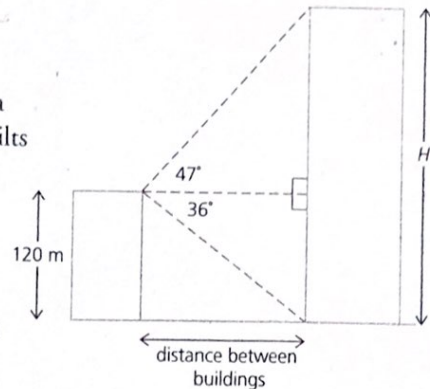


TRIG PROBLEMS

To evacuate some refugees, a bridge needs to be built across a river. The first step is to find out how wide the river is. A surveyor is on one side of the river, with a transit mounted on a tripod 1.2 m above the ground. An assistant stands on the other side of the river, holding a 3 m pole vertically. The angle of elevation from the transit to the top of the pole is 8.5° . How wide is the river?

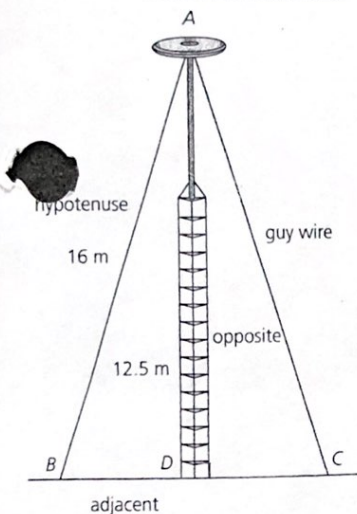
A video camera is mounted on the top of a 120 m tall building. When the camera tilts down 36° with the horizontal, it views the bottom of another building. If it tilts up 47° with the horizontal, it can view the top of the same building.

- How far apart are the two buildings?
- How tall is the building viewed by the camera?



A communications antenna is attached to the roof of a school and held in place with two 16 m guy wires. The antenna is 12.5 m tall.

- What angle do the wires make with the roof?
- At what distance from the base of the tower should the wires be secured to the roof?



- A tree that is 8.5 m tall casts a shadow 6 m long. At what angle are the sun's rays hitting the ground?

- Communication:** Jasmine is planning to do some rock climbing. Before she scales the cliff, she paces off 100 m from the base of the cliff and sights the top with a clinometer. The angle of elevation to the top is 80° . How high is the cliff? Show all your steps.

- An airplane takes off from a runway near some mountains. The peak of the mountain is on the flight path 2.5 km from the end of the runway. The mountain is 2000 m high. What angle of ascent is needed to clear the mountain top?

B

- To avoid slipping, a ladder should not be placed against a wall at an angle less than 45° with the ground. What is the minimum height up a wall that the top of a 10 m ladder should reach?

- Laurier places a 10 m ladder against a wall at an angle of 70° with the ground. How high is the top of the ladder?

- Knowledge and Understanding:** A captain knows that his ship is due south of a lighthouse. His destination is 20 km due west of the lighthouse, on a course setting of 40° west of the lighthouse. How far south of the lighthouse is the ship?
[S 40° W]

- Lee is standing at the top of a hill that is 200 m high. Using a clinometer, she sights the base of the hill at an angle of depression of 40° from the horizontal. If the slope of the hill is constant, how far will her walk be from the top of the hill to the base?

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- 54.8°
- 567.1 m
- 24.4°
- 52.0 m
- 38.7°
- 7.1 m
- 9.4 m
- 23.8 km
- 5.85 m
- 311.1 m

1. 12 m wide

2. a) 165 m apart

b)

3. a) 51°

b) 10 m