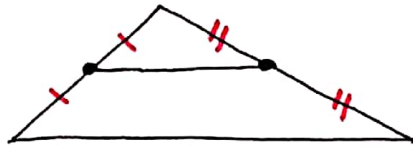


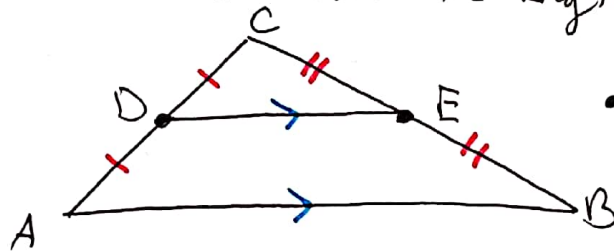
objective: To define and apply
the Triangle Midsegment Theorem
and triangle inequalities.

2/12/19

1.) Midsegment of a Triangle: A segment connecting the midpoints of 2 sides of a triangle.



2.) Triangle Midsegment Theorem: If a segment joins the midpoints of 2 sides of a triangle, then the segment is parallel ($//$) to the third side and half the length.



- $\overline{DE} // \overline{AB}$
- $\overline{DE} = \frac{1}{2}(\overline{AB})$

Examples:

a.) $DE = 3x + 1$
 $AB = 10x - 6$
 Find DE and AB

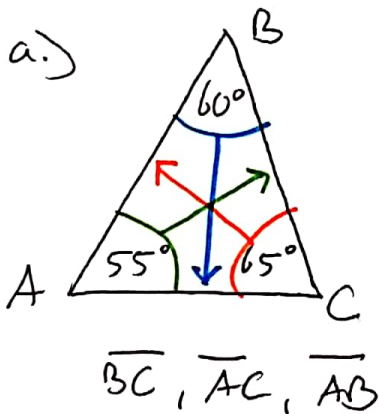
$$DE = 3(2) + 1 = \boxed{7}$$

$$AB = 10(2) - 6 = 20 - 6 = \boxed{14}$$

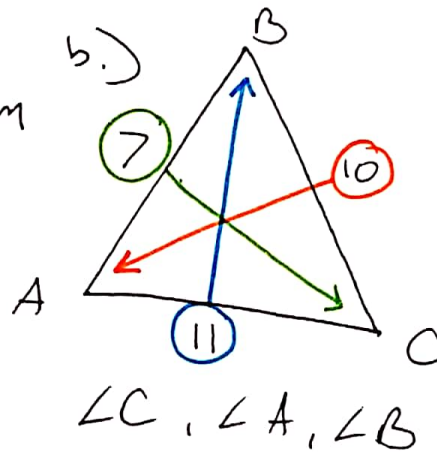
$$\begin{aligned} & \downarrow \\ & 2(3x+1) = \left[\frac{1}{2}(10x-6) \right] \cancel{x} \\ & \cancel{6}x + 2 = 10x - 6 \\ & \quad \quad \quad -6x \quad \quad \quad -6x \\ & \hline & 2 = 4x + 6 \\ & \quad +6 \quad \quad \quad +6 \\ & \hline & 8 = 4x \\ & \quad \quad \quad \cancel{4}x \\ & \quad \quad \quad \hline & \quad \quad \quad 2 = x \\ & \quad \quad \quad \hline & \quad \quad \quad x = 2 \end{aligned}$$

3) Triangle Inequalities

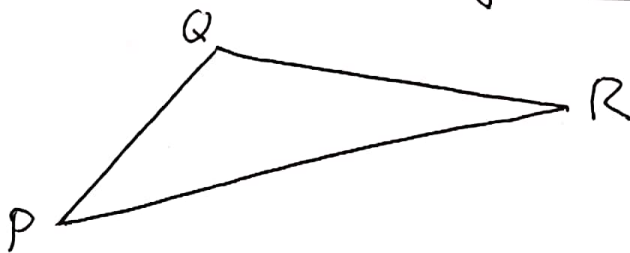
- longest side of a triangle is opposite its largest angle
- shortest side of a triangle is opposite its smallest angle.
- largest angle is opposite the largest side
- smallest angle is opposite the smallest side.



order angles
and sides from
least to
greatest



4) Triangle Inequality Theorem:



- $\overline{PQ} + \overline{QR} > \overline{PR}$
- $\overline{QR} + \overline{PR} > \overline{PQ}$
- $\overline{PR} + \overline{PQ} > \overline{QR}$

example: Does a triangle exist with side lengths

27, 18, 12

Yes

- $27 + 18 > 12$? ✓
- $18 + 12 > 27$? ✓
- $27 + 12 > 18$? ✓