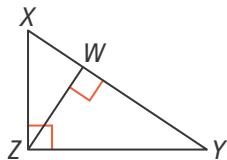


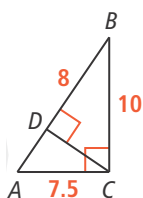


UNDERSTAND

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?



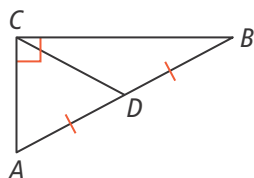
$\triangle ABC \sim \triangle ACD$ by Theorem 7-4.

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

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



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 $\overline{LM} \perp \overline{JK}$

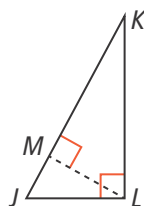
Prove: $\triangle JKL \sim \triangle JLM \sim \triangle LKM$

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

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

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

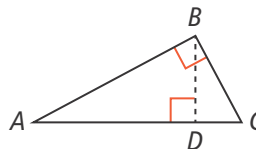
$$\text{Prove: } \frac{JK}{JL} = \frac{JL}{JM} \text{ and } \frac{JK}{LK} = \frac{LK}{MK}$$



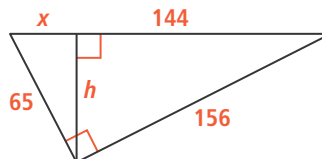
15. **Higher Order Thinking** Suppose the altitude to the hypotenuse of a right triangle also bisects the hypotenuse. What type of right triangle is it? Use the similarity of right triangles to explain your answer.

PRACTICE

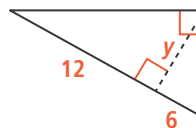
16. In the figure, what two smaller triangles are similar to $\triangle ABC$? Explain. SEE EXAMPLE 1



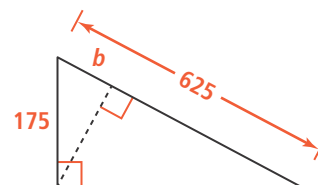
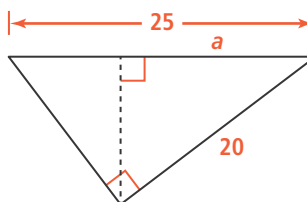
17. What are the values of h and x in the right triangle? Explain. SEE EXAMPLE 2



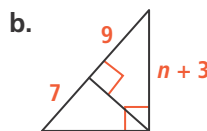
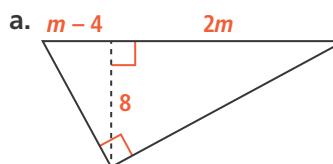
18. What is the value of y in the right triangle? Explain. SEE EXAMPLE 3



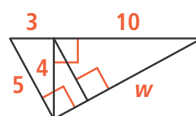
19. What are the values of a and b in each right triangle? Explain. SEE EXAMPLES 4 AND 6



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

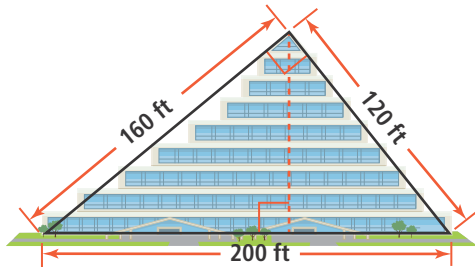


21. What is the value of w in the right triangle? Explain.

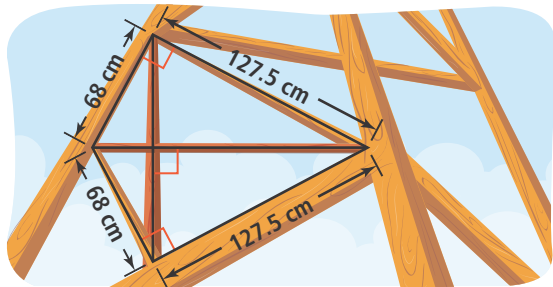


APPLY

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.



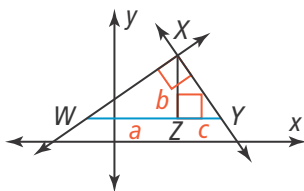
23. **Look for Relationships** Kiyo is repairing a wooden climbing tower.



- 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.

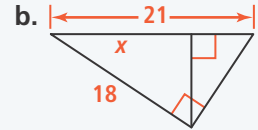
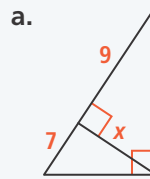
Given: Right $\triangle WXY$ with altitude $\overline{XZ}$ to hypotenuse $\overline{WY}$

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

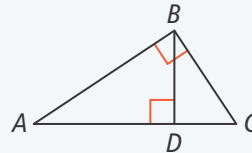


ASSESSMENT PRACTICE

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

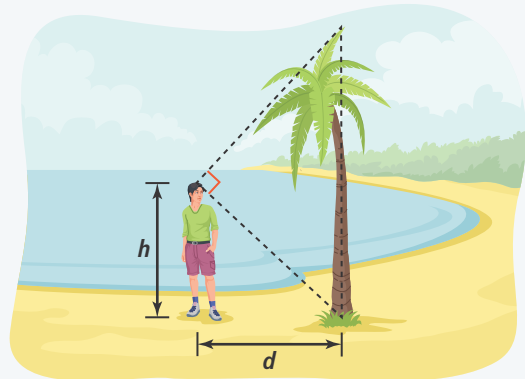


26. **SAT/ACT** Which triangle is similar to $\triangle ABC$?



- (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.