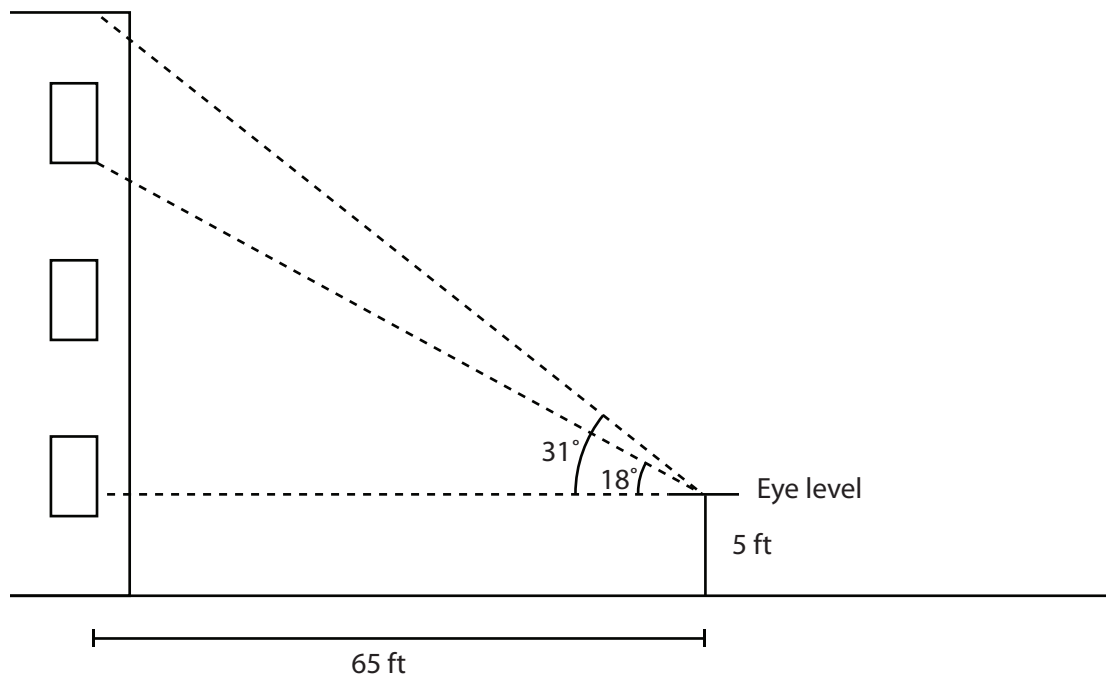## UNIT 5 • SIMILARITY, RIGHT TRIANGLE TRIGONOMETRY, AND PROOF
Lesson 9: Applying Trigonometric Ratios

Problem-Based Task 5.9.3: Fighting Flames from a Distance

You are a firefighter on call at a burning building. Your colleagues are on the roof preparing to help put out the blaze by entering the building through the third-floor window. They need you to find the distance from the roof to the windowsill and then determine if the firefighters on the ground are close enough to the building for the water to reach the flames through the window on the third floor.

You observe from below. The angle of elevation to the windowsill is 18° and the angle of elevation to the top of the building is 31°. You are standing 65 feet away from the building and your eyes are 5 feet above the ground, as shown in the diagram. You hold the hose at eye level in order to take aim at the third-floor window.

To the nearest foot, what is the distance from the roof to the windowsill that the firefighters will need to descend by rope to enter the building? If the hoses can spray water at a distance of 100 feet, are the firefighters standing close enough to the building to put the flames out at the third-floor window?

To the nearest foot, what is the distance from the roof to the windowsill that the firefighters will need to descend by rope to enter the building?

Problem-Based Task 5.9.3: Fighting Flames from a Distance

Coaching

a. In order to determine the distance from the windowsill to the roof, what other information do you need to find first?

b. What is the vertical height from the roof to your eye level? Sketch the triangle that provides the information necessary to answer the question.

c. What is the vertical height from the windowsill to your eye level?

d. What is the distance from the roof to the third-floor windowsill?

e. How can you use the information you've already found to determine the distance the water has to travel?

f. What distance does the water have to travel to reach the window?

g. Are the firefighters on the ground close enough to the building?