

GCSE Maths: Angles of elevation and depression, and bearings (Higher): answers

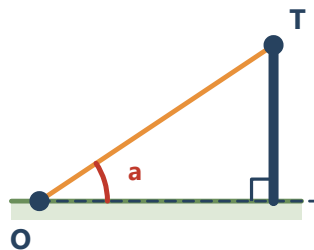
GCSE Maths - Pythagoras and Trigonometry - Higher - Lesson 20.6

Answers. Final answers to the worksheet questions. Full step-by-step solutions for every question are free at websink.site/gcse/maths/ch20-pythagoras-trigonometry/higher/angles-of-elevation-and-depression-and-bearings/

Exercise 20H Elevation, depression and bearings Calculator allowed

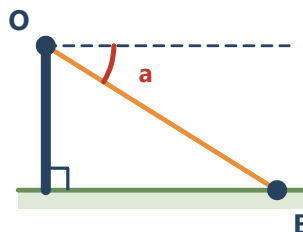
- 1 Look at each diagram. Is the angle marked α an angle of elevation or an angle of depression? Give a reason.

(a)



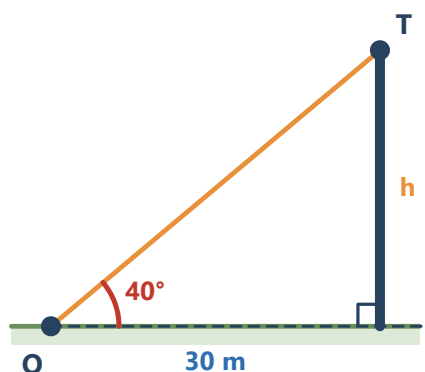
Answer: Elevation: it is measured upwards from the horizontal.

(b)



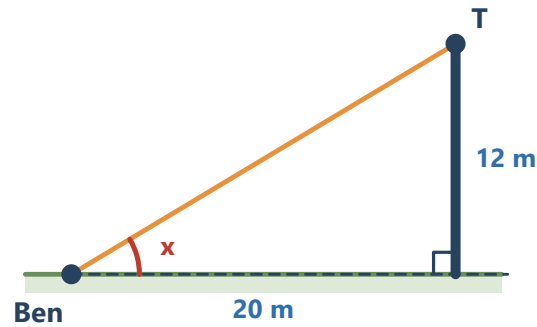
Answer: Depression: it is measured downwards from the horizontal.

- 2 The angle of elevation of the top of a flagpole from a point on level ground 30 m from its foot is 40° . Work out the height of the flagpole, correct to 1 decimal place.



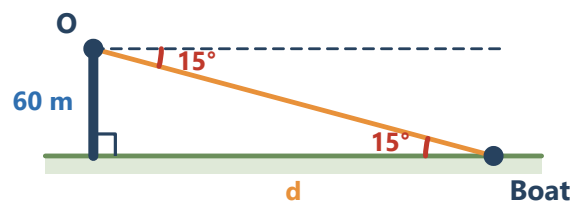
Answer: 25.2 m

- 3 A tree is 12 m tall. Ben stands 20 m from the base of the tree on level ground. Work out the angle of elevation of the top of the tree from Ben, correct to 1 decimal place.



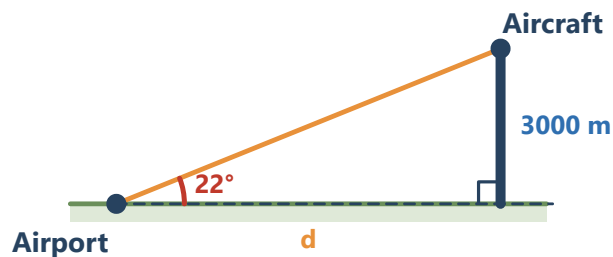
Answer: 31.0°

- 4 From the top of a vertical lighthouse 60 m tall, the angle of depression of a boat is 15° . How far is the boat from the foot of the lighthouse? Give your answer correct to 1 decimal place.



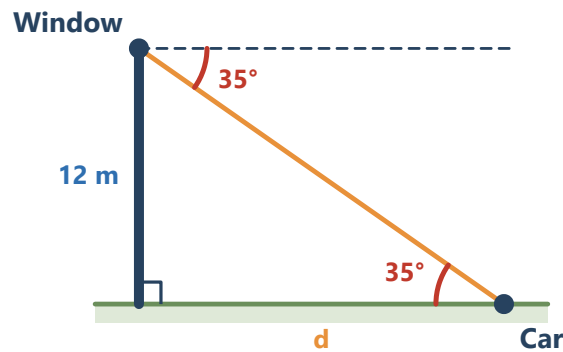
Answer: 223.9 m

- 5 An aircraft is flying at a height of 3000 m. From the airport the angle of elevation of the aircraft is 22° . Work out the horizontal distance of the aircraft from the airport, to the nearest metre.



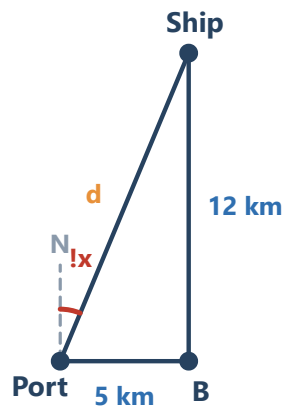
Answer: 7425 m

- 6 From a window 12 m above level ground, the angle of depression of a car is 35° . How far is the car from the wall of the building? Give your answer correct to 1 decimal place.



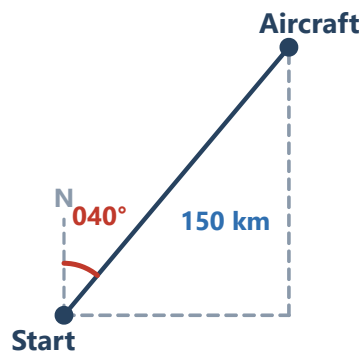
Answer: 17.1 m

- 7 A ship leaves a port and sails 5 km east and then 12 km north. Work out the distance of the ship from the port, and the bearing of the ship from the port to the nearest degree.



Answer: 13 km, 023°

- 8 An aircraft flies 150 km on a bearing of 040° . Work out how far (a) east and (b) north of its starting point the aircraft is. Give your answers correct to 1 decimal place.



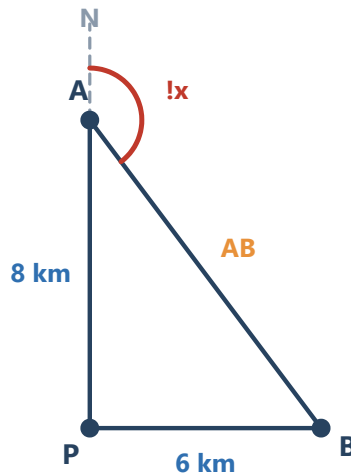
(a) east

Answer: 96.4 km

(b) north

Answer: 114.9 km

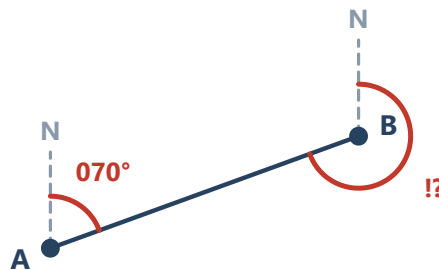
- 9 A port P has a lighthouse A 8 km due north of it. A buoy B is 6 km due east of P. Work out (a) the distance AB, (b) the bearing of B from A, to the nearest degree.



Answer: 10 km, 143°

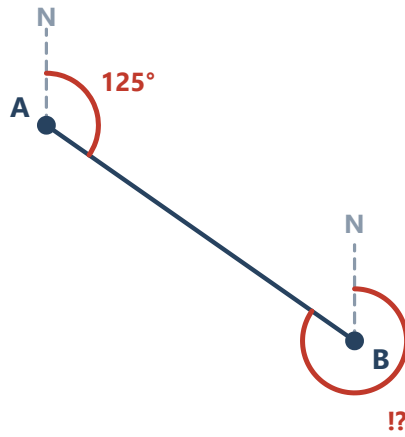
- 10 Work out each back bearing.

(a) The bearing of B from A is 070°. Find the bearing of A from B.



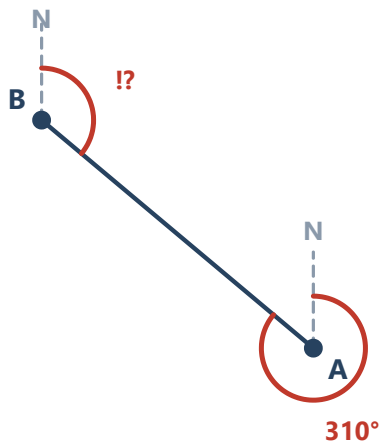
Answer: 250°

- (b) The bearing of B from A is 125° . Find the bearing of A from B.



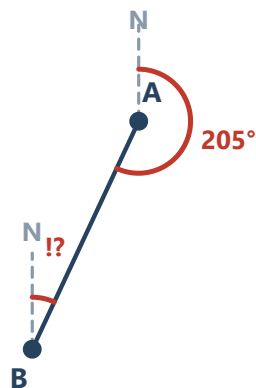
Answer: 305°

- (c) The bearing of B from A is 310° . Find the bearing of A from B.



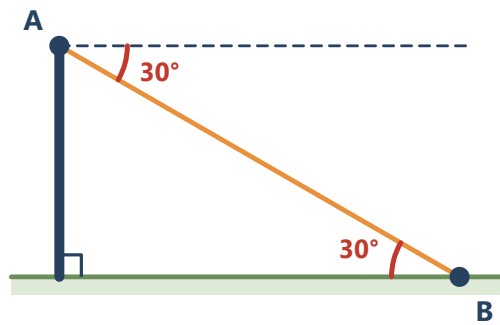
Answer: 130°

- (d) The bearing of B from A is 205° . Find the bearing of A from B.



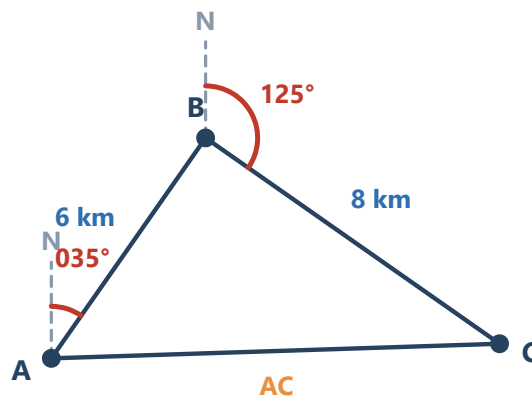
Answer: 025°

- 11** From the top A of a cliff, the angle of depression of a boat B is 30° . Explain why the angle of elevation of A from B is also 30° .



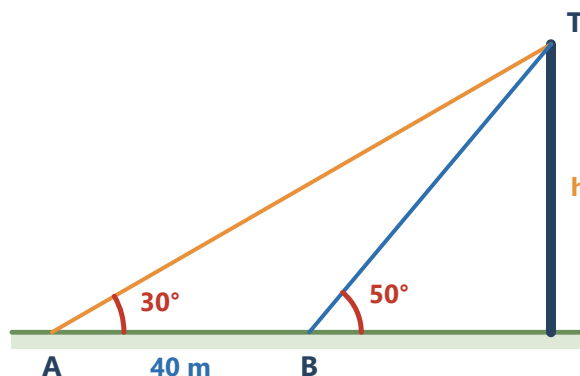
Answer: The horizontal lines are parallel, so the two angles are alternate angles and are equal.

- 12** A hiker walks 6 km on a bearing of 035° , then 8 km on a bearing of 125° . **Show that** the hiker finishes 10 km from the start.



Answer: Angle at B = 90° , so $AC = \sqrt{36 + 64} = 10$ km

- 13 Challenge.** Points A and B are on level ground in line with the foot of a vertical tower, with B between A and the tower. A and B are 40 m apart. The angle of elevation of the top of the tower is 30° from A and 50° from B. Work out the height of the tower, correct to 1 decimal place.



Answer: 44.8 m