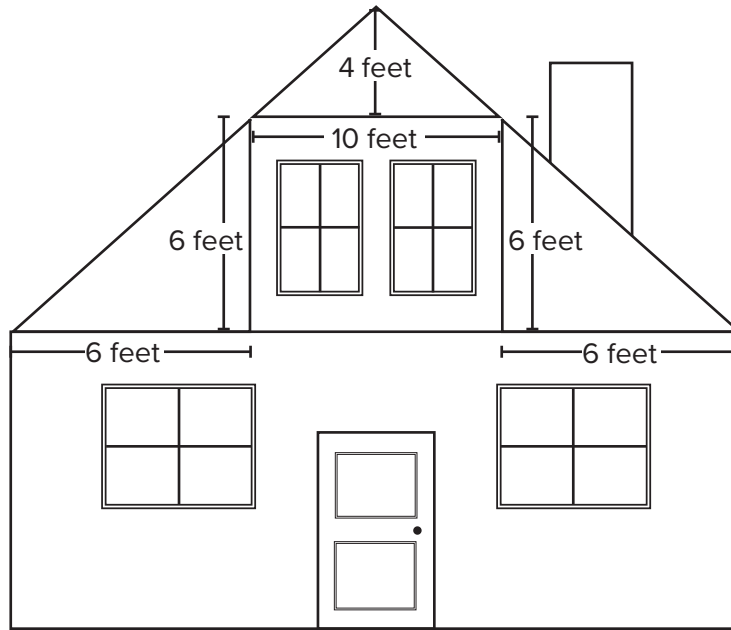# Lights and More Lights

The residents of Watson Avenue are decorating their houses for the upcoming holidays. They have decided to string lights along the roof lines of their houses. How many feet of lighting does Sarina need if she wants to string lights along the diagonal parts of the roof?

Your work should include:

- Length of the roof including formulas used (3 points)

- A description of the Pythagorean Theorem (3 points)

- Calculations (3 points)

- Explanations using math terms (3 points)

Rubric: 12 Total Points

	0 points	1 point	2 points	3 points
Length of the Roof	The length of the roof is not given.	The length is incorrect.	The length is correct, but no evidence of formulas used.	The length is given correctly and the formulas used are identified.
Pythagorean Theorem	Pythagorean Theorem is not stated.	Pythagorean Theorem is not stated correctly.	Pythagorean Theorem is stated correctly, but not used correctly.	Pythagorean Theorem is stated and used correctly.
Calculations	No calculations are shown.	Calculations are shown, but are incomplete or include many errors.	Complete calculations are shown, but a few errors exist.	Complete, accurate calculations are given.
Explanation using Math Terms	No explanation is given.	An explanation is given, but contains errors.	An explanation is given, but does not use math terms.	A complete explanation is given using math terms.

Teacher Notes

Task Name: Lights and More Lights

Overview: Students consider a picture of a house and need to determine the length along the roof. They will need to use the Pythagorean Theorem to determine this distance.

Sample Answer

The Pythagorean Theorem states that the sum of the squares on two legs of a right triangle is equal to the square of the hypotenuse, or $a^2 + b^2 = c^2$, where a and b are the lengths of the legs and c is the length of the hypotenuse.

There are two congruent triangles on either side of their house. The base and height of each triangle is 6 feet. To calculate the length of the hypotenuse for each triangle, I need to use the Pythagorean Theorem.

For the two congruent triangles, the length of the hypotenuse is:
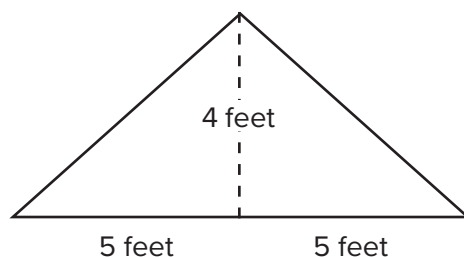
$$a^2 + b^2 = c^2$$
$$6^2 + 6^2 = c^2$$
$$72 = c^2$$
$$\sqrt{72} = c$$
$$8.49 \approx c$$

The length of the roof along each of those triangles is about 8.49 feet.

To determine the length of the roof along the top of the house, I need to create 2 right triangles.

4 feet

5 feet   5 feet

I can calculate the length of each diagonal of the roof by using the Pythagorean Theorem.

$$a^2 + b^2 = c^2$$
$$5^2 + 4^2 = c^2$$
$$41 = c^2$$
$$\sqrt{41} = c$$
$$6.40 \approx c$$

The total length of the roof is about 6.4 + 6.4 + 8.49 + 8.49, or 29.78, feet.