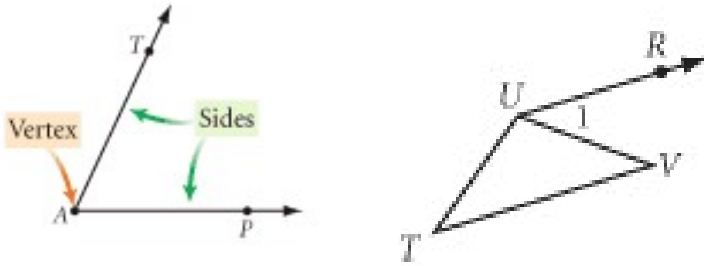
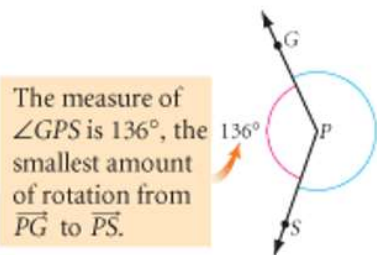


## Lesson 1.2 – Poolroom Math

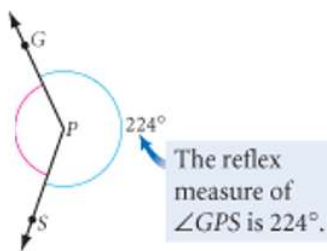
Angle - An angle is formed by two rays (called the sides of the angle) that share a common endpoint (called the vertex of the angle). Names of angles should always use the vertex point as the middle letter (i.e.  $\angle TAP$  or  $\angle PAT$ ). If there are no other angles that have the same vertex as the angle you are referencing, you may name the angle using only the vertex point (i.e.  $\angle A$ ). You may also name angles using the number on the inside of the angle near the vertex (i.e.  $\angle 1$ ).



Measure of an Angle - The measure (in degrees) of an angle is the smallest amount of rotation about the vertex from one ray to the other.

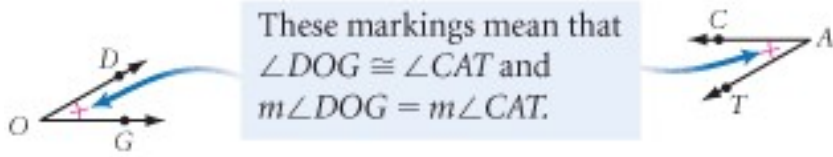


Reflex Measure of an Angle - The largest amount of rotation less than 360 degrees is called the reflex measure of an angle.

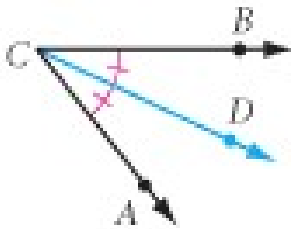


\*\*The measure of the angle and the reflex measure of the angle should add to  $360^\circ$ .

**Congruent Angles** - Two angles are congruent if and only if they have equal measure. Use identical markings to show that two angles in a figure are congruent.



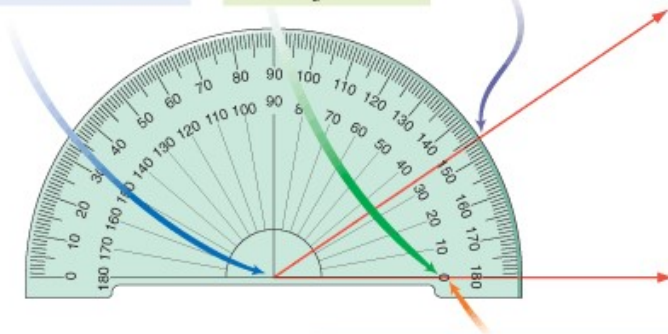
**Angle Bisector** - A ray is the angle bisector if it contains the vertex and divides the angle into two congruent angles. We can say  $\overrightarrow{CD}$  bisects  $\angle BCA$  because it divides  $\angle BCA$  into  $\angle BCD$  and  $\angle DCA$ , and  $\angle BCD \cong \angle DCA$ .



**Step 1:** Place the center mark of the protractor on the vertex.

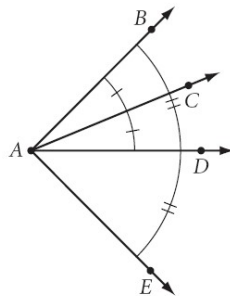
**Step 2:** Line up the 0-mark with one side of the angle.

**Step 3:** Read the measure on the protractor scale.

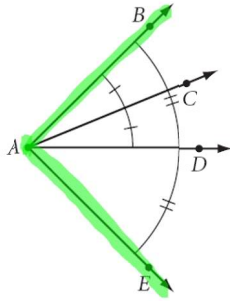


**Step 4:** Be sure you read the scale that has the 0-mark you are using! The angle in the diagram measures  $34^\circ$  and not  $146^\circ$ .

Example 1: Complete the statement



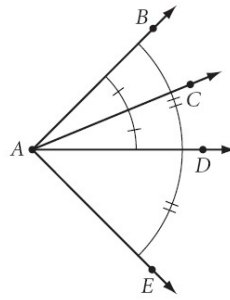
A is the \_\_\_\_\_ of  $\angle BAE$ .



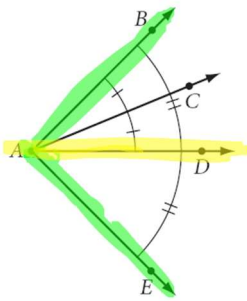
Since A is the point where the two rays that make  $\angle BAE$ , A is the vertex of the angle.

A is the vertex of  $\angle BAE$ .

Example 2: Complete the statement



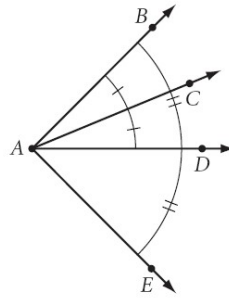
$\overrightarrow{AD}$  is the \_\_\_\_\_ of  $\angle BAE$ .



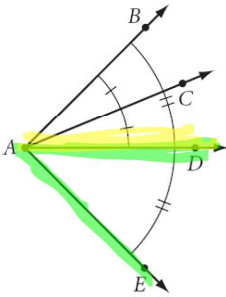
Since  $\overrightarrow{AD}$  is the ray that cuts  $\angle BAE$  in half,  $\overrightarrow{AD}$  is the angle bisector of the angle.

$\overrightarrow{AD}$  is the angle bisector of  $\angle BAE$

Example 3: Complete the statement



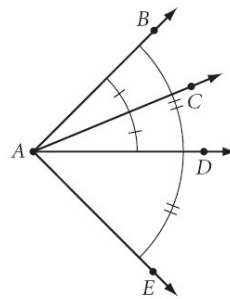
$\overrightarrow{AD}$  is the \_\_\_\_\_ of  $\angle DAE$ .



Since  $\overrightarrow{AD}$  is one of the rays that forms  $\angle DAE$  in half,  $\overrightarrow{AD}$  is a side of the angle.

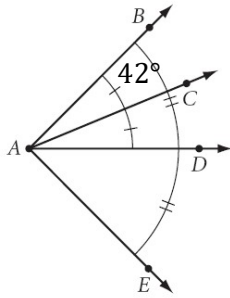
$\overrightarrow{AD}$  is the side of  $\angle DAE$

Example 4: Complete the statement

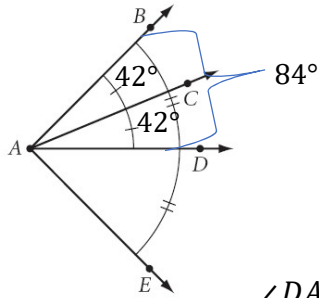
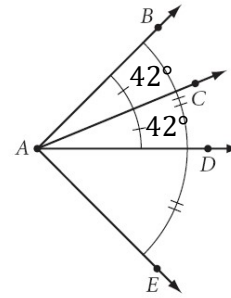


If  $m\angle BAC = 42^\circ$ , then  $m\angle CAE =$  \_\_\_\_\_.

Because there is a lowercase m in front of the angle name, we know that we are being asked for the degree measure of the angle.



$\angle CAD$  is marked congruent to  $\angle BAC$

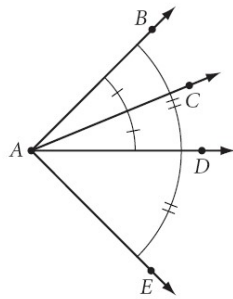


$\angle DAE$  is marked congruent to  $\angle BAD$

$$m\angle CAE = m\angle CAD + m\angle DAE = 42^\circ + 84^\circ = 126^\circ.$$

If  $m\angle BAC = 42^\circ$ , then  $m\angle CAE = \underline{\underline{126^\circ}}$ .

Example 5: Complete the statement

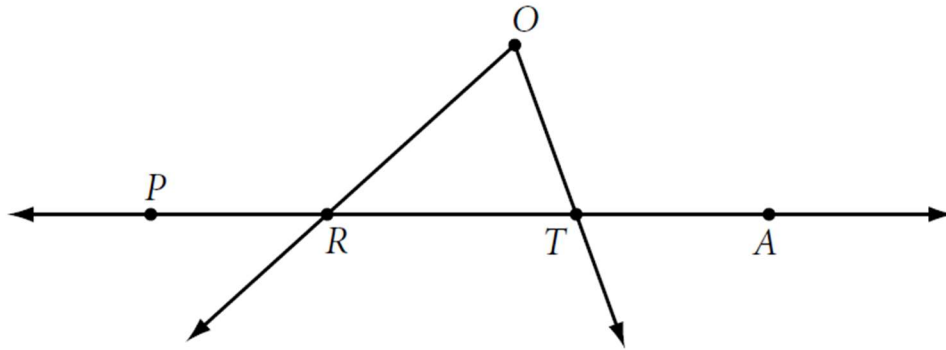


$\angle DAB \cong \underline{\hspace{2cm}}$ .

Because the question uses a congruent sign, we know that we are being asked to name a figure that has the same degree measure as  $\angle DAB$ . If we look at the figure,  $\angle DAB$  is marked with two tick marks as is  $\angle DAE$ .

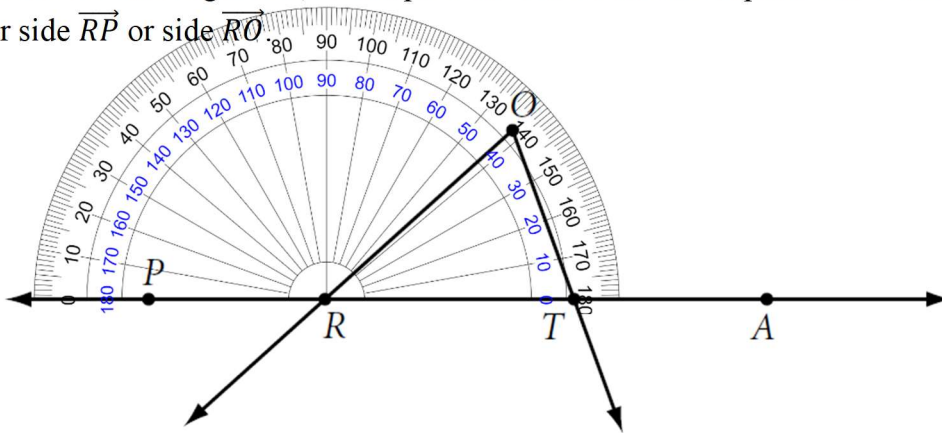
$\angle DAB \cong \underline{\underline{\angle DAE}}$ .

Example 6: Use your protractor to find the measure of the angle to the nearest degree.



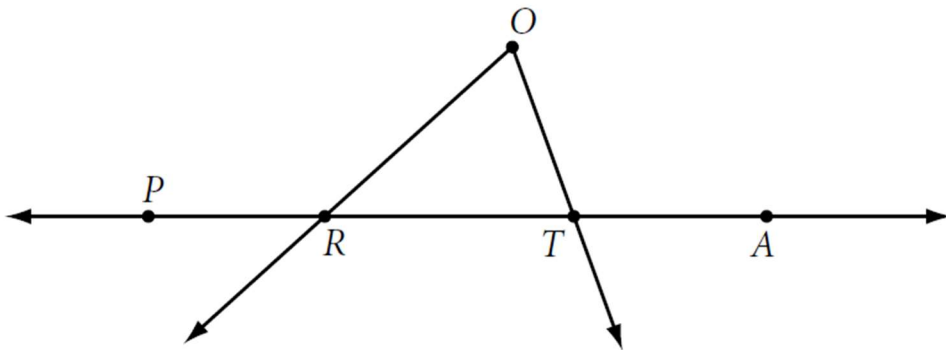
$m\angle PRO$

The vertex of this angle is R, so our protractor cross should be placed on R and lined up with either side  $\overrightarrow{RP}$  or side  $\overrightarrow{RO}$ .



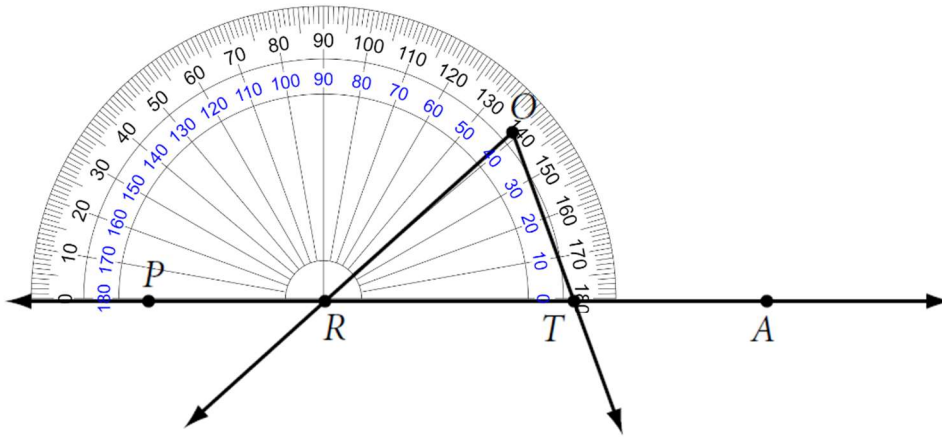
Since the angle is larger than  $90^\circ$ , we will read the larger number. So,  $m\angle PRO \approx 138^\circ$ .

Example 7: Use your protractor to find the measure of the angle to the nearest degree.



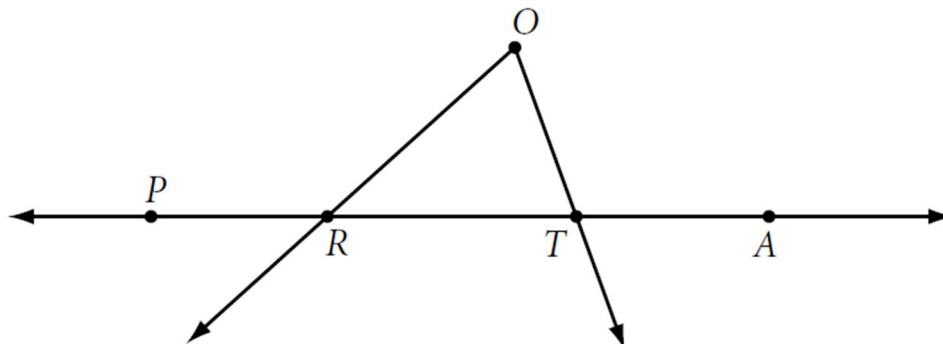
$m\angle ORT$

The vertex of this angle is R, so our protractor cross should be placed on R and lined up with either side  $\overrightarrow{RO}$  or side  $\overrightarrow{RT}$ .



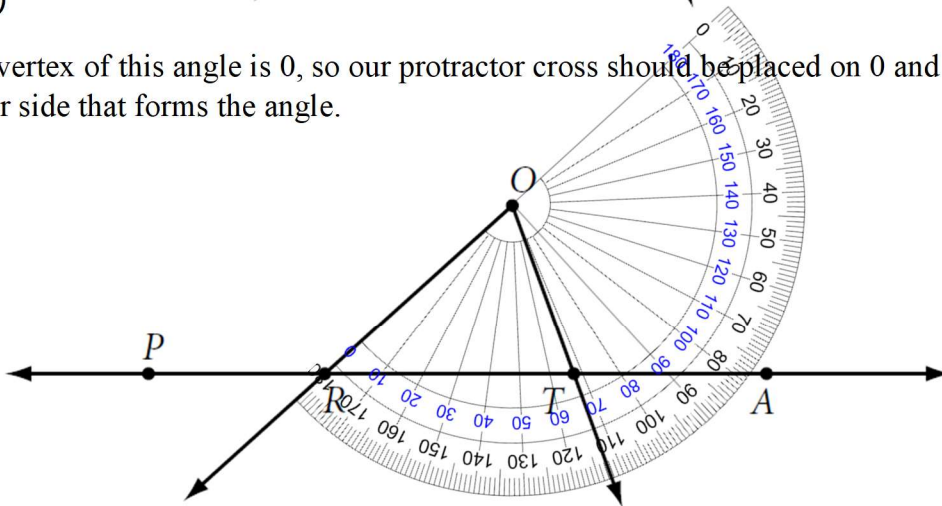
Since the angle is smaller than  $90^\circ$ , we will read the smaller number. So,  $m\angle ORT \approx 42^\circ$ .

Example 8: Use your protractor to find the measure of the angle to the nearest degree.



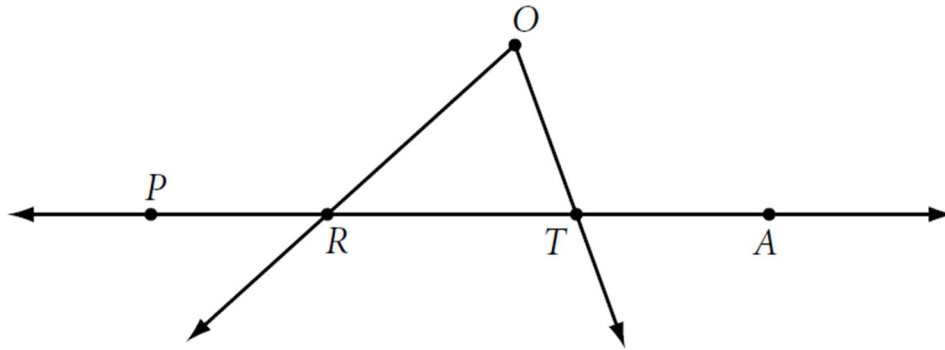
$m\angle O$

The vertex of this angle is O, so our protractor cross should be placed on O and lined up with either side that forms the angle.



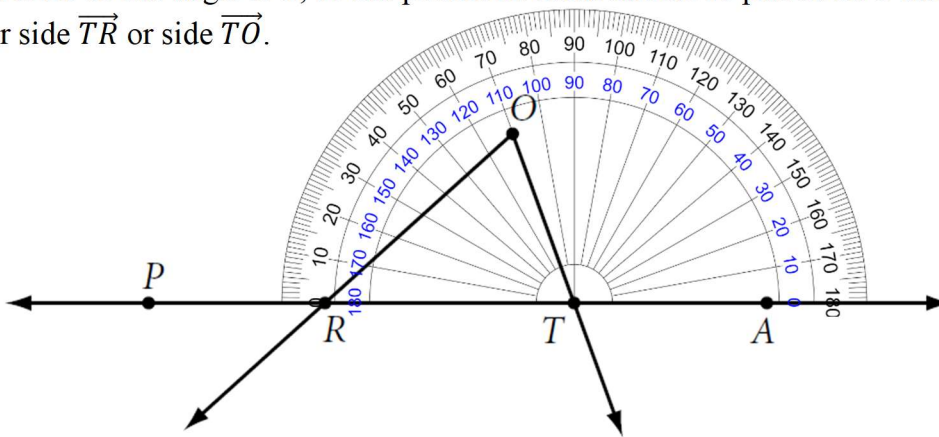
Since the angle is smaller than  $90^\circ$ , we will read the smaller number. So,  $m\angle O \approx 67^\circ$ .

Example 9: Use your protractor to find the measure of the angle to the nearest degree.



$m\angle RTO$

The vertex of this angle is T, so our protractor cross should be placed on T and lined up with either side  $\overrightarrow{TR}$  or side  $\overrightarrow{TO}$ .



Since the angle is smaller than  $90^\circ$ , we will read the smaller number. So,  $m\angle RTO \approx 70^\circ$ .

Example 10: Use your protractor to draw and label the angle with the given measure

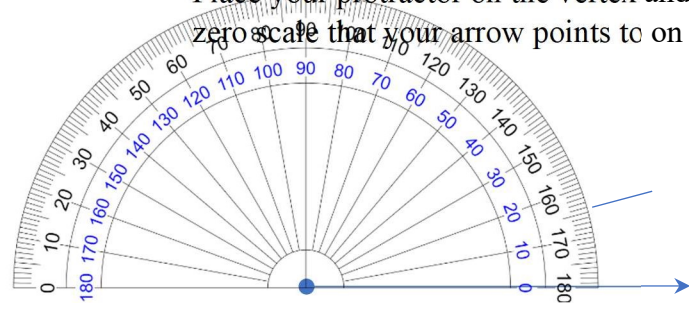
$m\angle MNO = 15^\circ$

Start by drawing a ray.

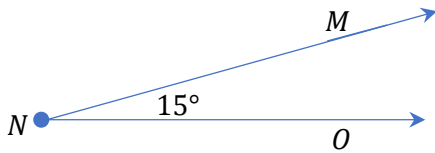




Place your protractor on the vertex and measure the desired angle. Make sure you start at the zero scale that your arrow points to on the protractor. Make a mark at the measure you want.



Connect the vertex of your angle to the mark you made and label the angle with the degree measure as well as the name. Remember that the middle letter of the name must be the vertex of the angle.



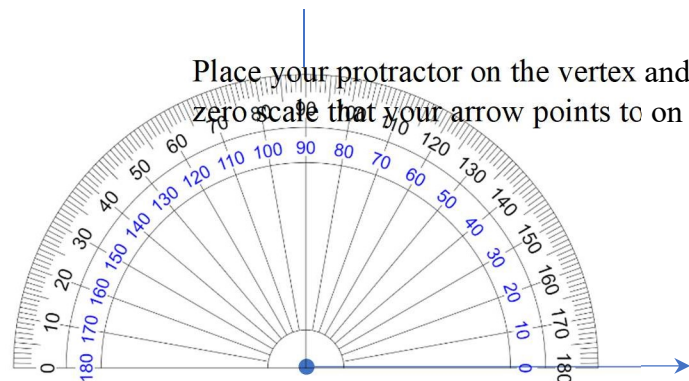
Example 11: Use your protractor to draw and label the angle with the given measure

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

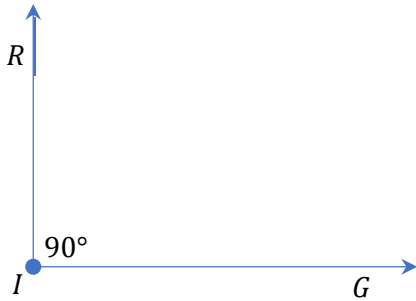
Start by drawing a ray.



Place your protractor on the vertex and measure the desired angle. Make sure you start at the zero scale that your arrow points to on the protractor. Make a mark at the measure you want.



Connect the vertex of your angle to the mark you made and label the angle with the degree measure as well as the name. Remember that the middle letter of the name must be the vertex of the angle.



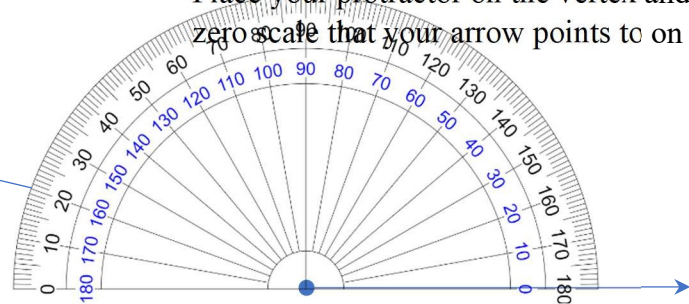
Example 12: Use your protractor to draw and label the angle with the given measure

$$m\angle Z = 160^\circ$$

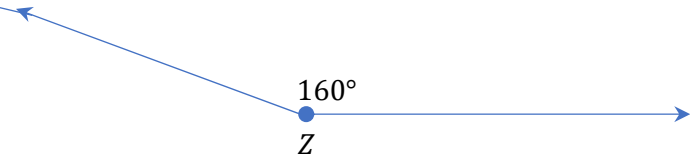
Start by drawing a ray.



Place your protractor on the vertex and measure the desired angle. Make sure you start at the zero scale that your arrow points to on the protractor. Make a mark at the measure you want.

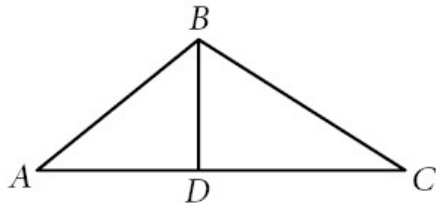


Connect the vertex of your angle to the mark you made and label the angle with the degree measure as well as the name. Remember that if there is only one letter in the name it must be the vertex of the angle.

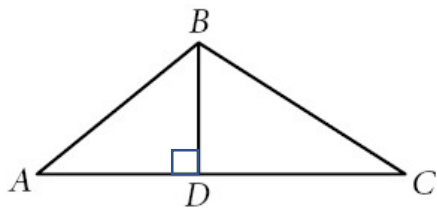


Example 13: Mark the figure with the given information

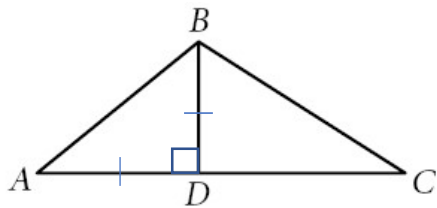
$m\angle ADB = 90^\circ, AD = BD, \angle DAB \cong \angle DBA$



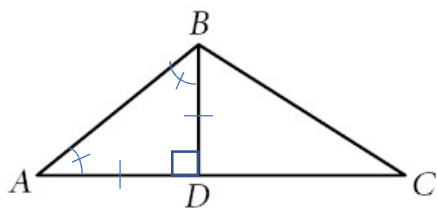
$m\angle ADB = 90^\circ$



$AD = BD$

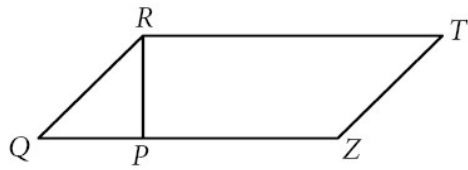


$\angle DAB \cong \angle DBA$

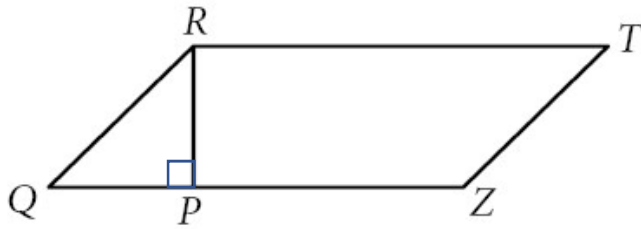


Example 14: Mark the figure with the given information

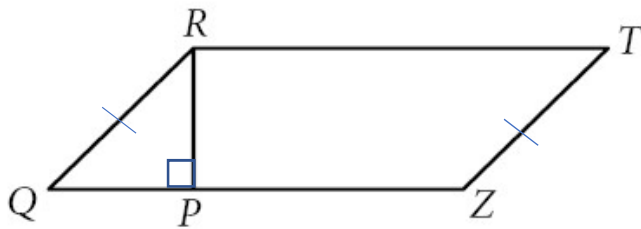
$m\angle RPO = 90^\circ, QR = TZ, RT = QZ, \angle Q \cong \angle T$



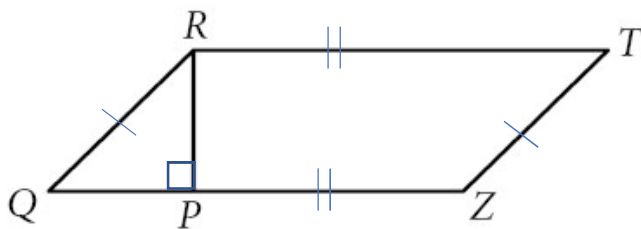
$m\angle RPO = 90^\circ$



$QR = TZ$



$RT = QZ$



$\angle Q \cong \angle T$

