

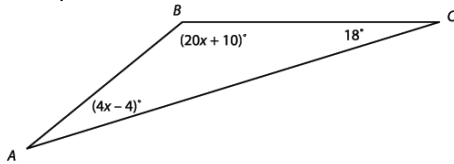
Name: _____

SM2 9.2: Prove Triangle Theorems

Problems:

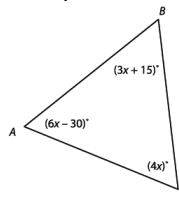
Use what you know about the sums of the interior and exterior angles of triangles to determine the measure of each identified angle.

- 1) Find $m\angle A$ and $m\angle B$



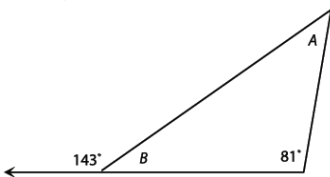
$$\begin{aligned} m\angle A &= 22^\circ \\ m\angle B &= 140^\circ \end{aligned}$$

- 2) Find $m\angle A$, $m\angle B$, and $m\angle C$



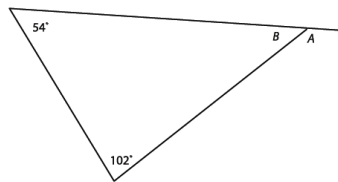
$$m\angle A = m\angle B = m\angle C = 60^\circ$$

- 3) Find $m\angle A$ and $m\angle B$



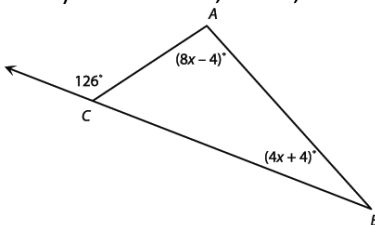
$$\begin{aligned} m\angle A &= 62^\circ \\ m\angle B &= 37^\circ \end{aligned}$$

- 4) Find $m\angle A$ and $m\angle B$



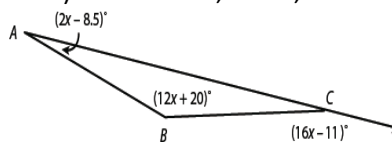
$$\begin{aligned} m\angle A &= 156^\circ \\ m\angle B &= 24^\circ \end{aligned}$$

- 5) Find $m\angle A$, $m\angle B$, and $m\angle ACB$



$$\begin{aligned} m\angle A &= 80^\circ \\ m\angle B &= 46^\circ \\ m\angle ACB &= 54^\circ \end{aligned}$$

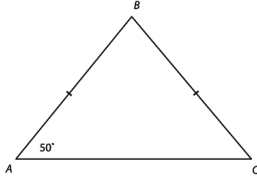
- 6) Find $m\angle A$, $m\angle B$, and $m\angle ACB$



$$\begin{aligned} m\angle A &= 14^\circ \\ m\angle B &= 155^\circ \\ m\angle ACB &= 11^\circ \end{aligned}$$

Use what you know about isosceles triangles to find each angle measure.

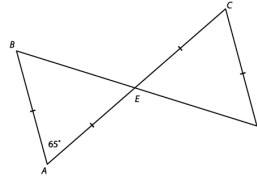
7) Find $m\angle B$ and $m\angle C$



$$m\angle B = 80^\circ$$

$$m\angle C = 50^\circ$$

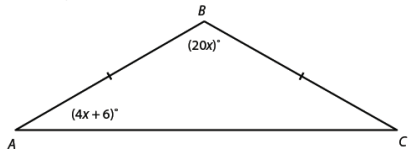
8) Find $m\angle B$, $m\angle C$, and $m\angle D$



$$m\angle B = m\angle D = 57.5^\circ$$

$$m\angle C = 65^\circ$$

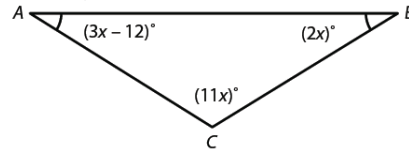
9) Find $m\angle A$, $m\angle B$, and $m\angle C$



$$m\angle A = m\angle C = 30^\circ$$

$$m\angle B = 120^\circ$$

10) Find $m\angle A$, $m\angle B$, and $m\angle C$

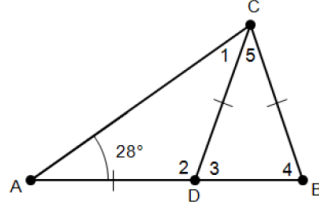


$$m\angle A = m\angle B = 24^\circ$$

$$m\angle C = 132^\circ$$

Find the missing angle measures.

11) Find $m\angle 1$, $m\angle 2$, $m\angle 3$, $m\angle 4$ and $m\angle 5$



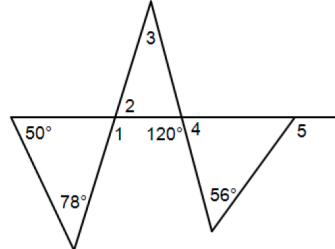
$$m\angle 1 = 28^\circ$$

$$m\angle 2 = 124^\circ$$

$$m\angle 3 = m\angle 4 = 56^\circ$$

$$m\angle 5 = 68^\circ$$

12) Find $m\angle 1$, $m\angle 2$, $m\angle 3$, $m\angle 4$ and $m\angle 5$



$$m\angle 1 = 128^\circ$$

$$m\angle 2 = 52^\circ$$

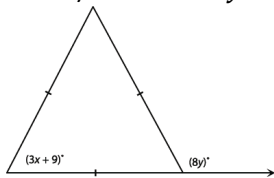
$$m\angle 3 = 68^\circ$$

$$m\angle 4 = 60^\circ$$

$$m\angle 5 = 116^\circ$$

Find each value using the given information.

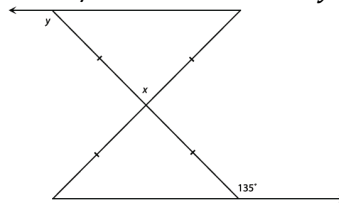
13) Find x and y



$$x = 17$$

$$y = 15$$

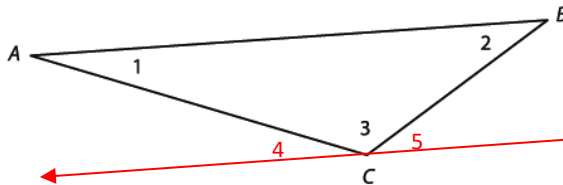
14) Find $m\angle x$ and $m\angle y$



$$m\angle x = 90^\circ$$

$$m\angle y = 135^\circ$$

15) The Triangle Sum Theorem states that the sum of the angle measures of a triangle is 180° . Write a proof of this theorem. (Hint: you will need to add to the diagram below)



Draw a line through pt. C that is parallel to \overleftrightarrow{AB} , and label the angles that are formed

Parallel Postulate

$$\angle 1 \cong \angle 4$$

Alternate Interior Angles Theorem

$$\angle 2 \cong \angle 5$$

$$m\angle 4 + m\angle 3 + m\angle 5 = 180$$

Linear Triple

$$m\angle 1 + m\angle 3 + m\angle 2 = 180$$

Substitution

16) The converse of a statement is where you switch the "if" and "then". Example: "If P , then Q ." The converse is "If Q , then P ." The converse of a statement also needs to be proved or disproved.

The converse of the Isosceles Triangle Theorem states: If two angles of a triangle are congruent, then the sides opposite those angles are congruent. Write a proof of this statement. (You cannot use the original Isosceles Triangle Theorem to prove the converse.)

$\angle B \cong \angle C$	Given
Draw the angle bisector of $\angle A$ and call the intersection of the angle bisector and the opposite side point D .	Construction
$\angle BAD \cong \angle CAD$	Definition of an Angle Bisector
$\overline{AD} \cong \overline{AD}$	Reflexive Property
$\triangle ABD \cong \triangle ACD$	AAS Triangle Congruence
$\overline{AB} \cong \overline{AC}$	Corresponding Parts of Congruent Triangles are Congruent (CPCTC)

