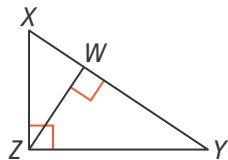




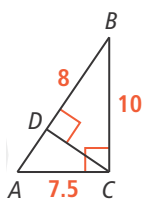
**UNDERSTAND**

11. **Mathematical Connections** Consider  $\triangle XYZ$  with altitude to the hypotenuse  $\overline{ZW}$ .



- Describe a sequence of transformations that maps  $\triangle XYZ$  to  $\triangle XZW$ .
- Describe a sequence of transformations that maps  $\triangle XYZ$  to  $\triangle ZYW$ .

12. **Error Analysis** Amaya was asked to find  $DC$ . What is Amaya's error?



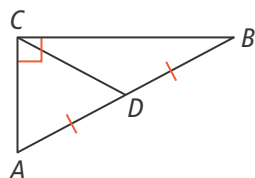
$\triangle ABC \sim \triangle ACD$  by Theorem 7-4.

$$\frac{AC}{BC} = \frac{AC}{DC} \rightarrow \frac{7.5}{10} = \frac{7.5}{DC}$$

$$7.5 \times DC = 7.5 \times 10, \text{ so } DC = 10.$$



13. **Make Sense and Persevere** Is  $CD$  the geometric mean of  $AD$  and  $BD$ ? Explain.



14. **Construct Arguments** Write proofs of Theorem 7-4 and its corollaries.

a. **Given:**  $m\angle JLK = 90$  and  $\overline{LM} \perp \overline{JK}$

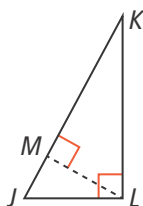
**Prove:**  $\triangle JKL \sim \triangle JLM \sim \triangle LKM$

b. **Given:**  $\triangle JLM \sim \triangle LKM$

**Prove:**  $\frac{JM}{LM} = \frac{LM}{KM}$

c. **Given:**  $\triangle JKL \sim \triangle JLM \sim \triangle LKM$

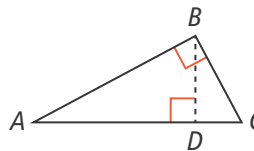
**Prove:**  $\frac{JK}{JL} = \frac{JL}{JM}$  and  $\frac{JK}{LK} = \frac{LK}{MK}$



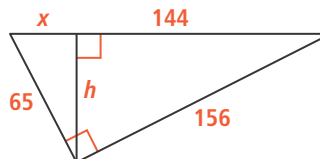
15. **Higher Order Thinking** Suppose the altitude to the hypotenuse of a right triangle also bisects the hypotenuse. What type of right triangle is it? Use the similarity of right triangles to explain your answer.

**PRACTICE**

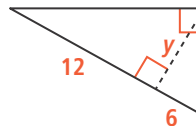
16. In the figure, what two smaller triangles are similar to  $\triangle ABC$ ? Explain. SEE EXAMPLE 1



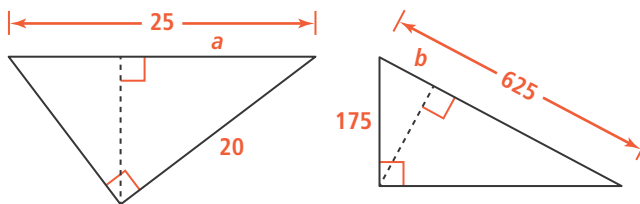
17. What are the values of  $h$  and  $x$  in the right triangle? Explain. SEE EXAMPLE 2



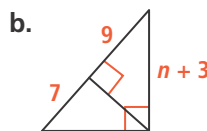
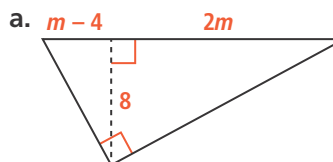
18. What is the value of  $y$  in the right triangle? Explain. SEE EXAMPLE 3



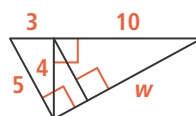
19. What are the values of  $a$  and  $b$  in each right triangle? Explain. SEE EXAMPLES 4 AND 6



20. What are the values of  $m$  and  $n$  in each right triangle? Explain. SEE EXAMPLE 5

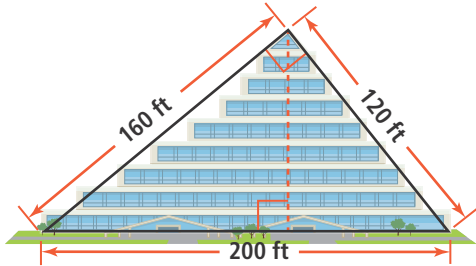


21. What is the value of  $w$  in the right triangle? Explain.

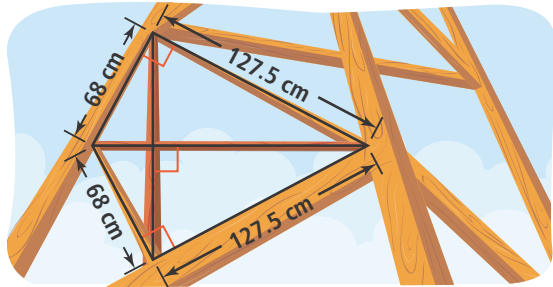


**APPLY**

22. **Reason** Jake wants the profile of a hotel he is planning to be a right triangle with the dimensions shown. The city prohibits structures over 100 ft at the location where he would like to build. Can the hotel be located there? Explain.



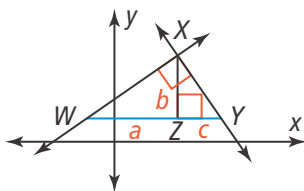
23. **Look for Relationships** Kiyo is repairing a wooden climbing tower.



- a. He needs to cut two crossbars. What should the lengths of the two crossbars be? Explain.
- b. Kiyo will make a notch in each crossbar in order to fit them together. Where should he make the notch on each crossbar? Explain.
24. **Higher Order Thinking** Write a proof for Theorem 2-14.

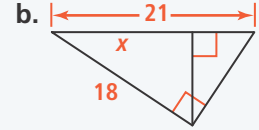
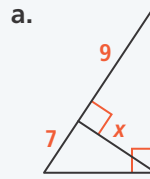
**Given:** Right  $\triangle WXY$  with altitude  $\overline{XZ}$  to hypotenuse  $\overline{WY}$

**Prove:** The product of the slopes of perpendicular lines is  $-1$ .

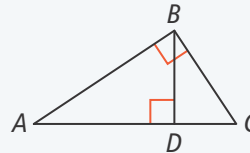


**ASSESSMENT PRACTICE**

25. For each figure, write an equation that you could use to find the value of  $x$ .

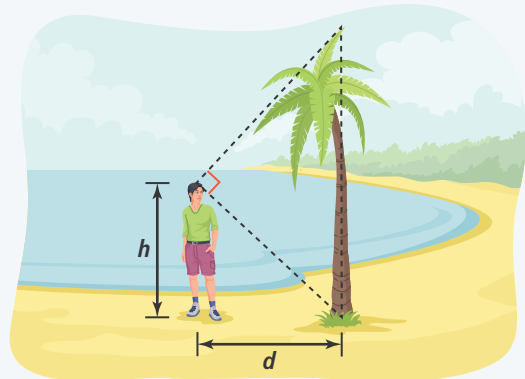


26. **SAT/ACT** Which triangle is similar to  $\triangle ABC$ ?



- (A)  $\triangle CBA$                       (C)  $\triangle CDB$   
(B)  $\triangle ABD$                       (D)  $\triangle BDC$

27. **Performance Task** To estimate the height of a tree, Tia and Felix walk away from the tree until the angle of sight with the top and bottom of the tree is a right angle. Let  $h$  represent the height of a person's eyes and  $d$  represent the distance away from the tree.



**Part A** If the height of Tia's eyes is 1.6 m and her distance away from the tree is 2.5 m, what is the height of the tree? Round to the nearest hundredth of a meter.

**Part B** If the height of Felix's eyes is 1.7 m, about how far from the tree is Felix if his angle of sight is a right angle? Round to the nearest hundredth of a meter.

**Part C** Suppose Tia and Felix stand the same distance away from another tree and their angles of sight are right angles, what is the height of the tree? Explain.