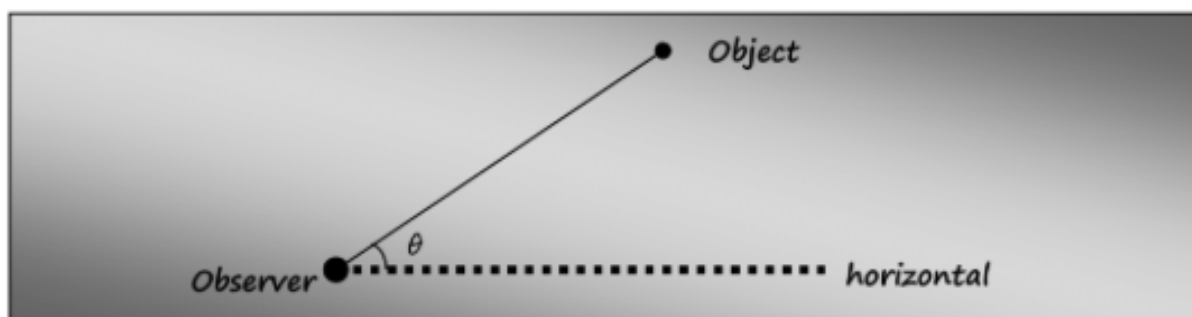


Angles of elevation and depression

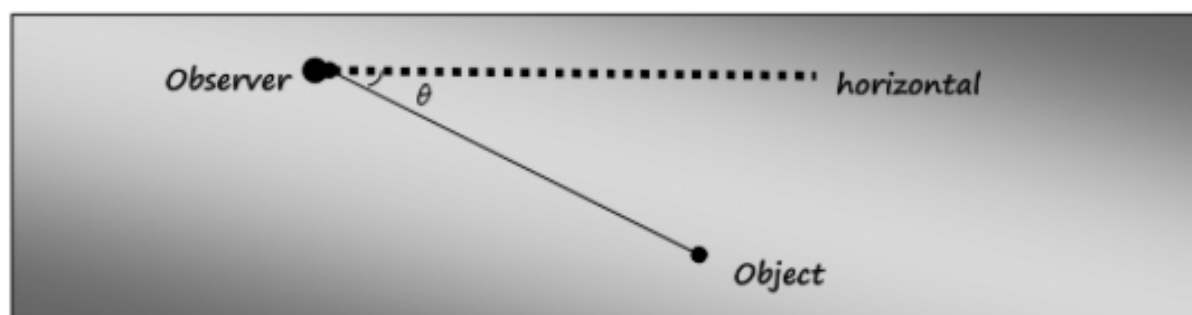
Angle of elevation

An object is above the horizontal level of an observer.

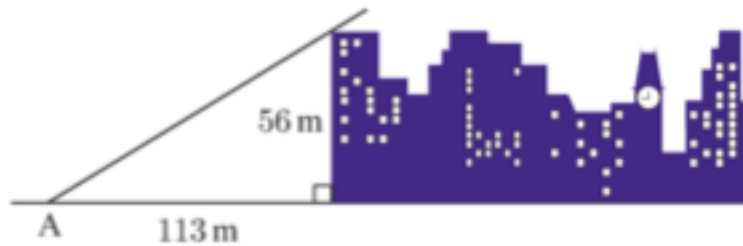


Angle of depression

An object is below the level of an observer.



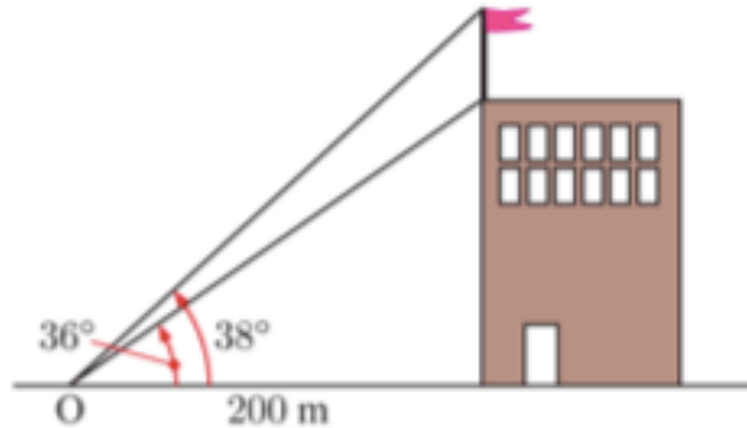
1.



(a) Find the angle of elevation to the top of a 56 m high building from point A which is 113 m from its base.

(b) What is the angle of depression from the top of the building A?

2.



From an observer O who is 200 m from a building, the angles of elevation to the bottom and the top of a flagpole are 36° and 38° respectively. Find the height of the flagpole.

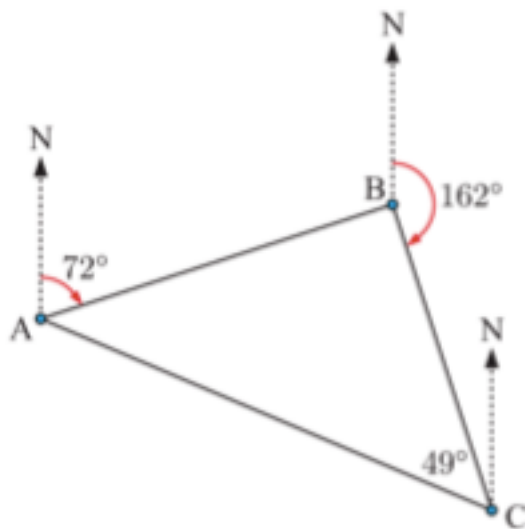
True bearing

1. Clockwise from the true north
2. Always 3 digits



The bearing of B from A is 048° .
The bearing of A from B is 228° .

1.



In the above diagram, find the bearing of:

- (a) B from A
- (b) B from C
- (c) A from B
- (d) A from C

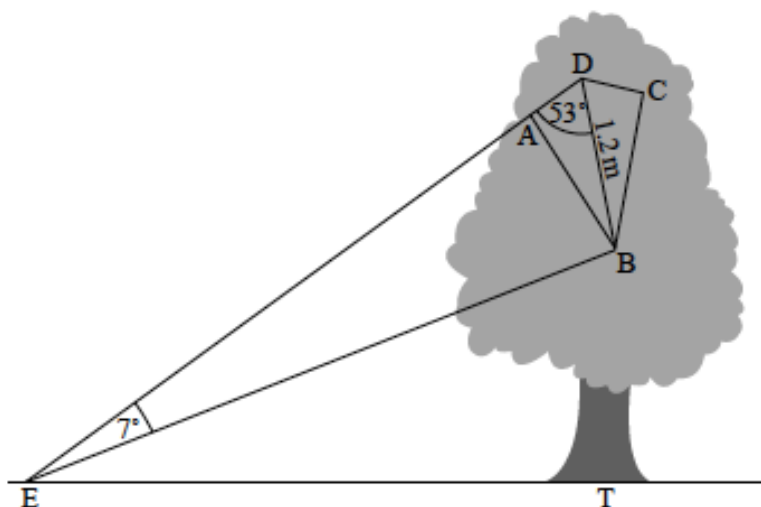
2. When Kenneth cycles in the hills, he finishes 30 km west and 24 km south of where he started.

(a) Find Kenneth's distance from his starting point.

(b) In which direction is the starting point from where Kenneth is now?

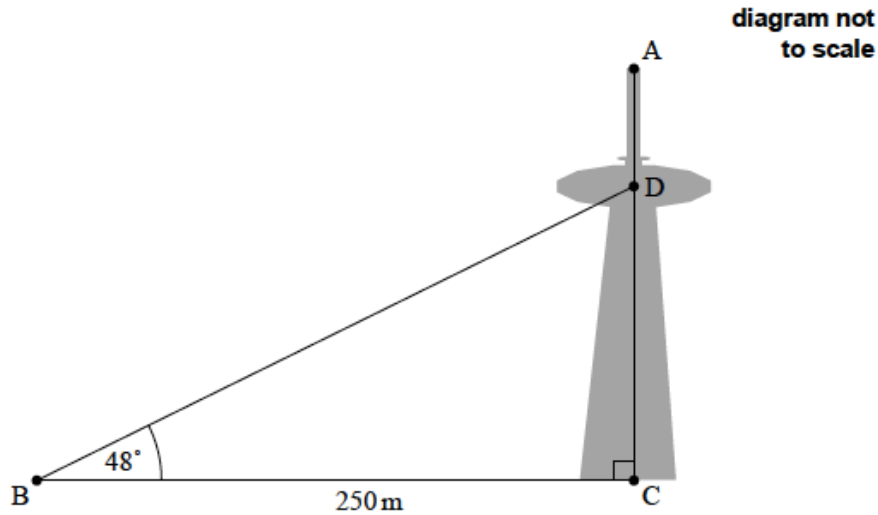
Exercise

1. Emily's kite ABCD is hanging in a tree. The plane ABCDE is vertical. Emily stands at point E at some distance from the tree, such that EAD is a straight line and angle BED = 7° . Emily knows BD = 1.2 metres and angle BDA = 53° , as shown in the diagram.



- (a) Find the length of EB.
- T is a point at the base of the tree. ET is a horizontal line. The angle of elevation of A from E is 41° .
- (b) Write down the angle of elevation of B from E.
 - (c) Find the vertical height of B above the ground.

2. AC is a vertical communications tower with its base at C.
The tower has an observation deck, D, three quarters of the way to the top of the tower, A.



From a point B, on horizontal ground 250 m from C, the angle of elevation of D is 48° .

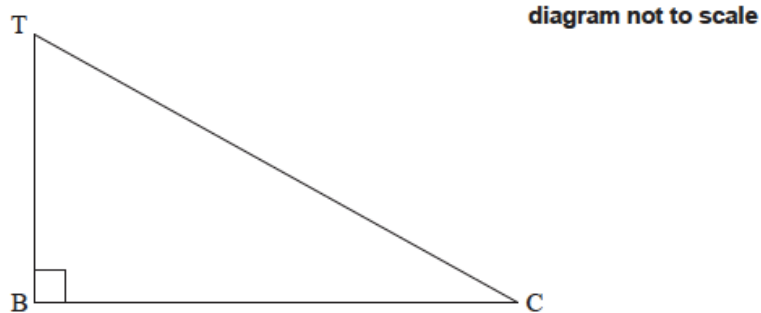
(a) Calculate CD, the height of the observation deck above the ground.

(b) Calculate the angle of depression from A to B.

3. Fabián stands on top of a building, T, which is on a horizontal street.

He observes a car, C, on the street, at an angle of depression of 30° . The base of the building is at B. The height of the building is 80 metres.

The following diagram indicates the positions of T, B and C.



(a) Show, in the appropriate place on the diagram, the values of
(i) the height of the building;
(ii) the angle of depression.

(b) Find the distance, BC, from the base of the building to the car.
(c) Fabián estimates that the distance from the base of the building to the car is 150 metres. Calculate the percentage error of Fabián estimate.
