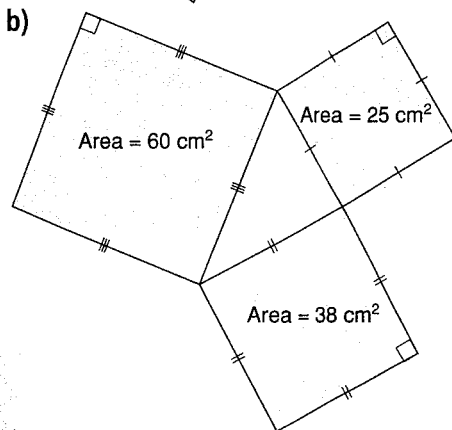
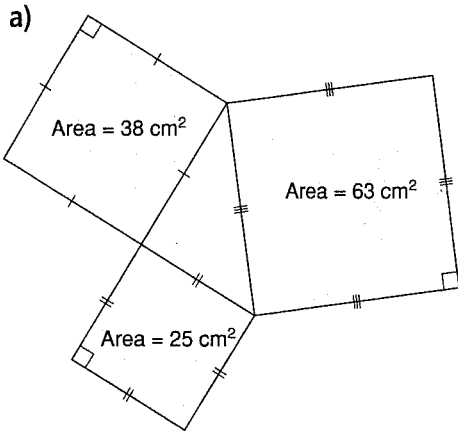


## Practice

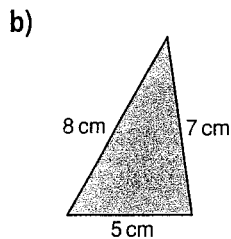
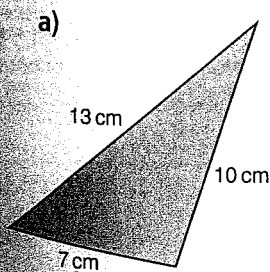
### Check

3. The area of the square on each side of a triangle is given. Is the triangle a right triangle? How do you know?

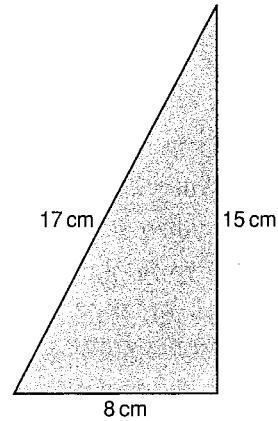


4. Which of these triangles appears to be a right triangle? Determine whether each triangle is a right triangle.

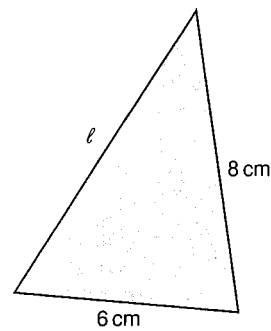
Justify your answers.



c)



5. Look at the triangle below. Can the Pythagorean Theorem be used to find the length of the side labelled with a variable? Why or why not?



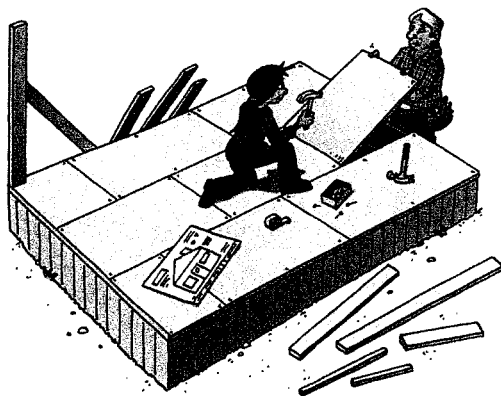
### Apply

6. Determine whether a triangle with each set of side lengths is a right triangle. Justify your answers.
- 16 cm, 30 cm, 34 cm
  - 8 cm, 10 cm, 12 cm
  - 20 m, 25 m, 15 m
  - 28 m, 53 m, 45 m
  - 17 mm, 14 mm, 5 mm
  - 30 mm, 9 mm, 25 mm
  - 9 cm, 9 cm, 15 cm
  - 10 cm, 26 cm, 24 cm

7. Which sets of numbers below are Pythagorean triples?

How did you decide?

- a) 16, 30, 34
  - b) 6, 8, 9
  - c) 15, 39, 36
  - d) 16, 65, 63
  - e) 9, 30, 35
  - f) 40, 42, 58
8. An elder and his granddaughter, Kashala, are laying a plywood floor in a cabin. The floor is rectangular, with side lengths 9 m and 12 m. Kashala measures the diagonal of the floor as 15 m. Is the angle between the two sides a right angle? Justify your answer.



9. A triangle has side lengths 6 cm, 7 cm, and  $\sqrt{13}$  cm.

Is this triangle a right triangle?

Do these side lengths form a Pythagorean triple? Explain.

### 10. Assessment Focus

May Lin uses a ruler and compass to construct a triangle with side lengths 3 cm, 5 cm, and 7 cm. Before May Lin constructs the triangle, how can she tell if the triangle will be a right triangle? Explain.



11. Look at the Pythagorean triples below.

3, 4, 5                      6, 8, 10  
12, 16, 20                15, 20, 25  
21, 28, 35

- a) Each set of numbers represents the side lengths of a right triangle. What are the lengths of the legs? What is the length of the hypotenuse?
- b) Describe any pattern you see in the Pythagorean triples.
- c) Use a pattern similar to the one you found in part b. Generate 4 more Pythagorean triples from the triple 5, 12, 13.

12. Two numbers in a Pythagorean triple are given.

Find the third number.

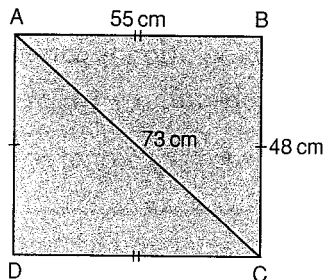
How did you find out?

- a) 14, 48,
- b) 32, 24,
- c) 12, 37,
- d) 20, 101,

13. In Ancient Egypt, the Nile River overflowed every year and destroyed property boundaries. Because the land plots were rectangular, the Egyptians needed a way to mark a right angle. The Egyptians tied 12 evenly spaced knots along a piece of rope and made a triangle. Explain how this rope could have been used to mark a right angle.



14. Is quadrilateral ABCD a rectangle? Justify your answer.



15. **Take It Further** The perimeter of a right triangle is 90 m. The length of the longest side of the triangle is 41 m. Find the lengths of the other two sides. How did you find out?

16. **Take It Further** Use your data and those of your classmates from *Investigate*, on page 39.

- Use the results for the obtuse triangles. How does the area of the square on the longest side compare to the sum of the areas of the squares on the other two sides?
- Use the results for the acute triangles. How does the area of the square on the longest side compare to the sum of the areas of the squares on the other two sides?
- Use the patterns in parts a and b to classify all the triangles in question 6.

17. **Take It Further** You can use expressions to generate the numbers in a Pythagorean triple.

Choose a number, then choose a greater number.

Use these expressions to find the numbers in a Pythagorean triple:

- $2(\text{lesser number})(\text{greater number})$
- $(\text{greater number})^2 - (\text{lesser number})^2$
- $(\text{greater number})^2 + (\text{lesser number})^2$

If a spreadsheet is available, enter the formulas. Change the numbers you start with to generate 15 Pythagorean triples.

## Reflect

When you know the side lengths of a triangle, how can you tell whether it is a right triangle?

What other condition must be satisfied for the numbers to be a Pythagorean triple?

Give examples in your explanation.