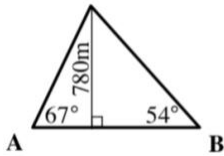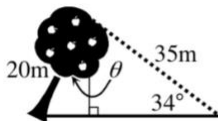1. The angles of elevation from a point A and a point B to the top of a mountain 780m high are 67° and 54° as shown. How long would a tunnel be from A to B?

2. Two spotlights are placed 10m apart on the ground facing up. The blue spotlight makes an angle of 45°, hitting the bottom of a mirror ball. The white spotlight makes an angle of 70°, hitting the same area. What is the height of the mirror ball? (There are *two possibilities*!)

3. A helicopter directly above a building sights a position A on the ground at an angle of depression of 38°. The helicopter then rises vertically above the building *d* metres, again sighting position A, now at an angle of depression of 52°. If position A is 352m from the building, what is *d*, the distance the helicopter has risen?

4. From a window 26m above the ground, the angle of elevation to the top of another building is 39°, while the angle of depression to the base of the other building is 29°. How high is the other building?

5. A forest ranger in a tower 128m high sights two separate fires from the same line of sight with angles of depression 42° and 61°. How far apart are the fires?

6. The angle of elevation of the top of a building from a point A, 56m from the base of the building is 58°. A flagpole is on top of the building, and the angle of elevation to it is 62°. What is the height of the flagpole?

7. A balloon is directly above location A. Another location on the ground, B, is sighted to have an angle of depression of 28° The balloon rises 58m and position B is again sighted, this time with an angle of depression of 42°. What is the distance between A and B?

8. A smokestack's base is at B and its top is at T. From two points P and Q on the ground, the angles of elevation of T are 45° and 36° respectively. If P is a distance of 100m from Q and the points are located on the same side of the smokestack, find the distance from P to T.
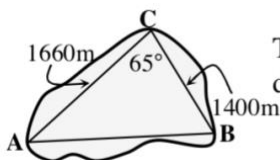
9. A non-vertical tree is being cut down. A 35m rope is tied to the top of the 20m high tree, making an angle of 34° with the ground. Find the angle the tree makes *with the vertical*.
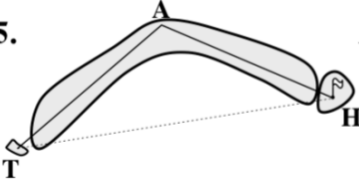
10. Three towns, Alpha, Beta and Gamma are located so that Beta is 25km from Alpha and Gamma is 34km from Alpha. If the angle made from Alpha to Beta to Gamma is 110°, calculate the distance from Beta to Gamma.

11. Two rescue helicopters flying at the same altitude are 3000m apart when they spot a raft on the sea below them. The angles of depression to the raft are 47° and 38°. Find the distance from the raft to the closest helicopter. (There are *two possibilities*!)

12. The posts of a hockey net are 2m apart. A player shoots the puck along the ice from a point exactly 6.5m from one post and 8m from the other. Within what angle must he shoot to get the puck on net?
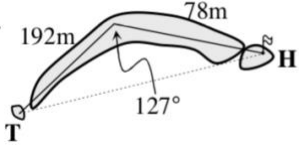
13. The diagram to the side shows information about Lake Guistini. Find the distance across the lake from A to B.

14. The distance from Las Vegas to Waterloo is 3100km, from Las Vegas to Chicago is 2450km and from Chicago to Waterloo is 700km. What is the angle formed by Las Vegas, Waterloo and Chicago?

15. A golf hole is designed with a dog leg as shown. If $\angle T = 32°$, $TH = 450m$ and $\angle A = 102°$, find the distance between A and H.

16. A golf hole has a dog leg as shown. What is the *direct* distance from the tee to the hole?

78m
192m
127°

17. On a 200m hole, a golfer slices the ball 30° to the right. If the ball lands 150m from the hole, at what angle from the last shot must the ball be hit to be straight at the hole?

ANSWERS:

1.	897.8m	**2.**	7.3m *or* 15.7m	**3.**	175.5m	**4.**	64m
5.	71.2m	**6.**	15.7m	**7.**	157.3m	**8.**	376m
9.	12°	**10.**	16.03km	**11.**	1854m *or* 11.8km	**12.**	10.5°
13.	1658.7m	**14.**	19.2°	**15.**	243.8m	**16.**	246.9m
17.	42° to the left						