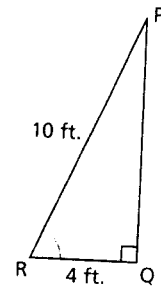


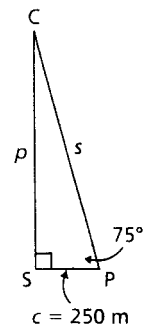
Instructions: For each question, show the formula, numbers in the formula and final answer. For questions without a diagram, draw a diagram and label. All questions are worth 3 marks each unless otherwise indicated.

1. A 10 ft. ladder leans against the side of a building with its base 4 ft. from the wall. What angle, to the nearest degree, does the ladder make with the ground?

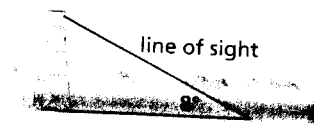


2. A support cable is anchored to the ground 5 m from the base a telephone pole. The cable is 19 m long. It is attached near the top of the pole. What angle, to the nearest degree, does the cable make with the ground?

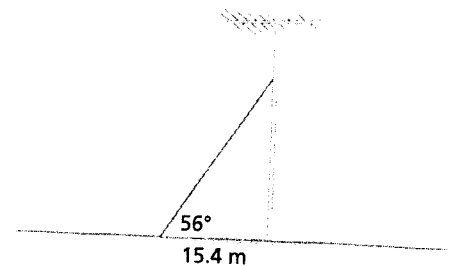
3. A search light beam shines vertically on a cloud. At a horizontal distance of 250 m from the searchlight, the angle between the ground and the line of sight to the cloud is 75° . Determine the height of the cloud to the nearest metre.



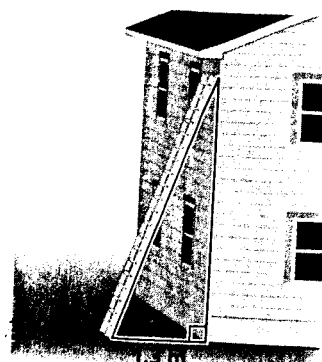
4. At a horizontal distance of 200 m from the base of an observation tower, the angle between the ground and the line of sight to the top of the tower is 8° . How high is the tower to the nearest metre? The diagram is not drawn to scale.



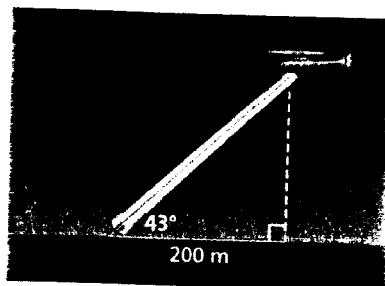
5. A guy wire helps to support a tower. The angle between the wire and the level ground is 56° . One end of the wire is 15.4 m from the base of the tower. How high up the tower does the wire reach to the nearest tenth of a metre.



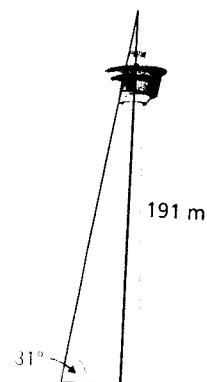
6. The base of a ladder is on level ground 1.3 m from a wall. The ladder leans against the wall. The angle between the ladder and the ground is 71° . How far up the wall does the ladder reach to the nearest tenth of a metre.



7. A helicopter is descending vertically. On the ground, a searchlight is 200 m from the point where the helicopter will land. It shines on the helicopter and the angle the beam makes with the ground is 43° . How high is the helicopter at this point to the nearest metre?



8. Claire knows that the Calgary Tower is 191 m high. At a certain point, the angle between the ground and Claire's line of sight to the top of the tower was 81° . To the nearest metre, about how far was Claire from the tower?

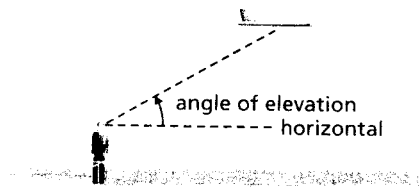


9. The angle between one longer side of a rectangle and a diagonal is 34° . One shorter side of the rectangle is 2.3 cm.

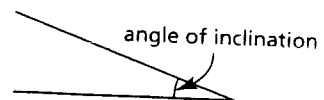
a) Sketch and label the rectangle

b) What is the length of the rectangle to the nearest tenth of a centimeter?

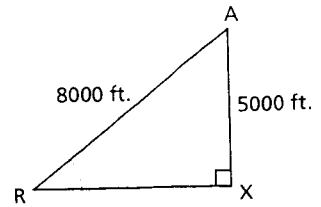
NOTES: The **angle of elevation** of an object above the horizontal is the angle between the horizontal and the line of sight from an observer.



The **angle of inclination** of a line or line segment is the acute angle it makes with the horizontal.

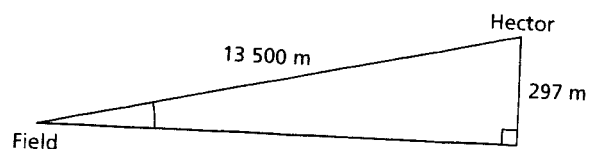


10. A water bomber is flying at an altitude of 5000 ft. The plane's radar shows that it is 8000 ft. from the target site. What is the **angle of elevation** of the plane measured from the target site, to the nearest degree?



11. An observer is sitting on a dock watching a float plane in Vancouver harbor. At a certain time, the plane is 300 m above the water and 430 m from the observer. Determine the **angle of elevation** of the plane measured from the observer, to the nearest degree.

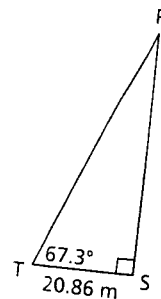
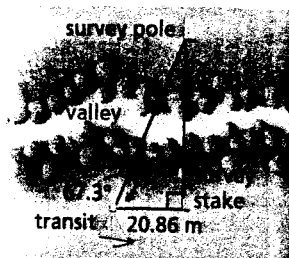
12. Suppose the railroad track through the spiral tunnels from Field to Hector were straightened out. It would look like the diagram below. The diagram is not drawn to scale. What is the angle of inclination of the track to the nearest tenth of a degree?



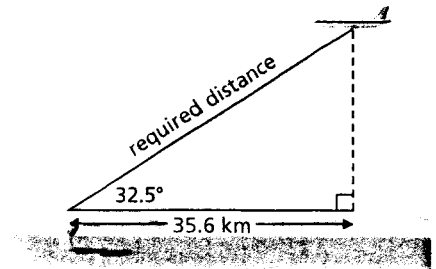
13. A ladder is 6.5 m long. It leans against a wall. The base of the ladder is 1.2 m from the wall. What is the angle of inclination of the ladder to the nearest tenth of a degree?

14. A rectangle is 4.8 cm long and each diagonal is 5.6 cm long. What is the measure of the angle between a diagonal and the longest side of the rectangle? Give the answer to the nearest degree.

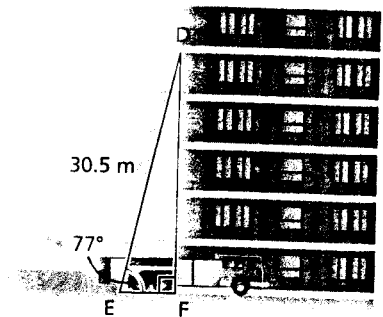
15. A surveyor made the measurements shown in the diagram. How could the surveyor determine the distance from the transit to the survey pole to the nearest hundredth of a metre?



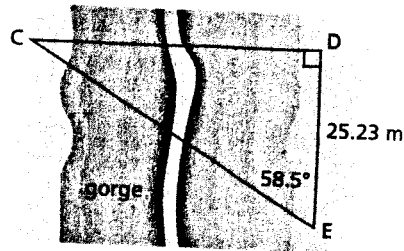
16. From a radar station, the angle of elevation of an approaching airplane is 32.5° . The horizontal distance between the plane and the radar station is 35.6 km. How far is the plane from the radar station to the nearest tenth of a kilometer?



18. A fire truck has an aerial ladder that extends 30.5 m measured from the ground. The angle of inclination of the ladder is 77° . To the nearest tenth of a metre, how far up the wall of an apartment building can the ladder reach?



19. A surveyor makes the measurements shown in the diagram to determine the distance from C to E across a gorge.

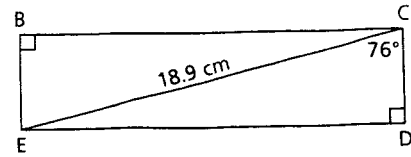


- a) To the nearest tenth of a metre, what is the distance from C to E?

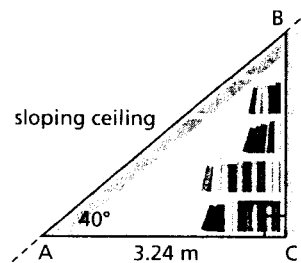
- b) How could the surveyor calculate the distance C to D? Show your work.

20. An airplane approaches an airport. At a certain time, it is 939 m high. Its angle of elevation measured from the airport is 19.5° . To the nearest metre, how far is the plane from the airport?

21. Calculate the dimensions of this rectangle to the nearest tenth of a centimeter.



22. A bookcase is built against the sloping ceiling of an attic. The base of the book case is 3.24 m long. The angle of inclination of the attic ceiling is 40° .



a) What is the length of the top of the bookcase, to the nearest centimetre, measured along the attic ceiling?

b) What is the greatest height of the bookcase, to the nearest centimetre?