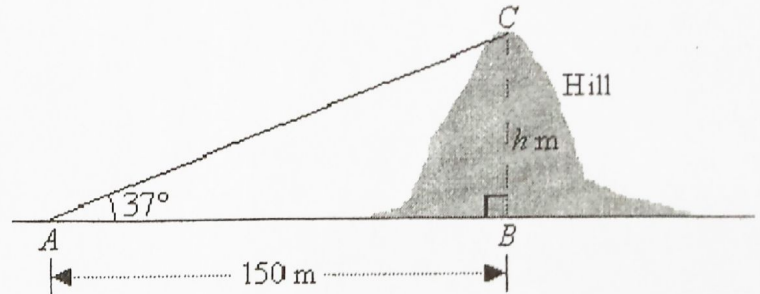


## ANGLES OF ELEVATION AND DEPRESSION

➤ Use a pencil and a ruler to draw diagrams

1. John wants to measure the height of a tree. He walks exactly 100 feet from the base of the tree and looks up. The angle from the ground to the top of the tree is  $33^\circ$ . How tall is the tree?
2. A building is 50 feet high. At a distance away from the building, an observer notices that the angle of elevation to the top of the building is  $41^\circ$ . How far is the observer from the base of the building?
3. An airplane is flying at a height of 2 miles above the ground. The distance along the ground from the airplane to the airport is 5 miles. What is the angle of depression from the airplane to the airport?
4. A bird sits on top of a lamppost. The angle of depression from the bird to the feet of an observer standing away from the lamppost is  $35^\circ$ . The distance from the bird to the observer is 25 meters. How tall is the lamppost?
5. Two poles on horizontal ground are 60 m apart. The shorter pole is 3 m high. The angle of depression of the top of the shorter pole from the top of the longer pole is  $20^\circ$ . Sketch a diagram to represent the situation.
6. A man who is 2 m tall stands on horizontal ground 30 m from a tree. The angle of elevation of the top of the tree from his eyes is  $28^\circ$ . Estimate the height of the tree
7. From a point on the ground, a giant teacher is 100m away and the angle of elevation to the top of the giant teacher is  $38.5^\circ$ . How tall is the giant teacher (to 1 decimal place)?
8. From the top of the building, the angle of elevation of the top of a 120 ft tower is 10 degrees. From a window 6ft below the top of the building, the angle of depression of the base of the tower is 30 degrees. Determine the height of the building and the distance between the tower and the building.

10. A surveyor measures the angle to the peak of a hill from point A, as shown in the diagram. Calculate the height,  $h$ , of the hill rounded to 2 decimal places.



11. A ladder 5 m long has its end just resting on the top of a fence 3 m high. What angle, to the nearest minute, does the ladder make with the ground?
12. Two boats leave the same port. One goes 10 miles due west and drops anchor. The other leaves the port 20 degrees north of west. How far must it go in a straight line to get as far west as the first boat?
13. A man flies a kite with a 100 foot string. The angle of elevation of the string is  $52^\circ$ . How high off the ground is the kite?
14. An airplane takes off 200 yards in front of a 60 foot building. At what angle of elevation must the plane take off in order to avoid crashing into the building? Assume that the airplane flies in a straight line and the angle of elevation remains constant until the airplane flies over the building.
15. A 14 foot ladder is used to scale a 13 foot wall. At what angle of elevation must the ladder be situated in order to reach the top of the wall?
16. A ramp is needed to allow vehicles to climb a 2 foot wall. The angle of elevation in order for the vehicles to safely go up must be  $30^\circ$  or less, and the longest ramp available is 5 feet long. Can this ramp be used safely?