1) If the perimeter of $\triangle ABC$ is 20 cms, find the perimeter of the triangle obtained by joining the midpoints of sides of $\triangle ABC$

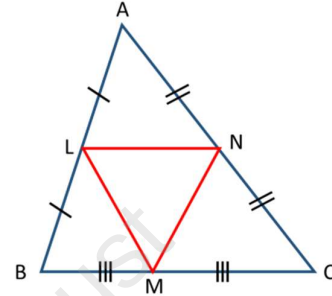
Solution:

Given: The perimeter of $\triangle ABC$ is 20 cms

To find the perimeter of $\triangle LMN$ where L, M, N are the midpoints of AB, BC AC respectively.

We have $LM = \frac{1}{2} AC$, $MN = \frac{1}{2} AB$ and $LN = \frac{1}{2} BC$ using mid-point theorem

$$\text{Perimeter of } \triangle LMN = LM + MN + LN = \frac{1}{2} (AC + AB + BC) = \frac{1}{2} \times 20 = 10 \text{ cms}$$



- 2) In $\triangle PQR$, PM is the median through P. A line through M and parallel to PQ meets PR at N. Prove that QN is a median of $\triangle PQR$.

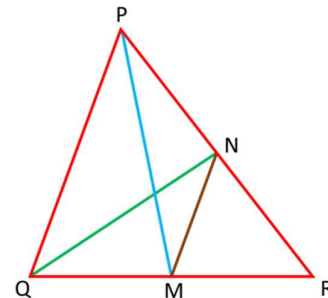
Solution:

Given: PM is the median of $\triangle PQR$

Thus, M is the midpoint of QR

In $\triangle PQR$, the line MN, through midpoint M of QR and parallel to the side PQ, bisects the third side PR. (using converse of mid-point theorem)

Thus, N is the midpoint of side PR and QN is a median of PQR



- 3) In $\triangle PQR$, points L and M on sides PQ, PR are taken such that $PL = \frac{1}{4} PQ$ and $PM = \frac{1}{4} PR$. Prove that $LM = \frac{1}{4} QR$.

Solution:

Given: In $\triangle PQR$, $PL = \frac{1}{4} PQ$ and $PM = \frac{1}{4} PR$

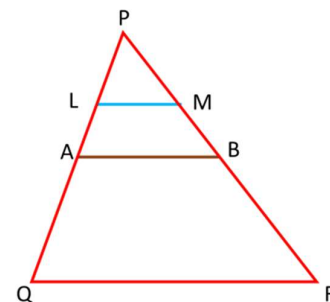
To prove: $LM = \frac{1}{4} QR$

Construction: Join midpoints A, B of PQ, PR respectively.

Proof: Applying mid-point theorem in $\triangle PQR$, $AB = \frac{1}{2} QR$

$$\frac{PL}{PA} = \frac{\frac{1}{4} PQ}{\frac{1}{2} PQ} = \frac{1}{2} \quad (1)$$

$$\frac{PL}{PA} = \frac{\frac{1}{4} PQ}{\frac{1}{2} PQ} = \frac{1}{2}$$





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L is the midpoint of PA. Similarly, M is the midpoint of PB.

Applying midpoint theorem in ΔPAB , $LM = \frac{1}{2} AB = \frac{1}{2} \left(\frac{1}{2} QR \right)$ (using equation (1))
 $= \frac{1}{4} QR$

4) The teacher may conduct the following project as a group activity

Aim: Identify the types of parallelograms from its properties, and application of the mid-point theorem

Resources required: Colored pencils/pens, ruler, eraser, notebook for calculations, pen (for each student)

Task paper, Chart paper, glue stick (for each group)

Setting of the activity: Indoor

Type of the activity: Project

Preparation of the activity:

1) The teacher divides the class into groups of 5-6 students. Each group selects a leader.

2) The teacher prepares a task paper as follows

Pramod visited his native place during Christmas vacation. One day he asked his grandmother to show her fields. She told Pramod, there was no use in going to fields. When Pramod asked the reason, she explained ...She had given her fields to farmers on lease. After a flood in rainy season, farms were submerged in water and the farmers were not able to identify the boundaries of their farms.

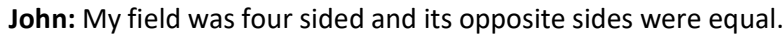
Pramod told grandmother, if the farmers know the dimensions and shapes of their farms, they can draw new boundaries and start working.

Pramod met the three farmers whose farms were affected. He found out that, the rope segments used to join two points, corner points or midpoints of sides of farms were all straight. The three farmers described their farms as follows.

Ram: My farm was a big three sided field. Longer side was on East direction and was common with Krishna's and John's fields. Other two sides (along West and South) were along boundary and the measuring tapes made exact 'L' shape at the point of intersection. The West side along the boundary was 160 meters long.

I used to divide the field into two parts by joining the midpoints of East and West sides to grow different varieties of food. The length of this segment was 60 meters.

Krishna: All four sides of my farm was equal to 50 meters. Ropes joining opposite points were not equal. But these ropes at the point of intersection made exact 'L' shape. Two sides were along the boundary and South side was common with John's field.

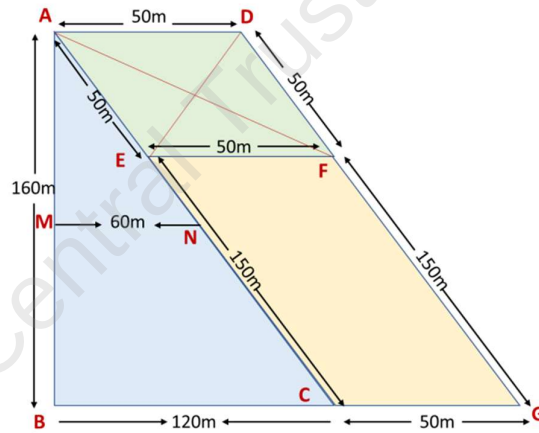


Can you help Pramod, to draw new boundaries of fields?

Role of the teacher: Facilitator

Procedure:

- The task paper is handed over to the group leader for the members of the group
- The group members discuss and prepare a chart representing the solution
- Each group leader presents the work of his/her group before the class and shares its observations/conclusions with the other groups. The members of other groups can ask questions on the presentation of a group.



Conclusion:

Rams farm is triangular, Krishnas farm is in rhombus shape and Johns farm is in parallelogram shape.

(Ram's farm is a right angled triangle ABC. Side BC is twice the length of segment MN using mid-point theorem. The hypotenuse AC is calculated using Pythagoras theorem.)

Follow-up questions:

- 1) Listening to Krishna's statement Pramod concluded that his farm might be a rhombus but not a square. Do you agree with him? Justify your answer
Yes. If all sides of a quadrilateral are equal and diagonals are perpendicular, then the quadrilateral is a rhombus or a square.
Ropes joining opposite sides were not equal, i.e. diagonals were not equal. So, it's not a square.
- 2) Listening to John's statement, Pramod concluded that his farm was a parallelogram. How?
In a quadrilateral, if opposite sides are equal, then it is a parallelogram.
- 3) How did you calculate the length of BC in Ram's farm?
Using Mid-point theorem the length of BC is double the length of MN, the line joining midpoints of East and West sides in Ram's farm.



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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 titbits 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.