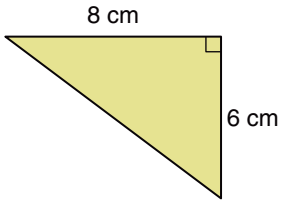
Practice

Where necessary, give the answers to 1 decimal place.

1. Determine each unknown length.

a)



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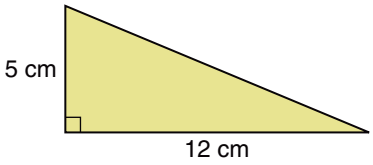

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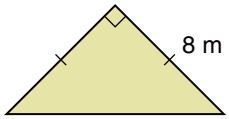
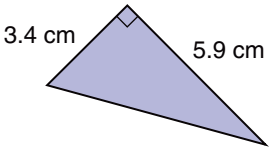


2. Determine each unknown length.

a)



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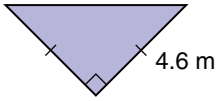

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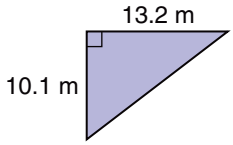
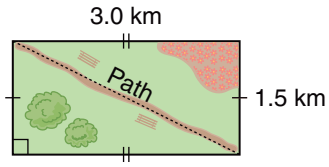


3. Ali walks along the path through the park.
How far does Ali walk?

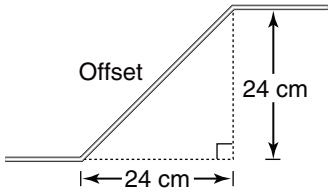


4. A right triangle has legs 9 cm and 12 cm.
Sketch the triangle. What is its perimeter?
Show your work.

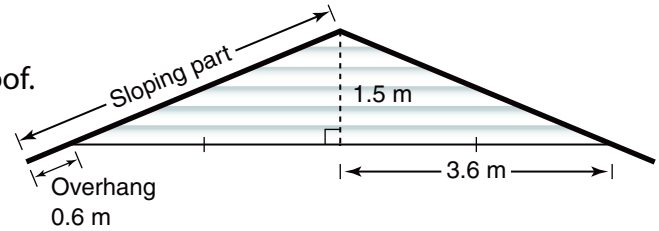
5. A plumber is installing pipe.
She has to offset the pipe around an obstacle.

a) What is the length of this offset section of pipe?
Justify your answer.

b) Is the result reasonable? Explain.

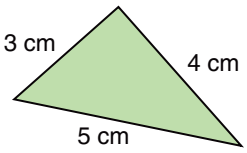


6. A contractor estimates how many sheets of plywood will be needed to build this roof.
His first step is to determine the length of the sloping part.
How long is it? Justify your answer.



7. Use the Pythagorean Theorem to find out if these are right triangles.
Justify your answers.

a)



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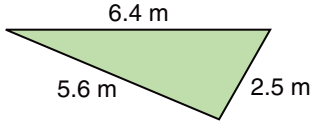

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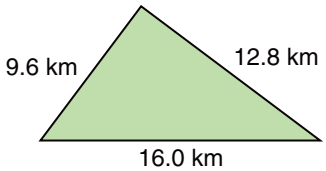


Remember: $a^2 + b^2 = c^2$ is only true for right triangles.
c is the longest side.

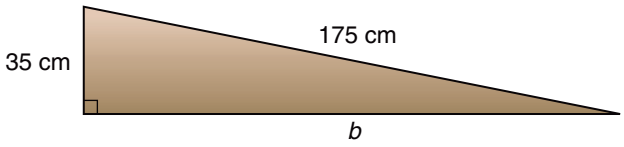
We can also use the Pythagorean Theorem to determine the length of a leg.

Example

Kim is building a ramp with a piece of wood 175 cm long.
The height of the ramp is 35 cm.
What is the horizontal length of the ramp?

Solution

Since the side view of the ramp is a right triangle, we use the Pythagorean Theorem.



Let the horizontal leg be b.
Use: $a^2 + b^2 = c^2$
Substitute: $a = 35$ and $c = 175$

$$35^2 + b^2 = 175^2$$
$$1225 + b^2 = 30\,625$$

To isolate b^2, subtract 1225 from each side of the equation.

$$1225 - 1225 + b^2 = 30\,625 - 1225$$
$$b^2 = 29\,400$$

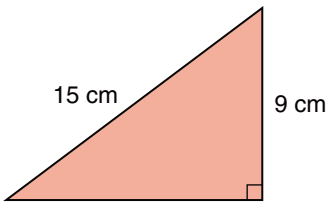
To calculate b, take the square root.

$$b = \sqrt{29\,400}$$
$$b \doteq 171.46$$

The horizontal length of the ramp is about 171 cm.

8. Determine each unknown length.

a)



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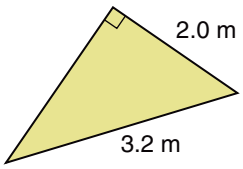

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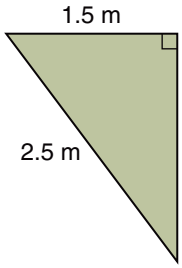

9. **Assessment Focus** Suppose you know that the lengths of two sides of a right triangle are 3.5 cm and 4.5 cm. What is the length of the third side? Show two possible answers.

10. **Take It Further** A ladder is 4.9 m long. It leans against a wall with its foot 1.2 m from the base of the wall. The distance from the foot of a ladder to the wall should be about one-quarter of the distance the ladder reaches up the wall.
Is the ladder safely positioned? Justify your answer.

In Your Own Words

Describe how the areas of the squares drawn on the sides of a right triangle are related.
Why is it important to know the Pythagorean Theorem?