

# Assignment

## Write

Provide an example to illustrate each term.

1. Isosceles Triangle Base Angle Theorem
2. Isosceles Triangle Base Angle Converse Theorem
3. Perpendicular Bisector Theorem
4. 30°-60°-90° Triangle Theorem
5. 45°-45°-90° Triangle Theorem

## Remember

The Perpendicular Bisector Theorem states: "The points on a perpendicular bisector of a line segment are equidistant from the segment's endpoints."

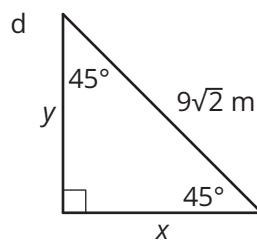
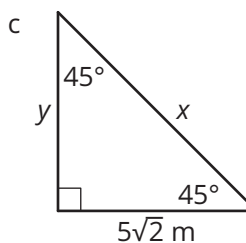
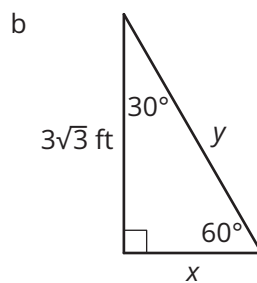
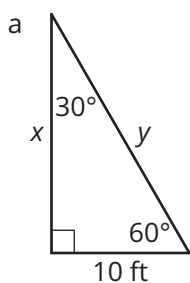
The Isosceles Triangle Base Angles Theorem states: "If two sides of a triangle are congruent, then the angles opposite these sides are congruent."

The 30°-60°-90° Triangle Theorem states: "The length of the hypotenuse in a 30°-60°-90° triangle is 2 times the length of the shorter leg, and the length of the longer leg is  $\sqrt{3}$  times the length of the shorter leg."

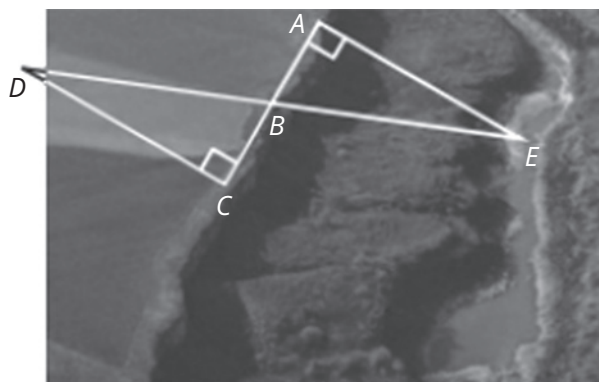
The 45°-45°-90° Triangle Theorem states: "The length of the hypotenuse in a 45°-45°-90° triangle is  $\sqrt{2}$  times the length of a leg."

## Practice

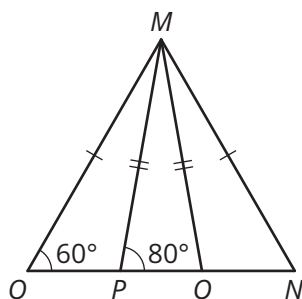
1. Solve for the unknown side lengths.



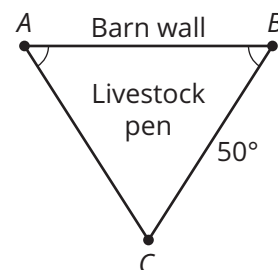
2. Samantha is hiking through the forest and she comes upon a canyon. She wants to know how wide the canyon is. She measures the distance between points  $A$  and  $B$  as 35 feet. Then, she measures the distance between points  $B$  and  $C$  as 35 feet. Finally, she measures the distance between points  $C$  and  $D$  as 80 feet. How wide is the canyon? Explain your reasoning.



3. Explain why  $m\angle NMO = 20^\circ$ .



4. Jill is building a livestock pen in the shape of a triangle. She is using one side of a barn for one of the sides of her pen and has already placed posts in the ground at points  $A$ ,  $B$ , and  $C$ , as shown in the diagram. If she places fence posts every 10 feet, how many more posts does she need? Note: There will be no other posts placed along the barn wall.

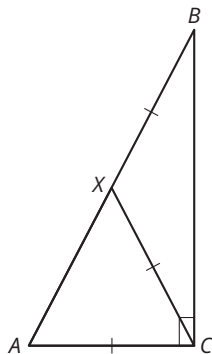


5. A mathematical society in India designed this stamp. The pyramidal design is an equilateral triangle. Suppose the height of the pyramidal design on the stamp is 42 millimeters. Determine the area of the pyramidal design on the stamp.



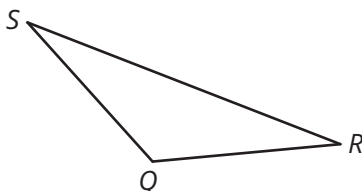
## Stretch

Explain why  $m\angle XAC = 60^\circ$ .



## Review

1. Determine the measure of an interior angle of a regular 18-gon.
2. If a regular polygon has 15 sides, what is the measure of each exterior angle? Explain your reasoning.
3. Write a conjecture about the exterior angles of triangles at a vertex. Then, write the converse of the conjecture.
4. Use a compass and straightedge to construct the centroid of  $\triangle QRS$ .



5. Given that  $l \parallel m$  and each angle measure, determine the measures of the remaining unknown angles.
  - a.  $m\angle 1 = 105^\circ$
  - b.  $m\angle 7 = 22^\circ$

