

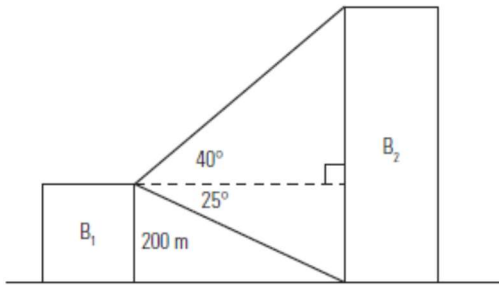
**ASSIGNMENT: Solving Complex Problems  
in the Real World**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Show your work! Round all lengths to the nearest hundredth and all angles to the nearest degree.**

1. From the top of a 200 m-tall office building, the angle of elevation to the top of another building is  $40^\circ$ . The angle of depression to the bottom of the second building is  $25^\circ$ . How tall is the second building?



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2. An extension ladder must be used at an angle of elevation of  $65^\circ$ . At its shortest length, it is 18 feet long. Fully extended, it has a length of 32 feet.
- a) How much higher up a building will it reach when it is fully extended, compared to its shortest length?

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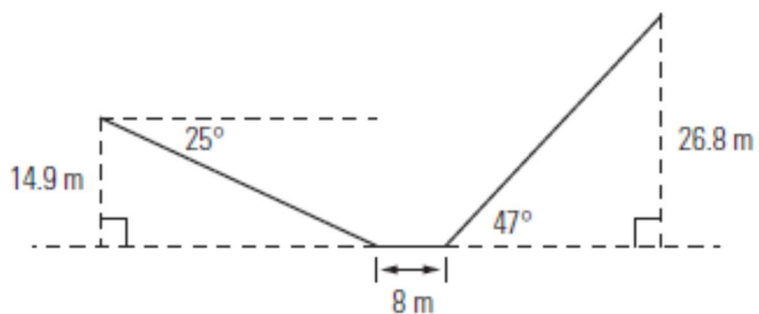
- b) How much farther from the house must the base be when it is fully extended, compared to its shortest length?

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3. Zola can see the top of a 180 m cell phone tower at an angle of elevation of  $32^\circ$ , and Naeem can see it at an angle of elevation of  $50^\circ$ . How far apart are Zola and Naeem if they are on a straight line with the tower? There are two possibilities.

\_\_\_\_\_ or \_\_\_\_\_

4. A roller coaster has a track that drops at an angle of depression of  $25^\circ$  from a height of 14.9 m. When it reaches the ground, it travels horizontally for 8 m. It then rises at an angle of elevation of  $47^\circ$  to a height of 26.8 m.



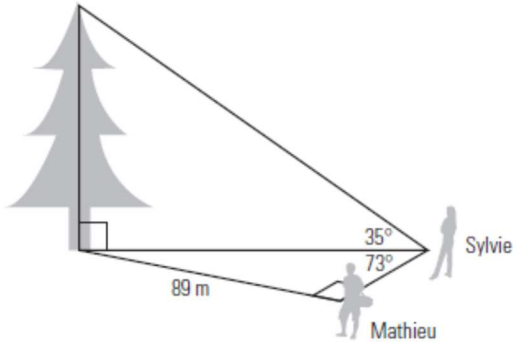
- a) What is the total horizontal distance covered by this portion of track?

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- b) What is the total distance travelled by a car on this portion of the roller coaster track?

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5. Sylvie and Mathieu are bird-watching. They both spot a nest at the top of a tree. Mathieu is 89 m from the tree. The angle between Sylvie's line of sight and Mathieu's is  $73^\circ$ . The angle of elevation from Sylvie to the top of the tree is  $35^\circ$ . What is the height of the nest?




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6. An airplane is flying 100 km north and 185 km west of an airport. It is flying at a height of 7 km.

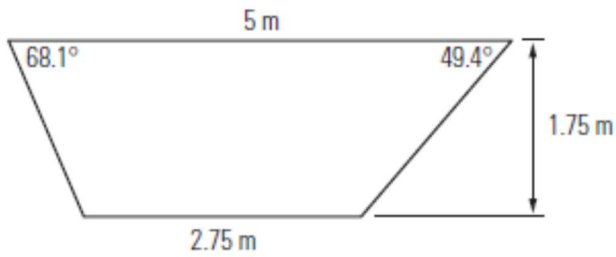
- a) What is the straight-line distance to the airport?  
Hint: draw a plan view sketch (looking down).

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- b) What is the angle of elevation of the airplane, from the point of view of the airport? Hint: draw a side view sketch.

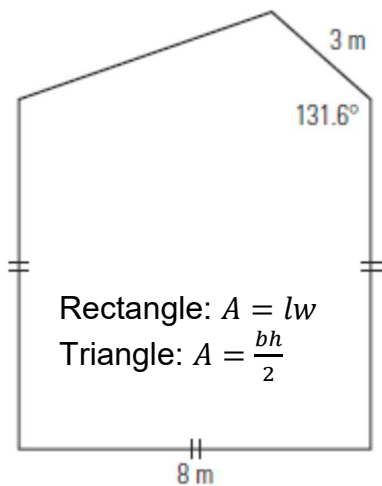
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7. Pauline is building a fence around her vegetable garden, shown below. To the nearest hundredth of a meter, what length of fence will she need to build?




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8. Soo-Jin is installing carpet in a den. Using the floor plan below, calculate the area of carpet Soo-Jin will need to buy (round your answer to the nearest square metre).




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1. 559.90 m
2. a) 12.69 ft b) 5.91 ft
3. 137.02 m or 439.08 m
4. a) 64.94 m b) 79.90 m
5. 65.17 m
6. a) 210.30 km b) 2°
7. 11.94 m
8. 72 m<sup>2</sup>