



# Math Virtual Learning

## 8th Grade Math

# Interior/Exterior Angles of a Triangle

April 10, 2020



8th Grade Math  
Lesson: April 10

**Learning Target:**

Student will identify interior and exterior angles of a triangle.

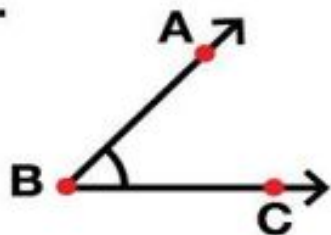
**Lesson Includes:**

- 1) Angle Types
- 2) Triangle Sum Theorem
- 3) Exterior Angle Theorem

# Warm Up Activity

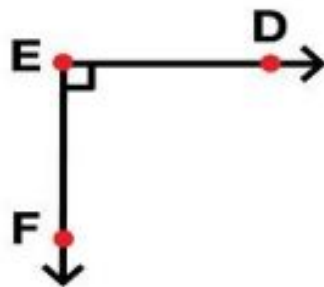
On a piece of paper, identify the following angles.

1.



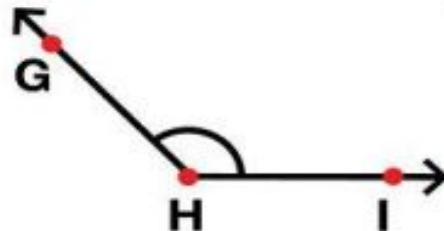
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2.



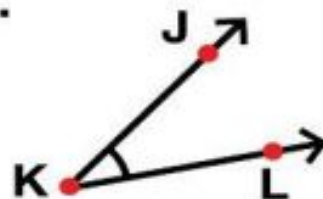
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3.



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4.

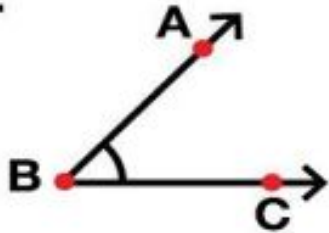


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# Warm Up Activity **Answers**

Review the questions from the previous slide.

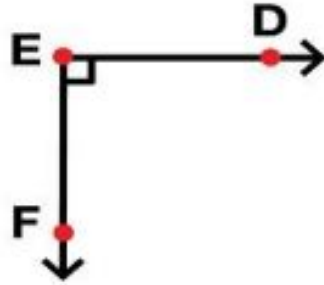
1.



**Acute**

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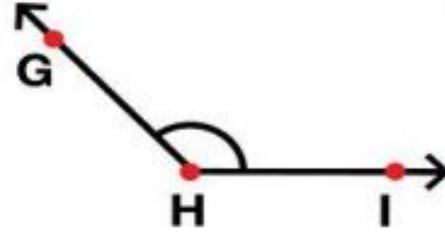
2.



**Right**

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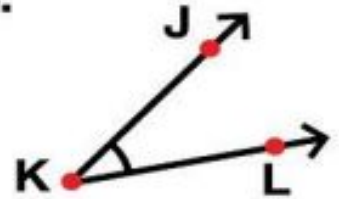
3.



**Obtuse**

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4.



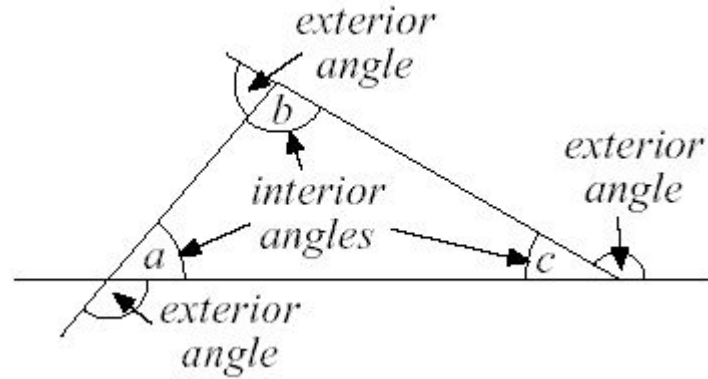
**Acute**

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# Instruction: Types of Angles

Read through the vocabulary and review the diagrams. Then watch the video linked [here](#).

- 1) **Interior Angle:** an angle inside a shape
- 2) **Exterior Angle:** is an angle outside of a shape, made by the side of a shape and a line drawn out from an adjacent side
- 3) **Acute Angle:** an angle that's less than 90 degrees
- 4) **Obtuse Angle:** an angle that is greater than 90 degrees
- 5) **Right Angle:** a 90 degree angle
- 6) **Complementary Angle:** two angles that when added together equal 90 degrees
- 7) **Supplementary Angle:** two angles that when added together equal 180 degree

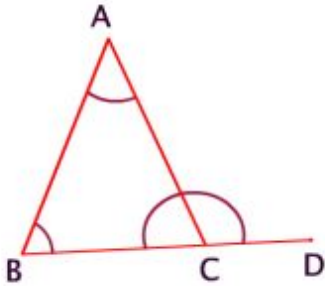


Today we are  
mainly focusing on  
Interior and  
Exterior Angles!

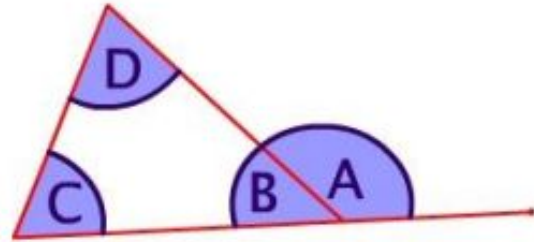
# Practice: Types of Angles

On a piece of paper: Identify the exterior and interior angles shown in the problems.

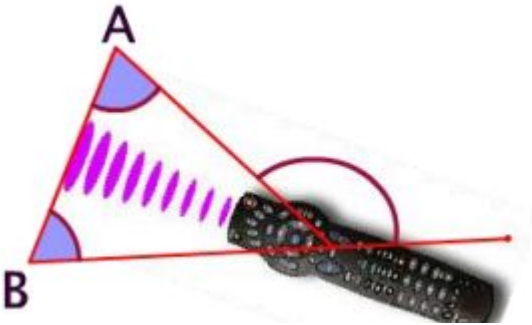
1)



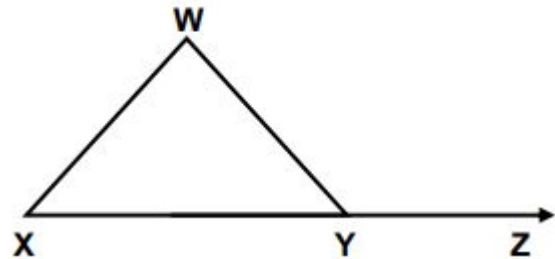
2)



3)



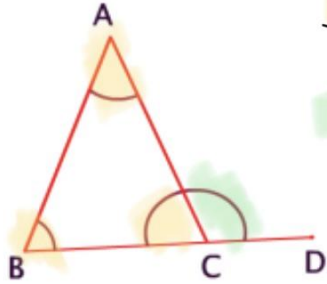
4)



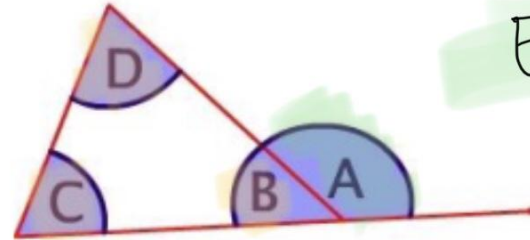
# Practice: Types of Angles **ANSWERS**

On a piece of paper: Identify the exterior and interior angles shown in the problems.

1)

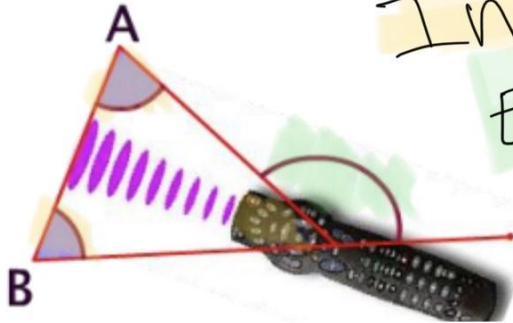


Interior = inside  
Exterior = outside



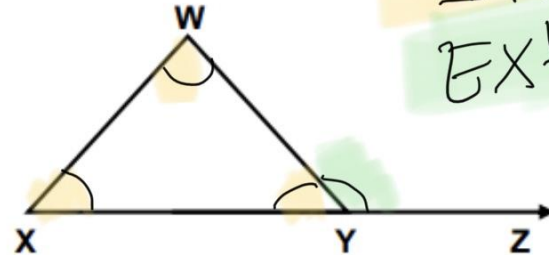
Interior  
Exterior

3)



Interior  
Exterior

4)



Interior  
Exterior

# Instruction: Triangle Sum Theorem

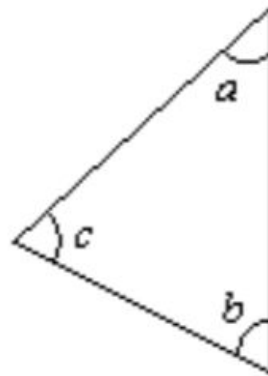
Read through the theorem and steps. Watch the provided video [here](#). Then review the examples on the next slide.

## Theorem:

The triangle sum property states that the sum of the three interior (inside the triangle) angles in a triangle is always 180 degrees.

## Steps:

- 1) Write an equation that adds all three angle measurements.
- 2) Set the equation equal to 180 degrees.
- 3) Solve for the variable.
- 4) Plug the value of the variable (the answer) back into any angle expression that you need to find the value of.



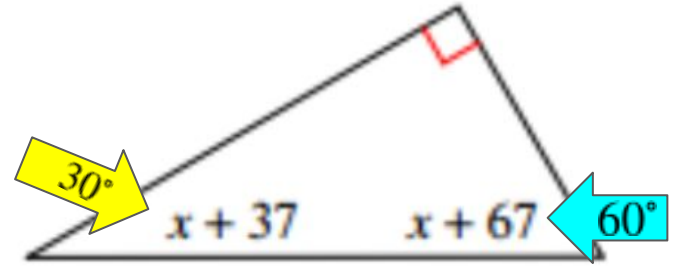
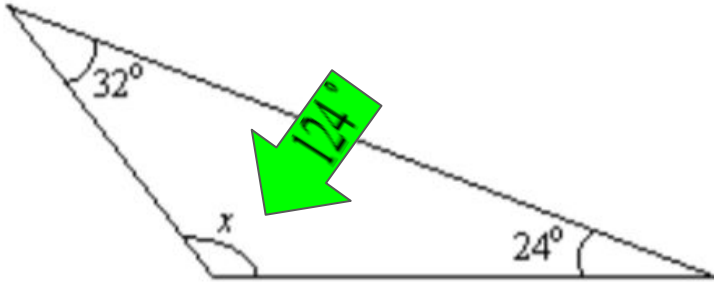
$$a + b + c = 180^\circ$$

**Don't forget your steps for solving equations!**



# Instruction: Triangle Sum Theorem

Review the examples. Directions: Solve for the variable, then find the missing angle(s).



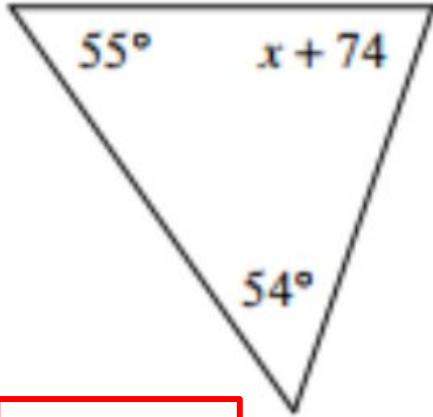
$$\begin{aligned} 32 + 24 + x &= 180 \\ 56 + x &= 180 \\ \underline{-56 \quad -56} & \\ x &= 124 \rightarrow \textcircled{124^\circ} \end{aligned}$$

$$\begin{aligned} \underline{x + 37 + x + 67 + 90} &= 180 \\ 2x + 194 &= 180 \\ \underline{-194 \quad -194} & \\ 2x &= -14 \\ \underline{\quad \quad 2 \quad \quad 2} & \\ x &= -7 \end{aligned}$$

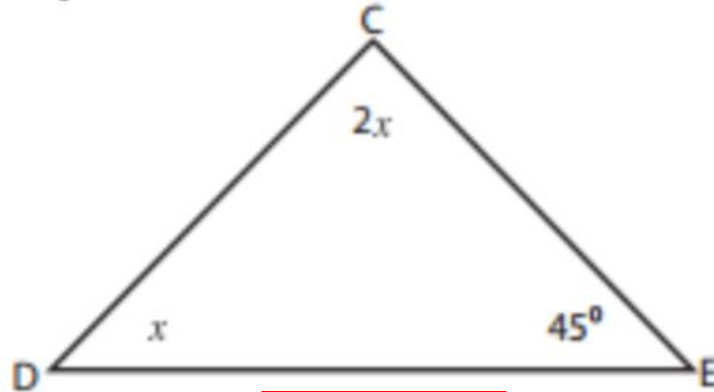
$x + 37$	$x + 67$
$-7 + 37$	$-7 + 67$
$\textcircled{30^\circ}$	$\textcircled{60^\circ}$

# Practice: Triangle Sum Theorem

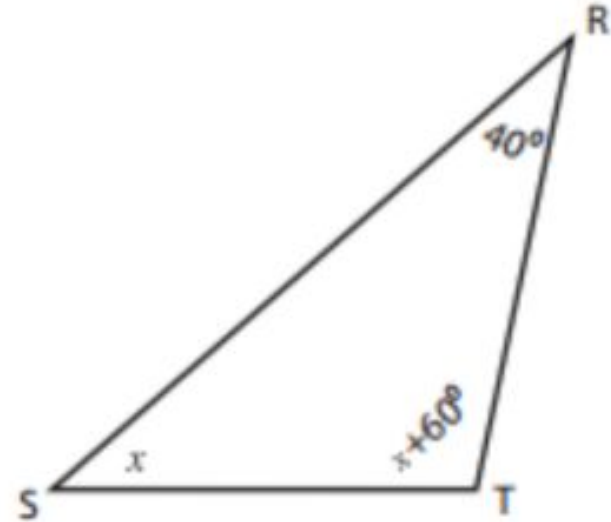
On a piece of paper: Solve for the variable, then find the missing angle(s).



Question 1



Question 2



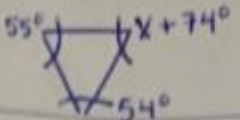
Question 3

# Practice: Triangle Sum Theorem **Answers**

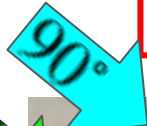
Check your work from the previous slide. Additional practice linked on the last slide.

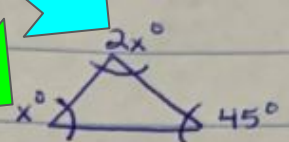
Question 1




$$55 + x + 74 + 54 = 180$$
$$x + 183 = 180$$
$$\begin{array}{r} -183 \quad -183 \\ \hline x = -3 \end{array}$$
$$x + 74$$
$$-3 + 74 = 71^\circ$$

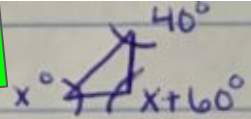
Question 2




$$x + 2x + 45 = 180$$
$$3x + 45 = 180$$
$$\begin{array}{r} -45 \quad -45 \\ \hline 3x = 135 \\ \hline \frac{3x}{3} = \frac{135}{3} \\ x = 45 \end{array}$$

Question 3




$$x + x + 60 + 40 = 180$$
$$2x + 100 = 180$$
$$\begin{array}{r} -100 \quad -100 \\ \hline 2x = 80 \\ \hline \frac{2x}{2} = \frac{80}{2} \\ x = 40 \end{array}$$
$$x + 60$$
$$40 + 60 = 100^\circ$$

# Instruction: Exterior Angle Theorem

Read through the theorem and steps. Watch the provided video [here](#). Then review the examples on the next slide.

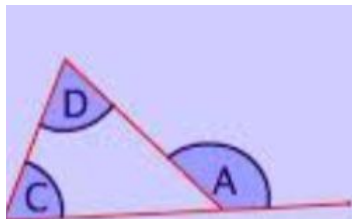
## Theorem:

The measure of an exterior angle of a triangle is equal to the sum of the measures of the two remote interior angles.

## Steps:

What if you are not given all the angles?

- 1) Write an equation: remote interior angle + remote interior angle = exterior angle
- 2) Solve for the variable.
- 3) Plug the value of the variable (the answer) back into any angle expression that you need to find the value of.



The diagram shows a triangle with interior angles labeled C and D. An exterior angle labeled A is formed by extending one of the sides. The exterior angle A is adjacent to the interior angle at that vertex.

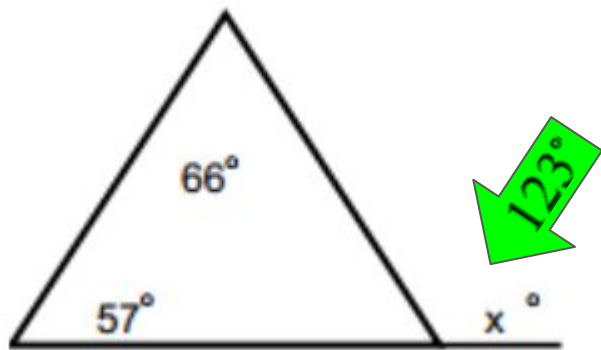
$\angle A =$  exterior angle  
 $\angle C =$  remote interior angle  
 $\angle D =$  remote interior angle

**Formula for Exterior Angles**  
exterior angle = sum of the remote interior angles  
$$\angle A = \angle C + \angle D$$

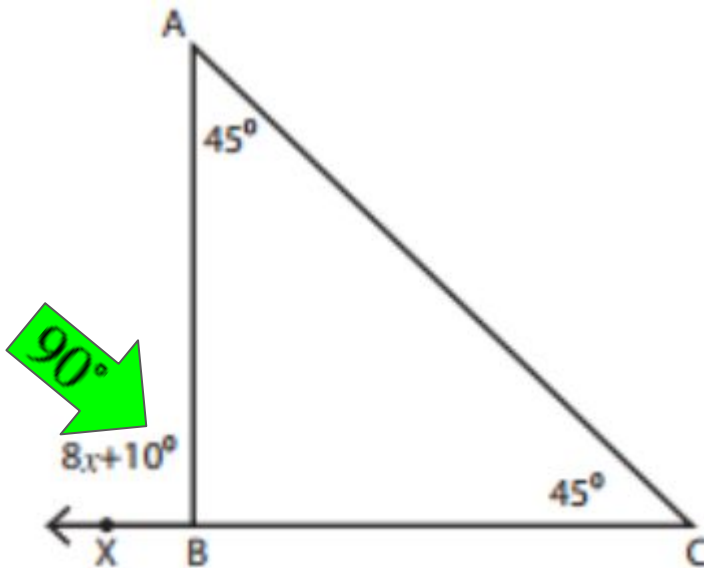
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# Instruction: Exterior Angle Theorem

Review the examples.



$$\begin{aligned}57 + 66 &= x \\123 &= x \\ \underline{123^\circ}\end{aligned}$$



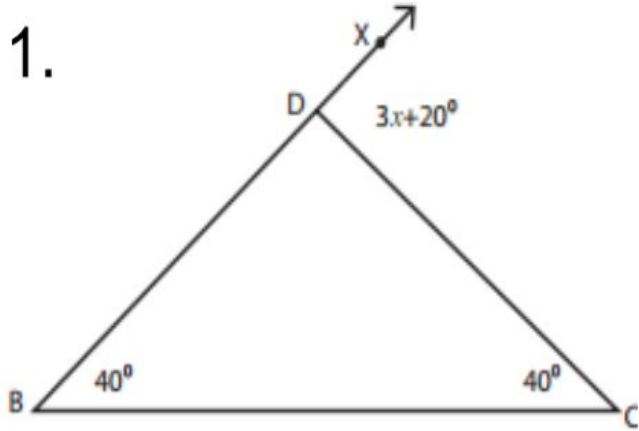
$$\begin{aligned}45 + 45 &= 8x + 10 \\90 &= 8x + 10 \\ \underline{-10 \quad -10} \\80 &= 8x \\ \underline{8 \quad 8} \\10 &= x\end{aligned}$$

$$\begin{aligned}8x + 10 \\8(10) + 10 \\80 + 10 \\ \underline{90^\circ}\end{aligned}$$

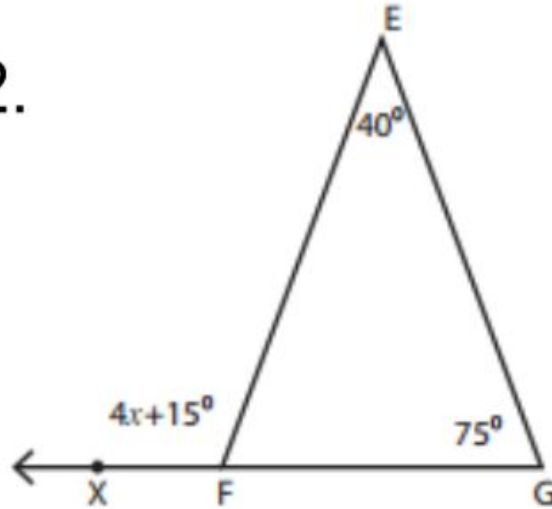
# Practice: Exterior Angle Theorem

On a piece of paper: Solve for the variable, then find the missing angle(s).

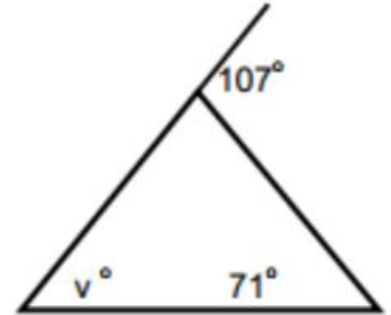
1.



2.



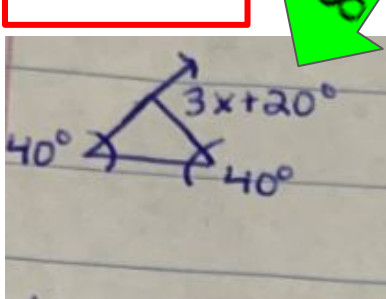
3.



# Practice: Exterior Angles Theorem **Answers**

Check your work from the previous slide. Additional practice linked on the last slide.

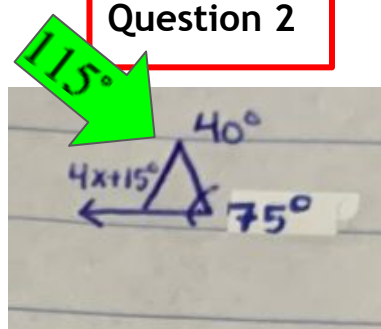
Question 1



$3x+20$   
 $3(20)+20$   
 $60+20$   
 $80^\circ$

$$40+40=3x+20$$
$$80=3x+20$$
$$\begin{array}{r} -20 \\ \hline 60=3x \\ \frac{60}{3}=\frac{3x}{3} \\ 20=x \end{array}$$

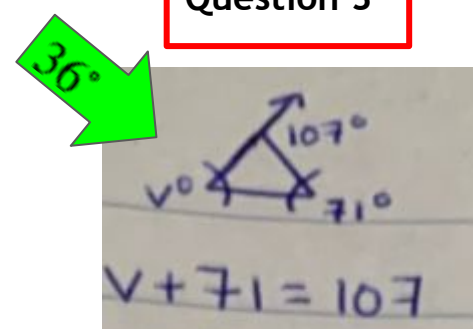
Question 2



$4x+15$   
 $4(25)+15$   
 $100+15$   
 $115^\circ$

$$75+40=4x+15$$
$$115=4x+15$$
$$\begin{array}{r} -15 \\ \hline 100=4x \\ \frac{100}{4}=\frac{4x}{4} \\ 25=x \end{array}$$

Question 3



$v+71=107$   
 $-71 \quad -71$   

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 $v=36$   
 $36^\circ$

# Additional Practice:

Click on the links below to get additional practice and to check your understanding!

[Types of Angles](#)

[Triangle Sum Theorem](#)

[Exterior Angle Theorem](#)

\* May need to click twice for the links \*