Name: _____

Triangle Sum Theorem (Part 3)

Addition Property of Equality: The resulting step after a number, variable or object is added to <u>both sides</u> of the equal sign.	**Division Property of Equality:** The resulting step after a number, variable or object is divided from <u>both sides</u> of the equal sign.

For each triangle, determine the measure of the missing angle, showing and explaining every step of the solution. Write the angle measures in the provided table, in order from smallest to largest, identifying their opposite sides (use the other two letters), as well.

Example:
On $\triangle ABC$, $m\angle A = (x+8)°, m\angle B = (3x-4)°$ & $m\angle C = (x+16)°$. $AB = 18, BC = 16$ & $AC = 25$. Fill in the table as accurately as possible.

	Angles	Opposite Sides
Small	$m\angle A = 40°$	$BC = 16$
Medium	$m\angle C = 48°$	$AB = 18$
Large	$m\angle B = 92°$	$AC = 25$

$m\angle A = (x+8)°, m\angle B = (3x-4)°$ & $m\angle C = (x+16)°$.			**<u>Given</u>**
$m\angle A + m\angle B + m\angle C = 180$			**<u>△ Sum Thm</u>**
$(x+8) + (3x-4) + (x+16) = 180$			**<u>Subst.</u>**
$5x + 20 = 180$			**<u>Simp.</u>**
$-20 \quad -20$			
$5x = 160°$			**<u>Subtr. Prop. =</u>**
$\div 5 \quad \div 5$			
$x = 32°$			Use the **<u>DIVISION</u>** Property of **<u>EQUALITY</u>** to divide a number from both sides of the equal sign.
$m\angle A = 32 + 8$	$m\angle B = 3(32) - 4$	$m\angle C = 32 + 16$	Use **<u>SUBSTITUTION</u>** to replace *x* with **<u>32</u>** in each angle.
$m\angle A = 40°$	$m\angle B = 92°$	$m\angle C = 48°$	**<u>SIMPLIFY</u>** the right side of each equation.

1. On $\triangle DEF$, $m\angle D = (x+40)°$, $m\angle E = (4x+86)°$ & $m\angle F = (8x+2)°$. $DE = 6$, $EF = 7$ & $DF = 10$. Fill in the table as accurately as possible.

	Angles	Opposite Sides
Small	$m\angle$ =	
Medium	$m\angle$ =	
Large	$m\angle$ =	

Statements			**Reasons**
			Use the _____ Property of _____ to divide a number from both sides of the equal sign.
			Use _____ to replace *x* with _____ in each angle.
			_____ the right side of each equation.

Name: _____

2. On $\triangle GHI, m\angle G = (8x)°, m\angle H = (x + 13)°$ & $m\angle I = (2x - 9)°$. $GH = 6, HI = 12$ & $GI = 7$. Fill in the table as accurately as possible.

Statements			Reasons
			Div. Prop. =
			Subst.
			Simp.

	Angle	Opp. Side
Sm		
Med		
Lg		

3. On $\triangle KLM, m\angle K = (4x - 15)°, m\angle L = (2x + 11)°$ & $m\angle M = (5x + 30)°$. $KL = 21, LM = 14$ & $KM = 13$. Fill in the table as accurately as possible.

Statements			Reasons

	Angle	Opp. Side
Sm		
Med		
Lg		

4. On $\triangle NPQ, m\angle N = (5x - 55)°, m\angle P = (3x - 15)°$ & $m\angle Q = (4x + 10)°$. $NP = 13, PQ = 9$ & $NQ = 9$. Fill in the table as accurately as possible.

Statements			Reasons

	Angle	Opp. Side
Sm		
Med		
Lg		

Name: _____

5. On $\triangle RST, m\angle R = (3x + 50)°, m\angle S = (20x + 8)°$ & $m\angle T = (2x - 3)°$. $RS = 1, ST = 11$ & $RT = 12$. Fill in the table as accurately as possible.

Statements	Reasons

	Angle	Opp. Side
Sm		
Med		
Lg		

6. On $\triangle VWY, m\angle V = (2x + 17)°, m\angle W = (10x + 106)°$ & $m\angle Y = (8x + 17)°$. $VW = 5, WY = 3$ & $VY = 7$. Fill in the table as accurately as possible.

Statements	Reasons

	Angle	Opp. Side
Sm		
Med		
Lg		

7. On $\triangle BCD, m\angle B = (4x + 44)°, m\angle C = (2x - 6)°$ & $m\angle D = (x + 16)°$. $BC = 6, CD = 9$ & $BD = 5$. Fill in the table as accurately as possible.

Statements	Reasons

	Angle	Opp. Side
Sm		
Med		
Lg		

Name: _____

8. On $\triangle EFG, m\angle E = (5x + 49)°, m\angle F = (4x + 46)°$ & $m\angle G = (5x + 1)°$. $EF = 7, FG = 13$ & $EG = 12$. Fill in the table as accurately as possible.

Statements	Reasons

	Angle	Opp. Side
Sm		
Med		
Lg		

9. On $\triangle HJK, m\angle H = (42x + 4)°, m\angle J = (5x + 10)°$ & $m\angle K = (3x + 16)°$. $HJ = 1, JK = 2$ & $HK = 1$. Fill in the table as accurately as possible.

Statements	Reasons

	Angle	Opp. Side
Sm		
Med		
Lg		

10. On $\triangle LMN, m\angle L = (5x - 8)°, m\angle M = (5x + 17)°$ & $m\angle N = (2x + 15)°$. $LM = 3, MN = 4$ & $LN = 5$. Fill in the table as accurately as possible.

Statements	Reasons

	Angle	Opp. Side
Sm		
Med		
Lg		

Triangle Sum Theorem Part 3 Answers

1.

$m\angle F = 34°$	DE= 6
$m\angle D = 44°$	$EF = 7$
$m\angle E = 102°$	$DF = 10$

2.

$m\angle I = 23°$	$GH = 6$
$m\angle H = 29°$	$HI = 7$
$m\angle G = 128°$	$HI = 12$

3.

$m\angle L = 39°$	$KM = 13$
$m\angle K = 41°$	$LM = 14$
$m\angle M = 100°$	$KL = 21$

4.

$m\angle N = 45°$	$PQ = 9$
$m\angle P = 45°$	$NQ = 9$
$m\angle Q = 90°$	$NP = 13$

5.

$m\angle T = 7°$	$RS = 1$
$m\angle R = 65°$	$ST = 11$
$m\angle S = 108°$	$RT = 12$

6.

$m\angle V = 21°$	$WY = 3$
$m\angle Y = 33°$	$VW = 5$
$m\angle W = 126°$	$VY = 7$

7.

$m\angle C = 30°$	$BD = 5$
$m\angle D = 34°$	$BC = 6$
$m\angle B = 116°$	$CD = 9$

8.

$m\angle G = 31°$	$EF = 7$
$m\angle F = 70°$	$EG = 12$
$m\angle E = 79°$	$FG = 13$

9.

$m\angle J = 25°$	$HK = 1$
$m\angle K = 25°$	$HJ = 1$
$m\angle H = 130°$	$JK = 2$

10.

$m\angle N = 41°$	$LM = 3$
$m\angle L = 57°$	$MN = 4$
$m\angle M = 82°$	$LN = 5$