Now we see that

$$\sin\frac{\pi}{4}=\frac{1}{\sqrt{2}}=\frac{\sqrt{2}}{2}$$

and

$$\csc\frac{\pi}{4}=\frac{1}{\sin\frac{\pi}{4}}=\frac{1}{\frac{\sqrt{2}}{2}}=\frac{2}{\sqrt{2}}=\sqrt{2}$$

7.R.2 Exercises

Concept Check

True/False. Determine whether each statement is true or false. If a statement is false, explain how it can be changed so the statement will be true. (**Note:** There may be more than one acceptable change.)

1. A triangle with sides of 4 inches, 4 inches, and 3 inches is an isosceles triangle.

2. A triangle with three angles that each measure less than 90 degrees is an acute triangle.

3. Similar triangles have corresponding sides that are equal.

4. If $\triangle ABC \cong \triangle DEF$, then the measure of angle C equals the measure of angle D.

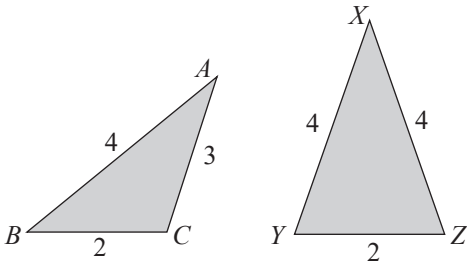
5. If $\triangle ABC \sim \triangle DEF$, then $AC = DF$.

6. Congruent triangles have corresponding angles that are equal.

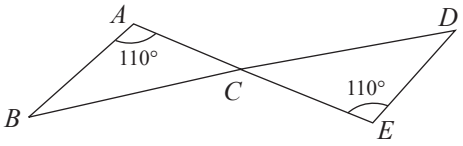
Practice

Determine whether each pair of triangles is similar. If the pair of triangles is similar, explain why and indicate the similarity by using the ~ symbol.

7.

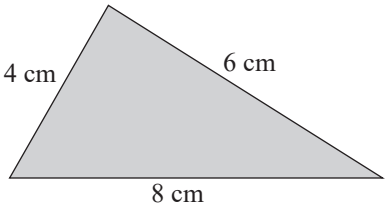


8.

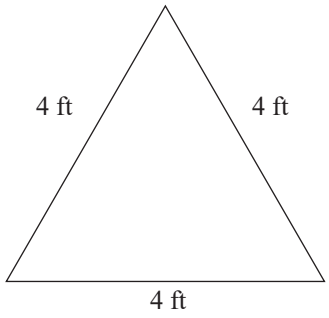


Classify each triangle in the most precise way possible, given the indicated lengths of its sides and/or measures of its angles.

9.

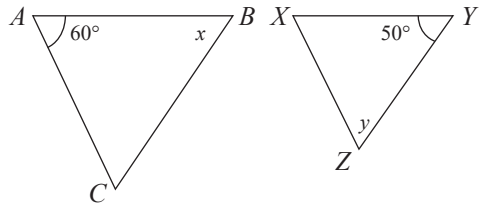


10.

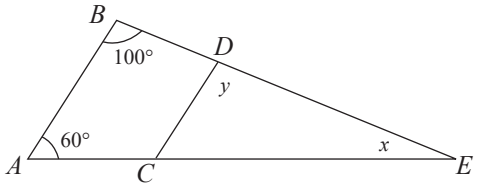


Find the values for x and y.

11. $\triangle ABC \sim \triangle XYZ$

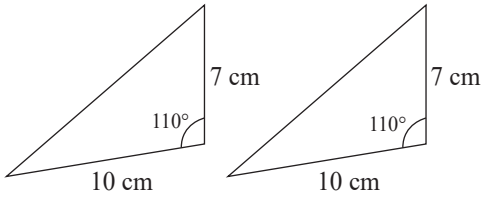


12. $\triangle ABE \sim \triangle CDE$

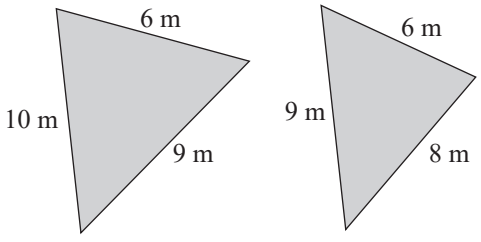


Determine whether each pair of triangles is congruent. If the pair of triangles is congruent, state the property that confirms that they are congruent.

13.



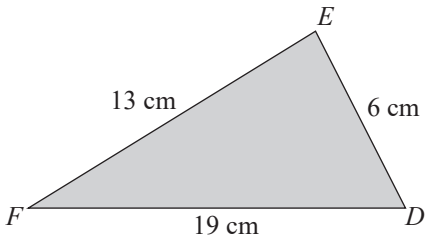
14.



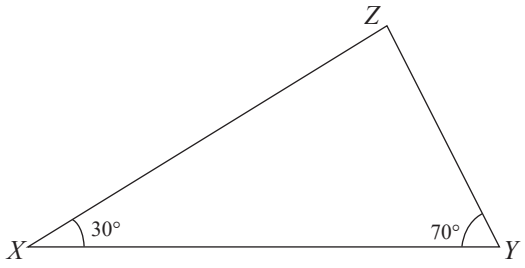
Applications

Solve.

15. Suppose the lengths of the sides of $\triangle DEF$ are as shown in the figure. Is this possible? Explain your reasoning.



16. In the triangle shown, $m\angle X = 30°$ and $m\angle Y = 70°$.



a. What is $m\angle Z$?

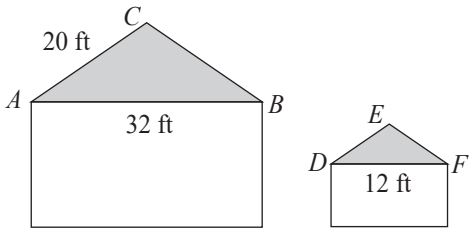
b. What kind of triangle is $\triangle XYZ$?

c. Which side is opposite $\angle X$?

d. Which sides include $\angle X$?

e. Is $\triangle XYZ$ a right triangle?

17. ***Construction:*** A child's playhouse is built to look like a smaller version of the family house, where the ends of the roofs have similar proportions. The width of the main house (AB) is 32 feet and the length from the peak to the gutter of the roof for one of the sides is 20 feet. If the width of the playhouse (DF) is 12 feet, what is the length from the peak to the gutter (DE) of the playhouse roof?



18. ***Holiday Decorating:*** Your neighbors are hanging their holiday lights. The ladder they are currently using is 12 feet long and when leaned up against the house just reaches the top of their 8-foot tall porch. How long of a ladder will they need to reach the top of their chimney which is at a height of 32 feet? (Assume that both ladders are placed such that they make the same angle with the ground.)

Writing & Thinking

19. Determine the errors in the following statements. Assume $\triangle ABC \sim \triangle DEF$.

a. Corresponding angles are congruent. This means $m\angle A = m\angle D$, $m\angle B = m\angle F$, and $m\angle C = m\angle E$.

b. Corresponding sides are the same length.