Angle of Elevation and Angle of Depression

Example 1
At a point on the ground 40 feet from the foot of a tree, the angle of elevation of the top of the tree is $42^\circ$. Find the height of the tree, to the nearest tenth of a foot.

Example 2
Find, to the nearest degree, the angle of elevation of the sun when a vertical post 15 feet high casts a shadow which is 20 feet long.

Example 3
An observer in a balloon, which is 2000 feet above an airport, finds that the angle of depression of a steamer ship out at sea is 21 degrees. Find, to the nearest hundred feet, the distance between the observer in the balloon and the steamer ship at sea.

Example 4
From the top of a lighthouse 160 feet high, the angle of depression of a boat out at sea is $24^\circ$. Find, to the nearest foot, the distance from the boat to the foot of the lighthouse. (The foot of the lighthouse is at sea level.)

Example 5
An airplane which had taken off from an airport traveled a ground distance (horizontal) of 3,660 feet. What is the angle of elevation from the point of take-off to the point when the plane has traveled 4,150 feet through the air? Round to the nearest degree.
Practice / Homework

1. A tree casts a 60 foot shadow. The angle of elevation is 30°. This is the angle at which you look up to the top of the tree from the ground. What is the height of the tree?

2. An observer is 120 feet from the base of a television tower which is 150 feet tall. Find, to the nearest degree, the angle of elevation of the top of the tower from the point where the observer is standing.

3. From the top of a vertical cliff which is 40 meters high, the angle of depression of an object that is level with the base of the cliff is 34°. How far is the object from the base of the cliff, to the nearest meter?

4. From the top of a cliff which is 450 feet above sea level, the angle of depression of a boat out at sea is 24 degrees. Find, to the nearest foot, the distance from the top of the cliff to the boat.

5. The angle of elevation of the top of a flagpole from a point on the ground 30 meters from the base of the flagpole is 18 degrees. What is the height of the flagpole, to the nearest meter?

6. An airplane is flying at an altitude of 1000 meters. From the plane, the angle of depression to the base of a tree on the ground is measured as 15°. What is the distance from the plane to the base of the tree, rounded to the nearest tenth of a meter?

7. From a 200 feet high cliff a boat is noticed floundering at sea! The boat is approximately 300 yards from the base of the cliff. What is the angle of depression, to the nearest degree, of the line of sight to the boat?