

MPM 1DI Unit 6

Geometric Relationships

Examples Day

7.4 Midpoints and Medians in Triangles

Terminology:

Midpoint: A point that divides a line segment into two equal segments.

Median: The line segment joining a vertex of a triangle to the midpoint of the opposite side.

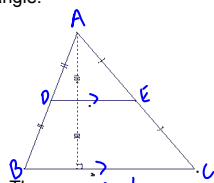
Bisect: Divide into 2 equal parts

Right Bisector: A line perpendicular to a line segment passing through its midpoint.

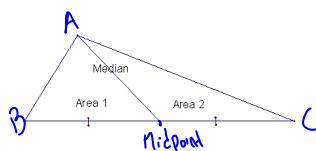
SUMMARY of Key Concepts:

1. A line segment joining the midpoints of two sides of a triangle is parallel to the third side and is half as long

2. The height of a triangle formed by joining the midpoints of two sides of a triangle is half the height of the original triangle.



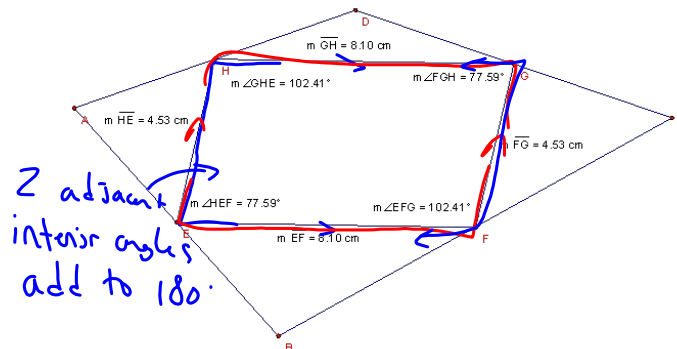
3. The Median of a triangle bisects its area.



7.5 Midpoints and Diagonals in Quadrilaterals

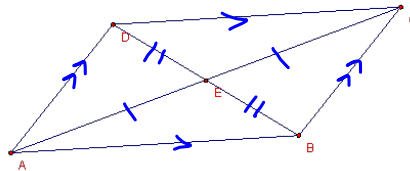
SUMMARY:

1. Joining the midpoints of the sides of any quadrilateral produces a Parallelogram

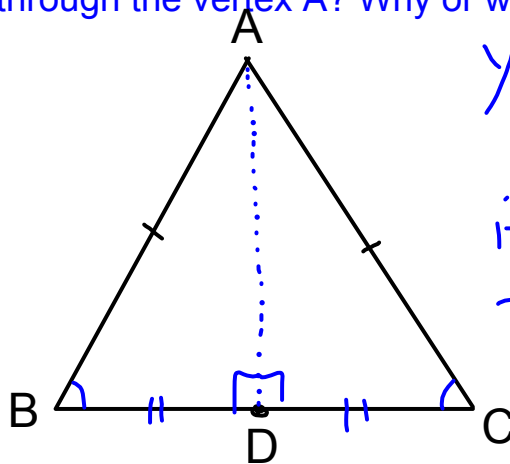


2. The diagonals of a parallelogram Bisect each other.

EA = 5.40 cm ED = 2.81 cm
EC = 5.40 cm EB = 2.81 cm

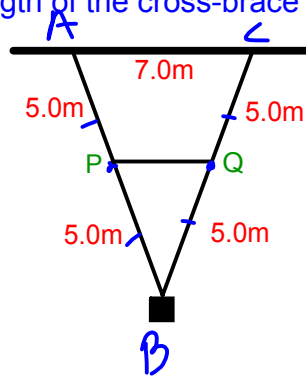


1. Construct a triangle with vertices A, B, and C, with $AB = AC$. Let D be the midpoint of BC. Will the right bisector through D pass through the vertex A? Why or why not?



yes it will
since $AB = AC$
it is an isosceles triangle and
 $\therefore \angle ABC = \angle ACB$
and $\angle ADB = \angle ADC$
 \therefore Right bisector goes directly through vertex A

2. Calculate the length of the cross-brace PQ in this bridge support.



$$QC = QB$$

$\therefore Q$ is a midpoint of CB

$$AP = PB$$

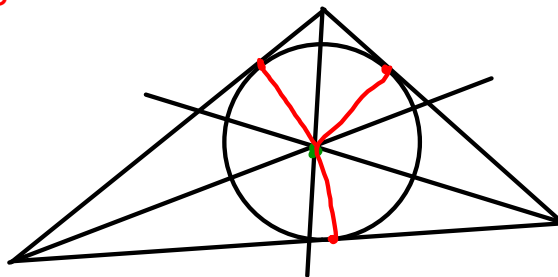
$\therefore P$ is a midpoint of AB

$$\therefore PQ = \frac{1}{2}(AC)$$

$$PQ = \frac{1}{2}(7)$$

$$PQ = 3.5 \text{ m}$$

3a.) Investigate whether the lines that bisect the angles of a triangle always intersect at a single point. Describe your findings.



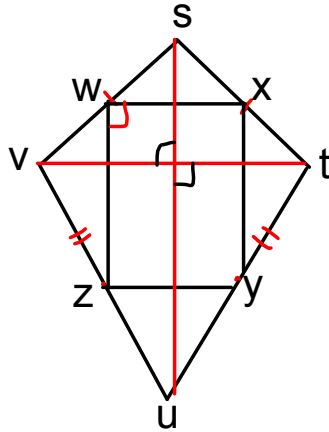
Yes!
Always intersect at the same point

b.) Draw a triangle in which the angle bisectors intersect at a single point. Can you draw a circle that has this point as its centre and intersects the triangle at exactly three points? If so, describe the properties of the circle.

Yes! Will touch at the closest point

on each side of the triangle and the length will be the radius of the circle

- 4a.) Draw a quadrilateral $STUV$ with $ST = SV$ and $UT = UV$. (A Kite)
 b.) At what angle do the diagonals of the quadrilateral intersect. 90°
 c.) Join the midpoints of the sides of the quadrilateral to form a smaller quadrilateral $WXYZ$. What type of quadrilateral is $WXYZ$? **Rectangle**
 d.) Make a conjecture about how the area of $WXYZ$ is related to the area of $STUV$.



Since $WXYZ$ is formed by joining the midpoints of $STUV$, $WXYZ$ will be half the area of $STUV$

Assigned Work

Pg 398 # 8 – 11, 13, 15

Pg 405 # 7, 8, 9abc, 10, 14