

Module 1d: Right Angles & Right Triangles

Math Practice(s):

- Use appropriate tools strategically
- Attend to precision

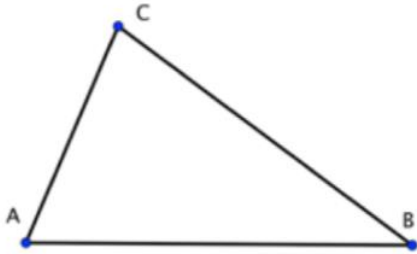
Learning Target(s):

- Identify the relationship between the measure of angles in a right triangle.

Homework:

HW #4: 1d #1-7

Warm-up



erase to show

1. $\triangle ABC$ is made from 3 vertices (plural of **vertex**; a point where 2 or more rays meet), points A, B, & C.

a. Points X, Y and Z are called the vertices of $\triangle XYZ$.

b. Name the 3 sides and the 3 angles of $\triangle ABC$. Use the appropriate symbols and notation.

\overline{CB} , \overline{CA} , \overline{AB} $\angle BAC$, $\angle ACB$, $\angle ABC$
 $\angle A$, $\angle C$, $\angle B$

c. Name the 3 sides and the 3 angles of $\triangle XYZ$. Use the appropriate symbols and notation.

\overline{XZ} , \overline{YZ} , \overline{YX} $\angle XYZ$, $\angle YZX$, $\angle ZXY$
 $\angle Y$, $\angle Z$, $\angle X$

d. Using your protractor, determine the measure of all three interior angles of each triangle.

$m\angle A =$ 67°

$m\angle X =$ 15°

$m\angle B =$ 36°

$m\angle Y =$ 130°

$m\angle C =$ 77°

$m\angle Z =$ 35°

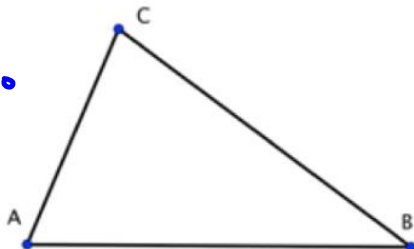
e. Analyze your answers to question 1D (above). Write a conjecture about the sum of the interior angles of a triangle.

They add up to 180°

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The **Triangle Angle-Sum Theorem** states that the sum of the measures of the \angle s in a triangle is 180° .

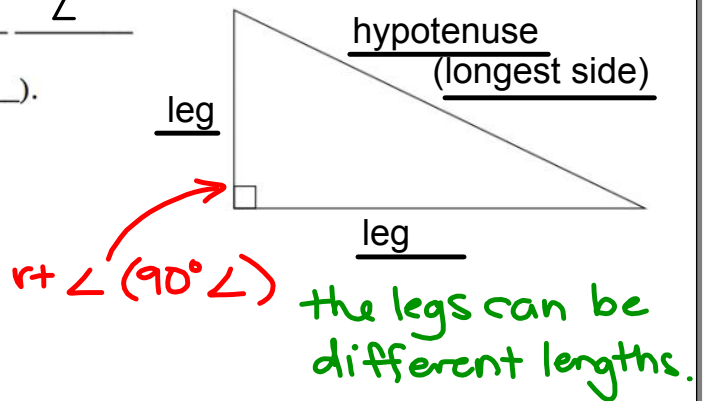
$m\angle A + m\angle B + m\angle C = 180^\circ$



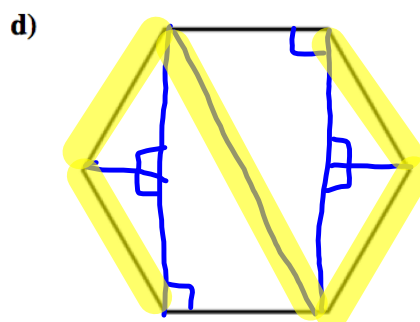
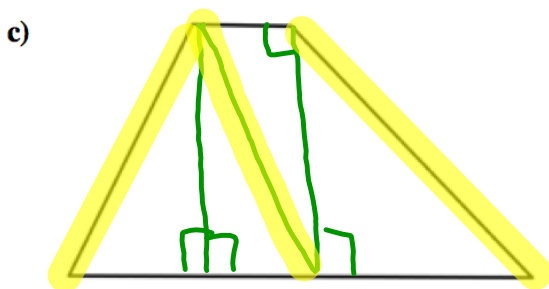
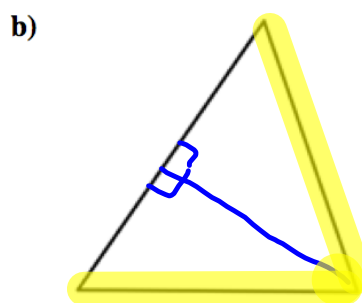
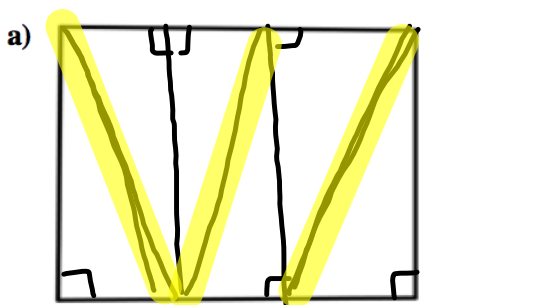
Right Triangles

Right triangles must have 1 right \angle
(and therefore, 2 acute \angle s).

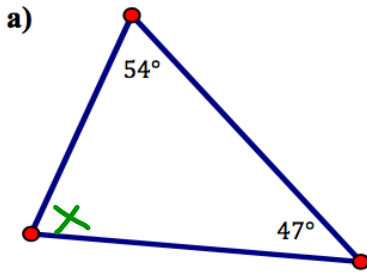
*Right triangles are one of the most basic shapes. So much so, that right triangles are the building blocks for many other shapes.



2. Draw segments inside each figure below to create right triangles. Label the right angle of each right triangle formed appropriately (with a box in the angle), and highlight each hypotenuse.



3. Use what you learned about the angles in triangles to find the measures of each missing angle.



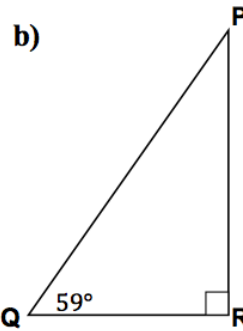
$$54 + 47 + x = 180$$

$$101 + x = 180$$

$$\begin{array}{r} -101 \\ -101 \end{array}$$

$$x = 79$$

The missing \angle measure is 79° .



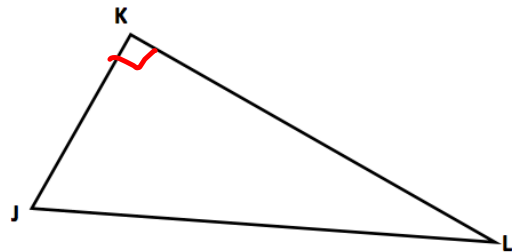
$$59 + 90 + m\angle P = 180$$

$$149 + m\angle P = 180$$

$$\begin{array}{r} -149 \\ -149 \end{array}$$

$$m\angle P = 31^\circ$$

c) $\overline{JK} \perp \overline{KL}$, $m\angle J = 4x$, $m\angle L = 3x + 6$



$$3x + 6 + 4x = 90$$

$$7x + 6 = 90$$

$$\begin{array}{r} -6 \\ -6 \end{array}$$

$$7x = 84$$

$$\begin{array}{r} \cancel{7} \\ \cancel{7} \end{array}$$

$$x = 12$$

$$3x + 6 + 4x + 90 = 180$$

$$m\angle J = 4x = 4(12)$$

$$m\angle L = 3x + 6 = 3(12) + 6$$

$$m\angle J = 48^\circ$$

$$m\angle L = 42^\circ$$

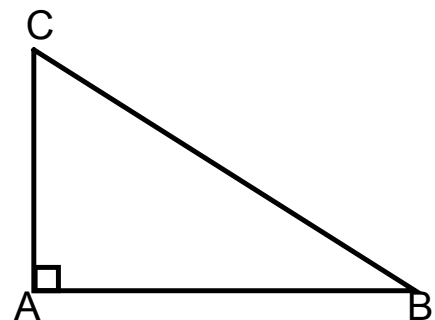
What about the other angles in right triangles???

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Theorem

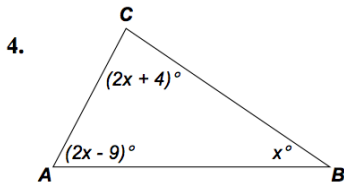
If a triangle is a right triangle, then the acute angles are complementary.

$$m\angle B + m\angle C = 90^\circ$$



Practice

Use the given information to determine the unknown measure(s) of each angle in the triangles below. Show how you determined your answers.



$$2x + 4 + 2x - 9 + x = 180$$

$$5x - 5 = 180$$

$$5x = 185$$

$$x = 37$$

$$m\angle C = 2(37) + 4$$

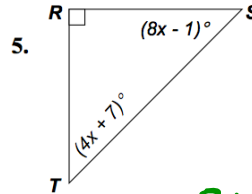
$$m\angle C = 78^\circ$$

$$m\angle A = 2(37) - 9$$

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

$$m\angle B = 37^\circ$$

$$4x + 7 + 8x - 1 + 90 = 180$$



↑
OR
↓

$$4x + 7 + 8x - 1 = 90$$

$$12x + 6 = 90$$

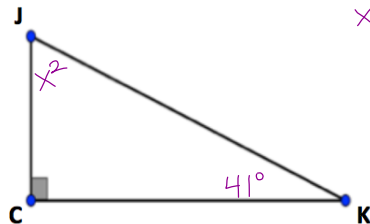
$$12x = 84$$

$$x = 7$$

$$m\angle T = 4(7) + 7 \quad m\angle S = 8(7) - 1$$

$$m\angle T = 35^\circ \quad m\angle S = 55^\circ$$

6. $m\angle J = x^2$, $m\angle K = 41^\circ$, find $m\angle J$.



$$x^2 + 41 + 90 = 180$$

$$x^2 + 131 = 180$$

$$\sqrt{x^2} = \sqrt{49}$$

$$x = 7$$

$$m\angle J = (7)^2$$

$$m\angle J = 49^\circ$$

7. In $\triangle ERW$, \overline{ER} is the hypotenuse of the triangle, and $m\angle E$ is five times as large as $m\angle R$.

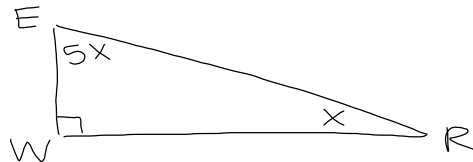
- Draw a diagram to represent $\triangle ERW$ and appropriately label the vertices and angles based on the given information.
- Then, determine the measure of all three angles of $\triangle ERW$. Show how you determined your answers.

$$5x + x + 90 = 180$$

$$6x + 90 = 180$$

$$6x = 90$$

$$x = 15$$



$$m\angle E = 5x$$

$$= 5(15)$$

$$m\angle E = 75^\circ$$

$$m\angle R = x$$

$$m\angle R = 15^\circ$$

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