


Personal Math Trainer 

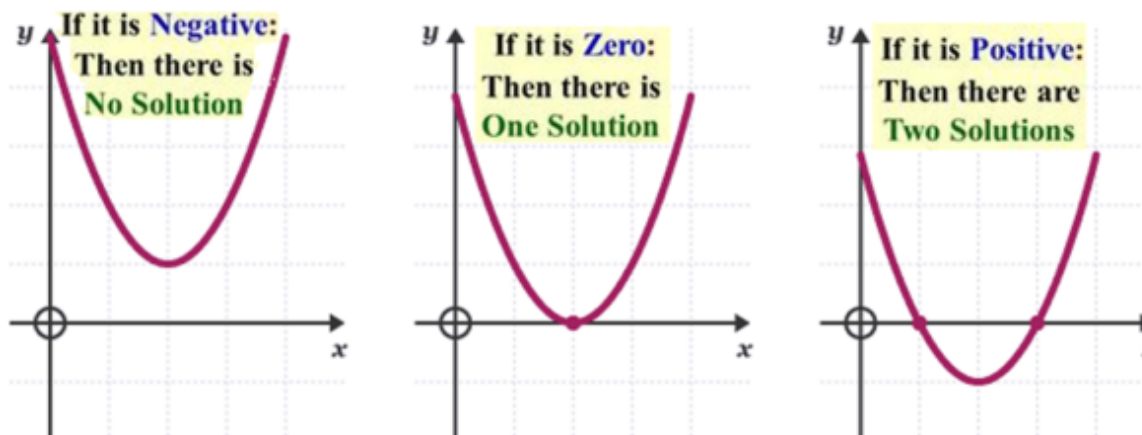
**15.1 Interior and Exterior Angles - Class & Homework**



The graph of  $y = 3x^2 + 4x + c$  has one  $x$ -intercept. What is the value of  $c$ ?

1

The discriminant is the expression under the radical:  $b^2 - 4ac$



For there to be one  $x$ -intercept, the discriminant must be .

Find the  $c$ :  $3x^2 + 4x + c$

$$b^2 - 4ac = 0$$

$$4^2 - 4(3)(c) = 0$$

$$16 - 12c = 0$$

Solve for  $c$ :

$$16 - 12c = 0$$

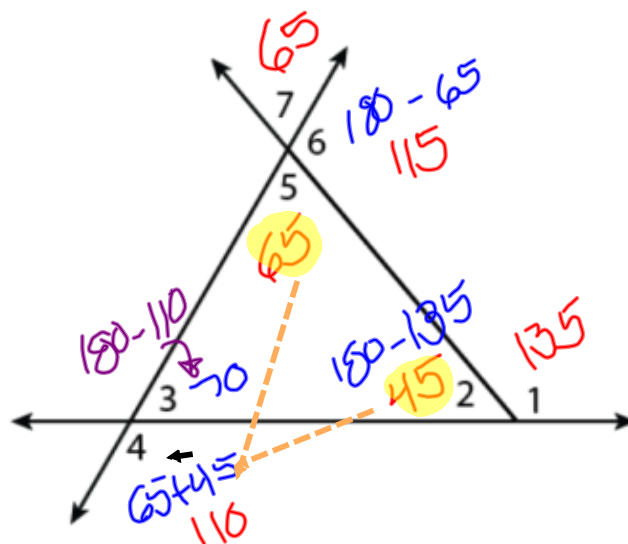
$$\begin{array}{r} -16 \qquad -16 \\ \hline \end{array}$$

$$-12c = -16$$

$$\begin{array}{r} -12 \quad -12 \\ \hline \end{array}$$

$$c = 4/3$$

**2** Given  $m\angle 1 = 135^\circ$  and  $m\angle 7 = 65^\circ$  drag and drop each measure next to the appropriate angle to show the correct measure for each angle.



$$m\angle 2 = 45$$

$$m\angle 5 = 65$$

$$m\angle 3 = 70$$

$$m\angle 6 = 115$$

$$m\angle 4 = 110$$

$\angle 1$  and  $\angle 2$  are supplementary angles.

$$135 + m\angle 2 = 180$$

$$m\angle 2 = 45^\circ$$

$\angle 7$  and  $\angle 6$  are supplementary angles.

$$65 + m\angle 6 = 180$$

$$m\angle 6 = 115^\circ$$

$\angle 5$  and  $\angle 6$  are supplementary angles.

$$m\angle 5 + 115 = 180$$

$$m\angle 5 = 65^\circ$$

$\angle 2$ ,  $\angle 3$  and  $\angle 5$  are the angles of a triangle.

According to the **Triangle Sum Theorem**, the sum of the angles in a triangle is  $180^\circ$ .

$$m\angle 2 + m\angle 3 + m\angle 5 = 180$$

$$45 + m\angle 3 + 65 = 180$$

$$110 + m\angle 3 = 180$$

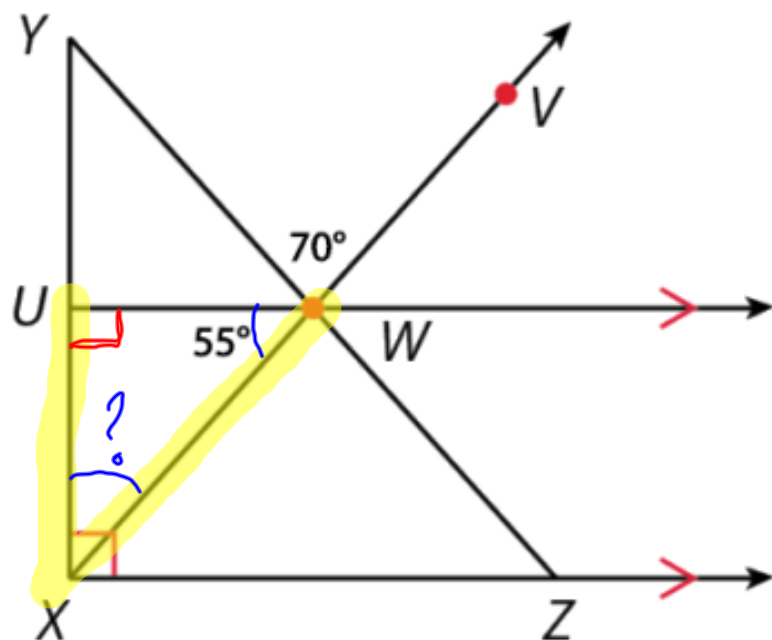
$$m\angle 3 = 70^\circ$$

$\angle 3$  and  $\angle 4$  are supplementary angles.

$$70 + m\angle 4 = 180$$

$$m\angle 4 = 110^\circ$$

**3** Determine the measure of  $\angle UXW$  in the diagram.



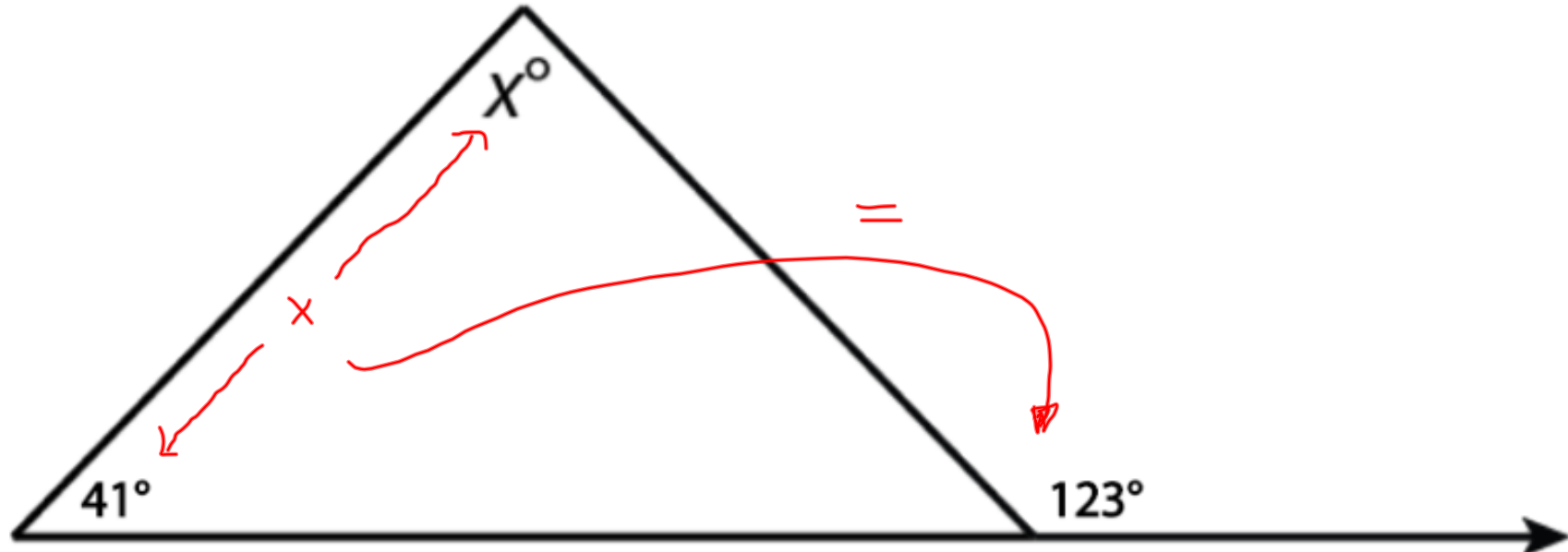
$$m\angle WUX = 90^\circ$$

According to the Triangle Sum Theorem, the sum of the angles of a triangle is  $180^\circ$ .

$$180^\circ = 55^\circ + 90^\circ + m\angle UXW$$

$$35^\circ = m\angle UXW$$

The measure of  $\angle UXW$  is   $^\circ$ .



According to the Exterior Angle Theorem, the measure of an exterior angle of a triangle is equal to the sum of the measures of its remote interior angles. Write and solve an equation relating the exterior and remote interior angles.

$$(x + 41)^\circ = 123^\circ$$

$$x = 82^\circ$$

The measure of angle  $x$  is   $^\circ$ .

- 5 Determine the measure of the indicated exterior angle in the diagram.

Triangle Sum Theorem = 180

Supplementary angles

$$(3x)^\circ + (2x)^\circ + (3x + 4)^\circ = 180$$

$$8x + 4 = 180$$

<del>8x</del>	-4	-4	
<del>8x</del>	-4	-4	
8	=	176	8

$$x = 22$$

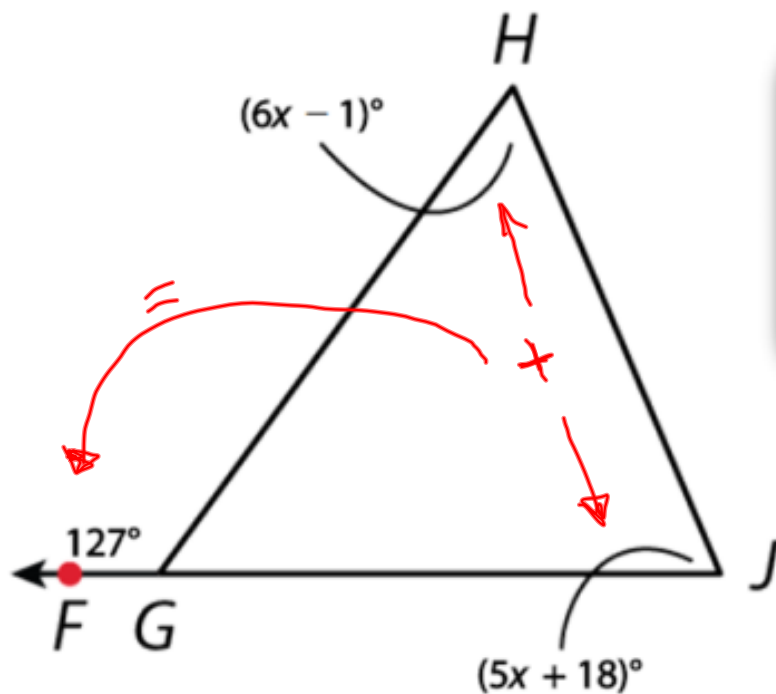
$(3x + 4)^\circ$

$$3(22) + 4 = 70$$

Supplementary angles

$$180 - 70 = 110^\circ$$

6 Find  $m\angle H$ .



Apply the remote interior angles.

$$\begin{aligned}(6x - 1) + (5x + 18) &= 127 \\ 11x + 17 &= 127 \\ 11x &= 110 \\ x &= 10\end{aligned}$$

Find  $m\angle H$ .

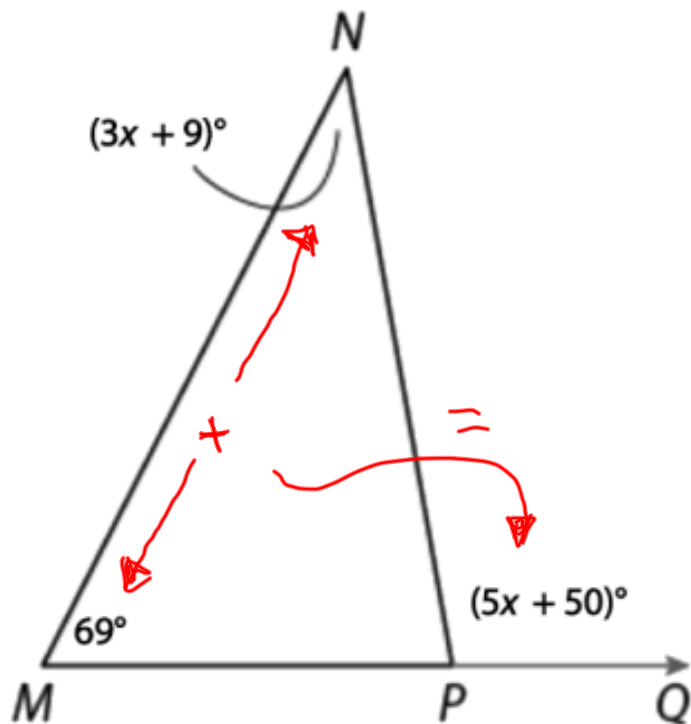
$$m\angle H = (6x - 1)^\circ = (6(10) - 1)^\circ = 59^\circ$$

$$m\angle H = \boxed{59}^\circ$$

7

Determine  $m\angle N$  in  $\triangle MNP$ .

$$m\angle N = \boxed{51}^\circ$$



Apply the remote interior angles.

$$5x + 50 = (3x + 9) + 69$$

$$5x + 50 = 3x + 78$$

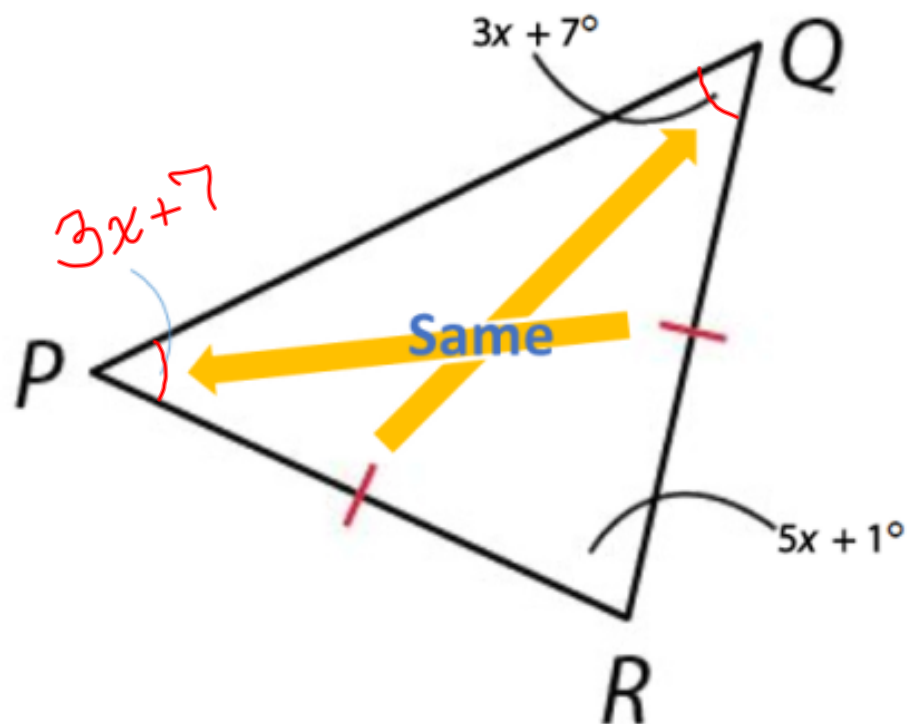
$$2x = 28$$

$$x = 14$$

$$m\angle N = (3x + 9)^\circ = (3(14) + 9)^\circ = 51^\circ$$



8 Find the angle measure.



$$2(3x + 7) + 5x + 1 = 180$$

$$6x + 14 + 5x + 1 = 180$$

$$11x + 15 = 180$$

$$11x = 165$$

$$x = 15$$

$$\text{So, } m \angle P = (3x + 7)^\circ$$

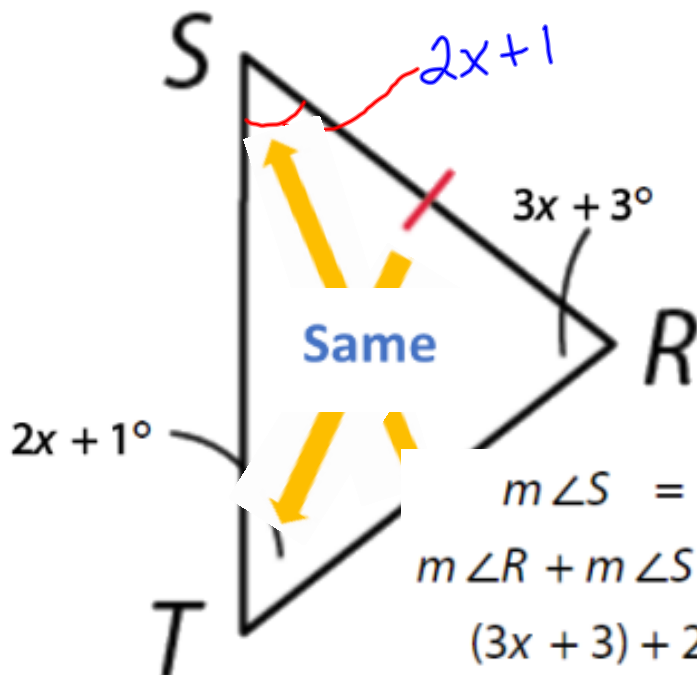
$$(3(15) + 7)^\circ$$

$$52^\circ$$

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

9

Find the measure of the indicated angle.



$$m \angle R = \boxed{78}^\circ$$

$$m \angle S = m \angle T = (2x + 1)^\circ \text{ Isosceles Triangle Theorem}$$

$$m \angle R + m \angle S + m \angle T = 180^\circ \text{ Triangle Sum Theorem}$$

$$(3x + 3) + 2(2x + 1) = 180 \text{ Substitution}$$

$$3x + 3 + 4x + 2 = 180 \text{ Distributive Property}$$

$$7x + 5 = 180 \text{ Addition}$$

$$7x = 175 \text{ Subtraction Property of Equality}$$

$$x = 25 \text{ Division Property of Equality}$$

$$\text{So, } m \angle R = (3x + 3)^\circ = (3(25) + 3)^\circ = 78^\circ.$$

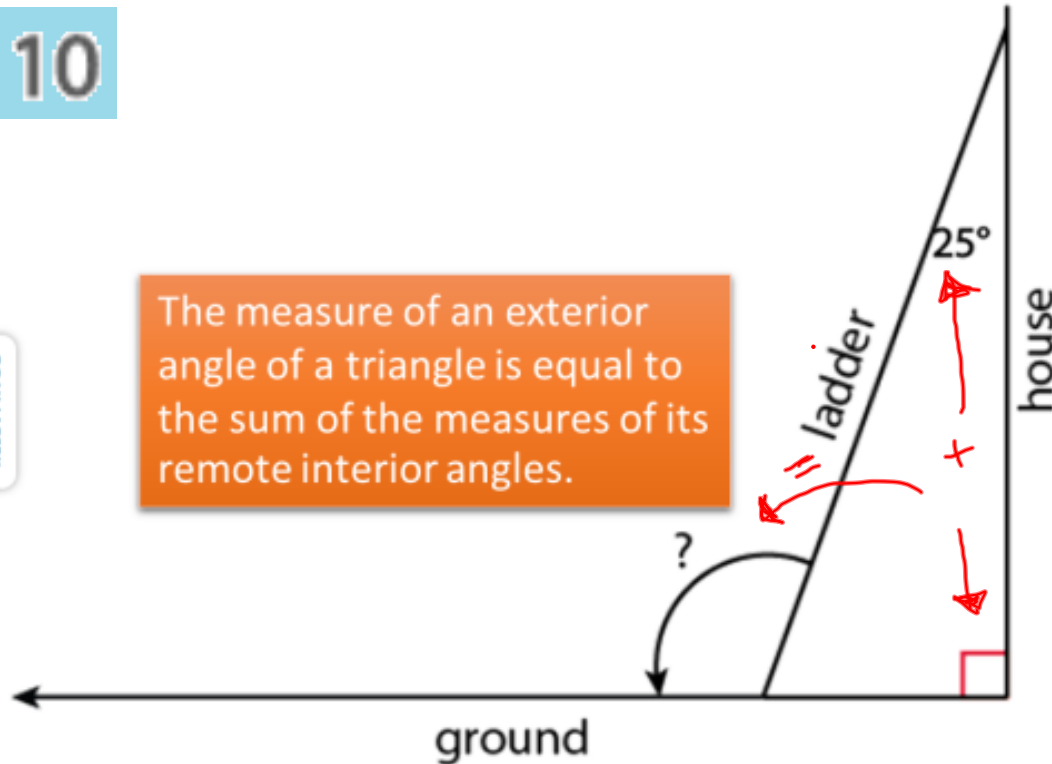
A ladder propped up against a house makes a  $25^\circ$  angle with the wall. What would be the ladder's angle measure with the ground facing away from the house?

10

RELEVANCE

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

The house is perpendicular to the ground, so the other remote interior angle is  $90^\circ$ .



Write and solve an equation relating the exterior and remote interior angles.

$$25 + 90 = 115$$

So, the measure of the indicated exterior angle is  $115^\circ$ .

**sotruefacts: #1801**

There is a 51% chance that a flipped coin will land on the side that was facing up when it was flipped.