

Objectives:

- I understand how to prove the Triangle Angle Sum theorem, Exterior Angle Theorem of a Triangle, the Isosceles Triangle theorem, and the Triangle Mid-segment Theorem.
- I can use these theorems to solve for missing variables.

Vocabulary:

Triangle classification by <u>angle measure</u>			Triangle classification by number of congruent sides		
Acute Triangle: <i>All interior angles of the triangle are less than 90°</i>	Obtuse Triangle: <i>One interior angle of the triangle is greater than 90°</i>	Right Triangle: <i>One interior angle of the triangle is equal to 90°</i>	Scalene Triangle: <i>None of the sides of the triangle are congruent</i>	Isosceles Triangle: <i>Two sides of the triangle are congruent</i>	Equilateral Triangle: <i>All three sides of the triangle are congruent</i>

Angle Sum Theorem:

- All angles of a triangle add up to be 180°

Examples:

Solve for x.

$$7x - 1 + 8x + 6 + 55 = 180$$

$$15x + 60 = 180$$

$$\begin{array}{r} 15x + 60 = 180 \\ -60 \quad -60 \\ \hline 15x = 120 \\ \frac{15x}{15} = \frac{120}{15} \\ \boxed{x = 8} \end{array}$$

Solve for x, then find the measure of angle A.

$$4x + 1 + 7 + 5x + 82 = 180$$

$$9x + 90 = 180$$

$$\begin{array}{r} 9x + 90 = 180 \\ -90 \quad -90 \\ \hline 9x = 90 \\ \frac{9x}{9} = \frac{90}{9} \\ \boxed{x = 10} \end{array}$$

$m\angle A = 4(10) + 1 = \boxed{41^\circ}$

Exterior Angle Theorem:

- If an exterior angle of a triangle forms a linear pair with an interior angle, the exterior angle will be equal to the sum of the other two angles.

Examples:

Find the measure of the missing angle

Solve for x

$$110 = 61 + x$$

$$\begin{array}{r} 110 = 61 + x \\ -61 \quad -61 \\ \hline 49 = x \end{array}$$

$$10x + 55 = 23x - 3$$

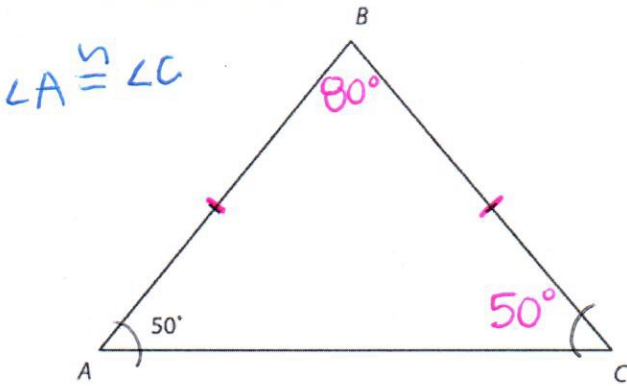
$$\begin{array}{r} 10x + 55 = 23x - 3 \\ -3 \quad -3 \\ \hline 10x + 52 = 23x \\ -10x \quad -10x \\ \hline 52 = 13x \\ \frac{52}{13} = \frac{13x}{13} \\ \boxed{x = 4} \end{array}$$

Isosceles Triangle Theorem:

- If two sides of a triangle are ||s, then the angles opposite the TWO sides are ||s.

Examples:

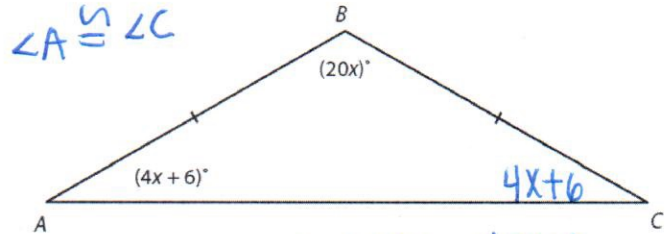
Find angle B and C



$\angle A \cong \angle C$

$\angle C = 50^\circ$
 $\angle B = 80^\circ$

Find x, and the measure of angle A and B



$\angle A \cong \angle C$

$$4x+6 + 4x+6 + 20x = 180^\circ$$

$$28x + 12 = 180$$

$$\begin{array}{r} -12 \quad -12 \\ \hline 28x = 168 \\ \boxed{x=6} \end{array}$$

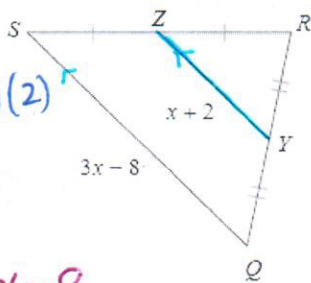
$m\angle A = 4(6) + 6$
 $\boxed{m\angle A = 30^\circ}$
 $m\angle B = 20(6)$
 $\boxed{m\angle B = 120^\circ}$

Triangle Midsegment Theorem:

- If a line is drawn from the midpoint of one side of a triangle to another it will be parallel to the line it does not touch. It will also be exactly 1/2 the length of the line it does not touch.

Examples:

Solve for x



$2(\overline{YZ}) = (\frac{1}{2}\overline{QS})(2)$

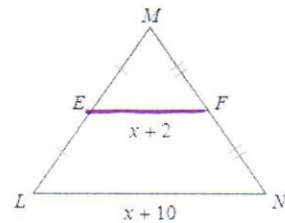
$2\overline{YZ} = \overline{QS}$

$2(x+2) = 3x-8$

$2x+4 = 3x-8$

$\begin{array}{r} +8 \quad +8 \\ \hline 2x+12 = 3x-8 \\ -2x \quad -2x \\ \hline 12 = x \end{array}$

Solve for x



$2EF = LN$

$2(x+2) = x+10$

$2x+4 = x+10$

$\begin{array}{r} -x \quad -x \\ \hline 2x = x+6 \\ -x \quad -x \\ \hline \boxed{x=6} \end{array}$