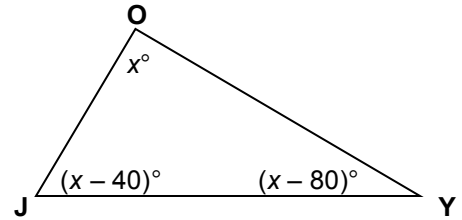


Show all your work. Box or circle your final answer when an answer line is not provided. When appropriate, write your answers in simplest radical form, as a simplified improper fraction, AND as a decimal rounded to the nearest hundredths place. REMEMBER UNITS!

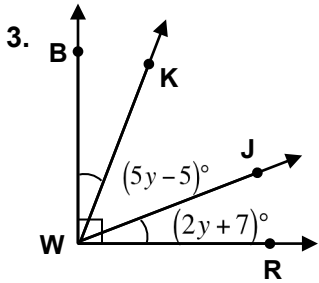
In 1 & 2, use the triangle to the right.

1. What is the value of  $x$ ?

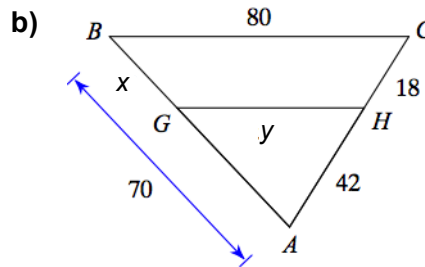
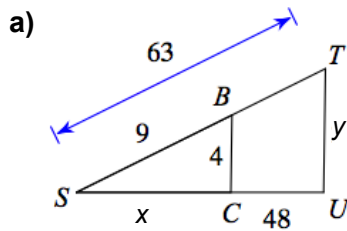
2. Determine  $m\angle YJO$ .



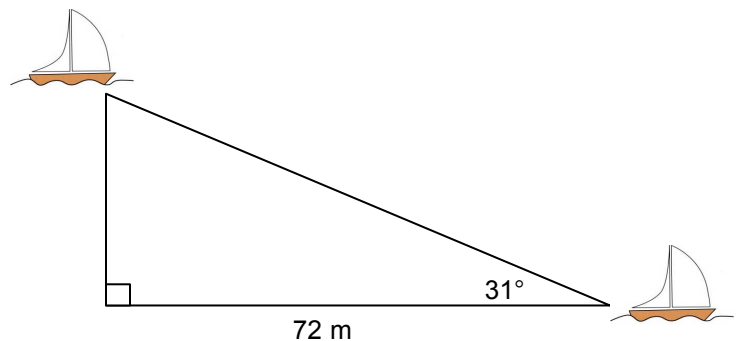
Find the value of the variable, and the measure of each angle.



4. Find the missing length. The triangles in each pair are similar.



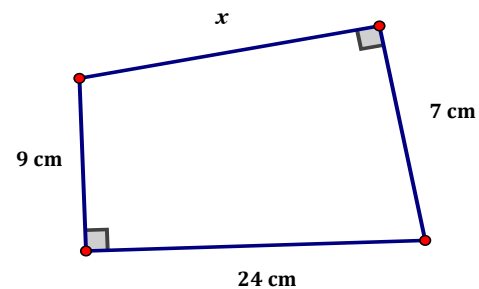
5. Pictured below is the Coast Guard's records of two boats sailing. How far apart are the two boats? Round your answer to the nearest tenths.



6. Which of the following expressions are equivalent to  $\sqrt{112}$ ?

Expression	Equivalent to $\sqrt{112}$ ? (Yes or No)
$4\sqrt{7}$	
$16\sqrt{7}$	
$7\sqrt{4}$	
$4\sqrt{14}$	
$2\sqrt{28}$	

7. Solve for  $x$ .



8. Which statements below are true? (Choose all that apply.)

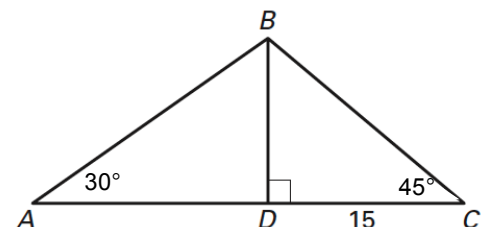
- A) You can solve for a segment in a right triangle if you are given the lengths of two sides.
- B) You can solve for a segment in a right triangle if you are given the measure of the two acute angles.
- C) You can solve for a segment in a right triangle if you are given only one side and one acute angle.
- D) You can solve for a segment in a right, isosceles triangle if you are given the length of one side.

Compare the quantity in Column A with the quantity in Column B. Choose the letter that best answers the question.

- A) The quantity in Column A is greater.
- B) The quantity in Column B is greater.
- C) The two quantities are equal.
- D) The relationship cannot be determined on the basis of the information supplied.

9. Column A  
AB

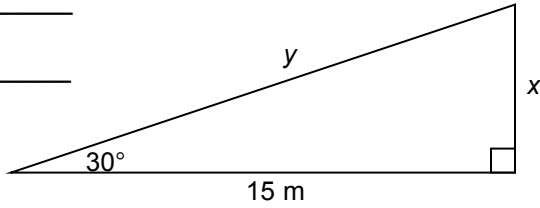
Column B  
BC



10. Find the value of the variable to the nearest hundredth. Unknown units are in meters.

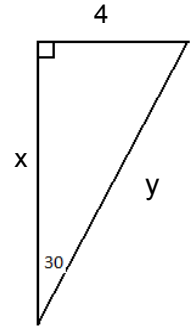
a)  $x =$  \_\_\_\_\_

$y =$  \_\_\_\_\_



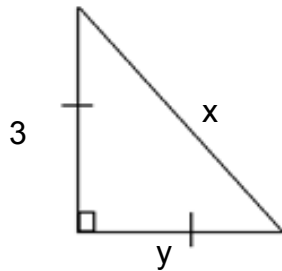
b)  $x =$  \_\_\_\_\_

$y =$  \_\_\_\_\_

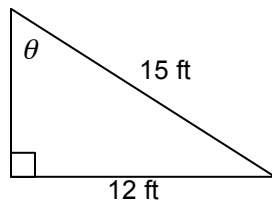


c)  $x =$  \_\_\_\_\_

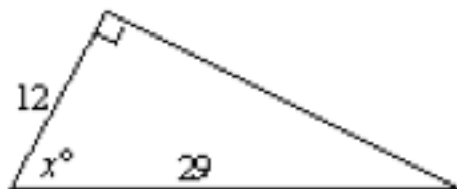
$y =$  \_\_\_\_\_



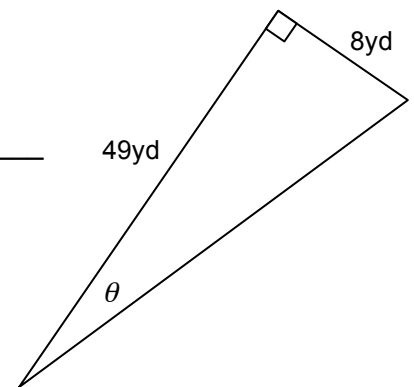
d)  $\theta =$  \_\_\_\_\_



e)  $x =$  \_\_\_\_\_

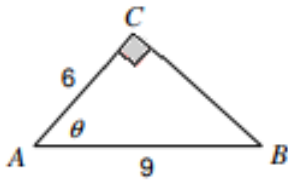


f)  $\theta =$  \_\_\_\_\_

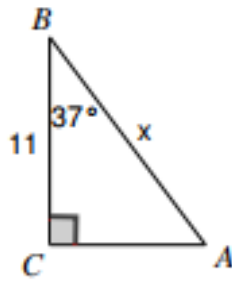


11. Find the values of the variables. Round answers to the nearest hundredth.

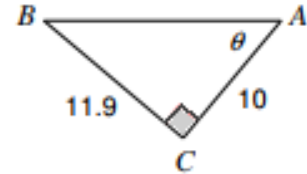
A.



B.



C.



12. A building near Atlanta, Georgia, is 181 feet tall. On a particular day at noon it casts a 204-foot shadow. What is the angle of elevation from the top of the shadow to the top of the building? Round your answer to the nearest degree.

**Diagram:**

**Solution:**

13. You would like to set up your tent using a center post that is 12 feet in height. You intend to tie a rope from the top of the center post to a stake anchored in the ground 10 feet away. Find the angle of elevation from the ground to the top of the center post. Round your answer to the nearest degree. Draw and label a diagram to represent the situation.

**Diagram:**

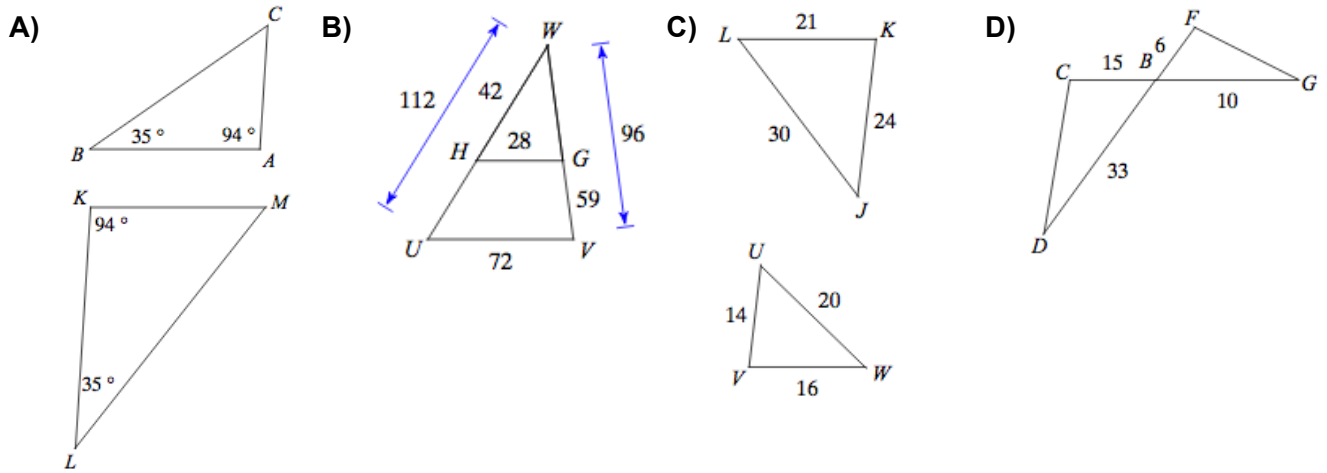
**Solution:**

14. A diver spots a sunken ship on the ocean floor 101 m away. If the ocean is 80 m deep, at what angle of depression must the diver swim to get directly to the sunken ship? Round to the nearest degree.

**Diagram:**

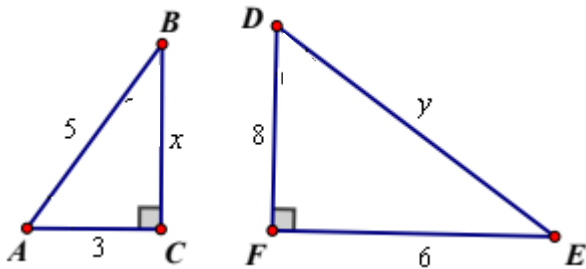
**Solution:**

15. In which figure(s) can you conclude that the triangles are similar? (Choose all that apply)



16. Solve for  $x$  and  $y$  where  $\triangle ABC \sim \triangle EDF$

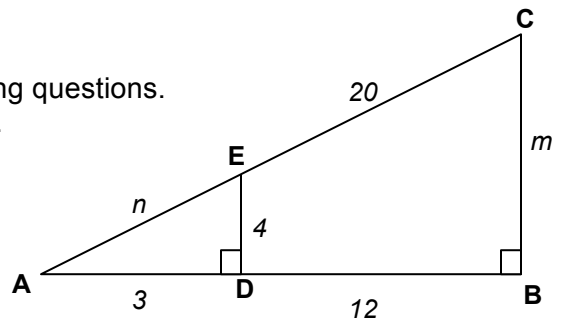
$x =$  \_\_\_\_\_  $y =$  \_\_\_\_\_



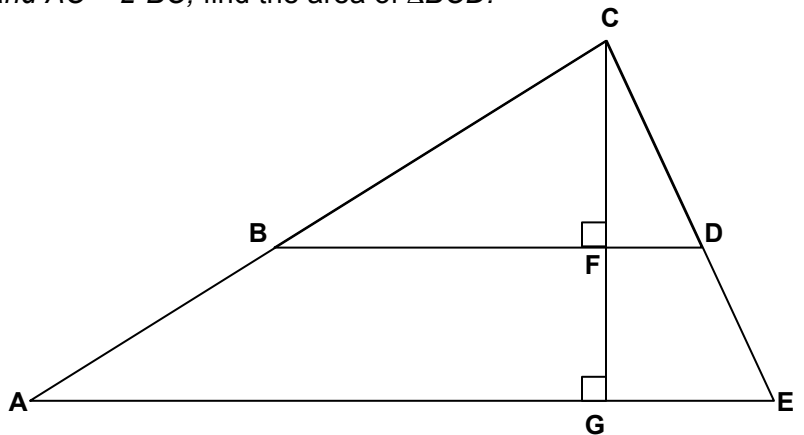
17. Use this diagram of overlapping triangles to answer the following questions.

a) Write an appropriate similarity statement for the triangles.

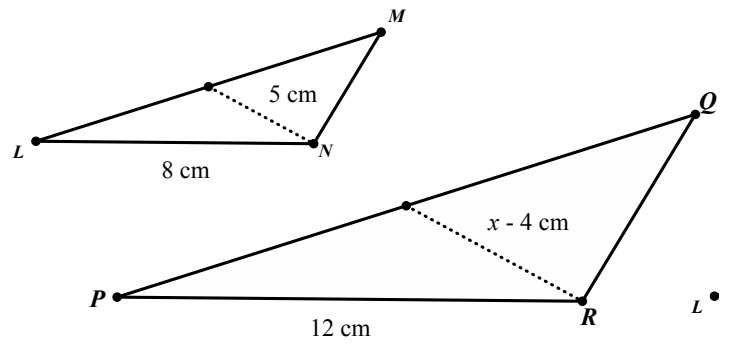
b) Determine the values of  $m$  and  $n$ .



18. Given  $\triangle BCD \sim \triangle ACE$ ,  $AE = 36$  ft,  $CG = 20$  ft, and  $AC = 2 \cdot BC$ , find the area of  $\triangle BCD$ .



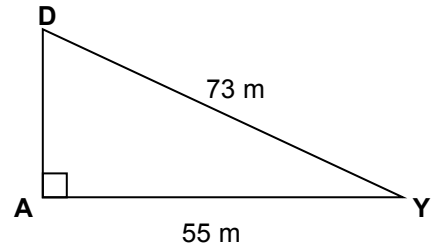
19. Solve for  $x$  where  $\Delta PQR \sim \Delta LMN$ .



In 20 & 21, a new subdivision in Kapolei has designed a park shaped like a right triangle, shown below.

20. Find  $DA$ .

- A) 230 m
- B) 98 m
- C) 1,421 m
- D) 48 m

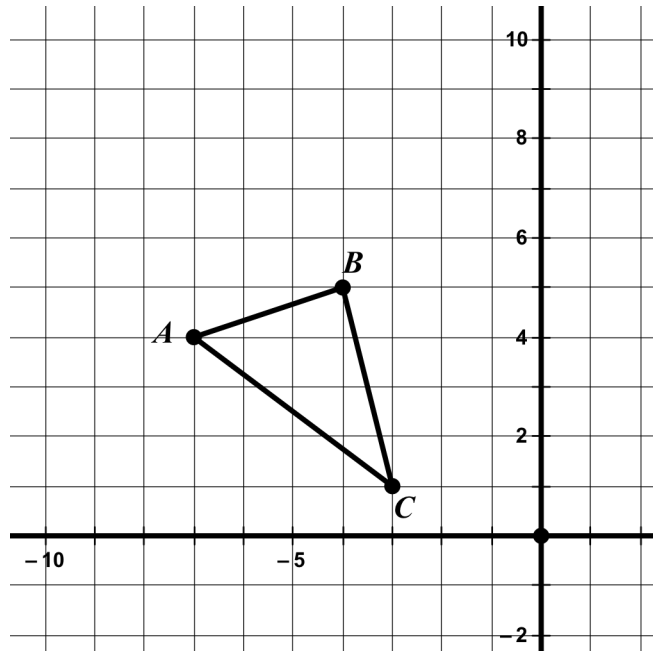


21. The association has decided that the dimensions of the park are too small, so they've asked your firm to enlarge the park by a scale factor is 2. Find the new length of  $DA$ .

22. For each of the following, mark with an X whether it is True or False.

True	False	Statement
		In similar triangles, corresponding angle measures are congruent and side lengths are congruent.
		A triangle dilated about the origin with a scale factor of 3 results in the new triangle having an area equal to three times the area of the original triangle.
		A dilation with a scale factor of $7/2$ will result in the image being larger than the original.
		Given $\Delta FGH \sim \Delta KJH$ , where $KJ = 1/4 FG$ , then the length of the altitude of $\Delta KJH$ is $1/4$ the length of the altitude of $\Delta FGH$ .
		The image BCDE was dilated about the origin. 

23. Dilate  $\triangle ABC$  about the origin using a scale factor of  $k = 1.5$ . Label your image appropriately.

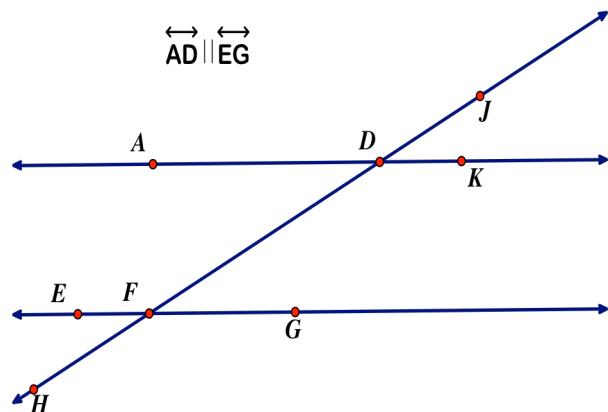


24. Mark with an X whether each statement is always, sometimes, or never true.

Always True	Sometimes True	Never True	Statement
			If a transversal crosses two parallel lines, then same side interior angles sum to $180^\circ$ .
			If a transversal crosses two parallel lines, then the alternate exterior angles are both right angles.
			If $\angle XYZ$ and $\angle ABC$ are adjacent angles, then $m\angle ABC + m\angle XYZ = 180^\circ$ .

25. Use the diagram to the right to label each pair of angles with its appropriate description.

- a)  $\angle ADJ$  and  $\angle GFH$
- b)  $\angle ADJ$  and  $\angle EFD$
- c)  $\angle EFH$  and  $\angle DFG$
- d)  $\angle GFD$  and  $\angle EFD$
- e)  $\angle KDF$  and  $\angle EFD$



**Possible Descriptions**

- Vertical Angles
- Alternate Interior Angles
- Linear Pair
- Alternate Exterior Angles
- Corresponding Angles
- Same Side Interior Angles

26. In the diagram below,  $j \parallel k$ . Justify each statement.

a)  $\angle 6 \cong \angle 7$

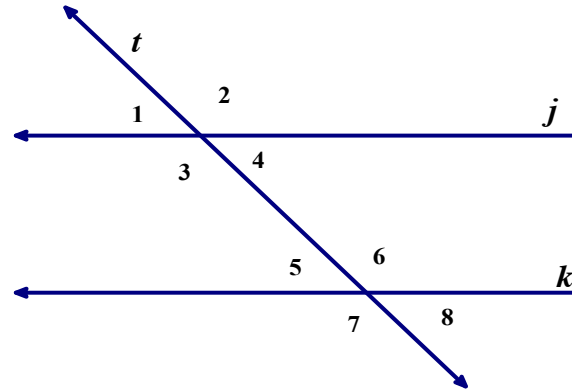
b)  $m\angle 1 + m\angle 3 = 180^\circ$

c)  $\angle 3 \cong \angle 6$

d)  $\angle 8 \cong \angle 4$

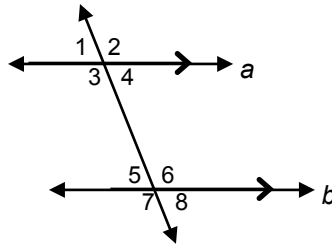
e)  $m\angle 3 + m\angle 5 = 180^\circ$

f)  $\angle 2 \cong \angle 7$



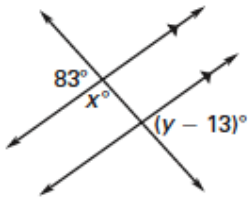
27. If  $m\angle 3 = 120^\circ$ , then  $m\angle 7 = \underline{\quad ? \quad}$ .

- A)  $60^\circ$
- B)  $90^\circ$
- C)  $120^\circ$
- D)  $180^\circ$

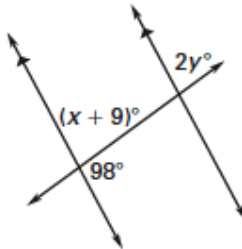


Find the value of the variables.

28.



29.



30.

