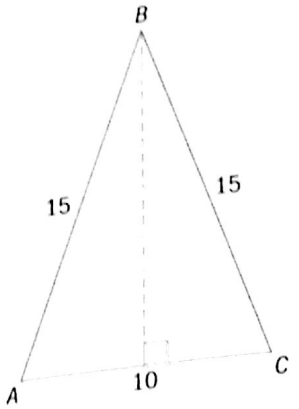
Exercise 11C

1 Isosceles triangle ABC has side $AC = 10\,\text{cm}$ and $AB = CB = 15\,\text{cm}$, as shown.

a Find the height of the triangle.

b Find the sizes of $B\hat{A}C$ and $A\hat{B}C$.

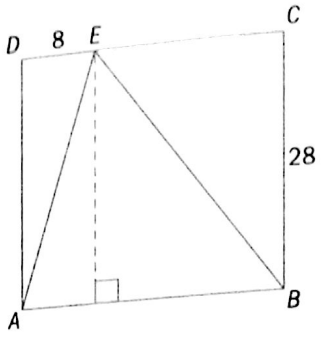


2 $\triangle ABE$ fits exactly inside the square $ABCD$, as shown. $BC = 28\,\text{cm}$ and $DE = 8\,\text{cm}$.

a Find the lengths of segments AE and BE.

b Find the sizes of $A\hat{E}D$, $E\hat{B}A$ and $A\hat{E}B$.

Give your answers correct to 3 sf.



3 An observer standing on the top of a vertical cliff 120 m above sea level sees a ship in the water at an angle of depression of 9°. How far is the ship from the base of the cliff?

If a diagram is not given with the question, start by drawing your own.

EXAM-STYLE QUESTION

4 A rectangle has length 25 mm and width 18 mm.
Find the angles between the diagonals of the rectangle.

5 Anya walks 2 km due north, then turns and walks another 3 km in the direction N35°W. Find her distance and bearing from her starting point.

6 From a window 12 m above the ground in Building A, the angle of elevation of the top of Building B across the street is 40°. If the buildings are 70 m apart, what is the height of Building B?

EXAM-STYLE QUESTION

7 A ship leaves port and sails 35 km on a bearing of 047°. The ship then turns and sails 15 km on a bearing of 105°. How far, and on what bearing, must the ship sail to return directly to port?

8 Buildings X and Y are across the street from each other, 95 m apart. From a point on the roof of Building X, the angle of depression to the base of Building Y is 55° and the angle of elevation to the top of Building Y is 35°. How tall are the two buildings?

9 Jacob is walking north along a straight road when he spots a tower in a field to his right on a bearing of 018°. After walking another 240 metres he notices the tower is now on a bearing of 066°. If he continues walking north, how close will he pass to the tower?

It is a good idea to check your final answers to make sure that the shortest side is opposite the smallest angle and the longest side is opposite the largest angle.

10 From her position at ground level, Hayley notices that the angle of elevation of the top of a building is 40°. When she moves 20 metres closer to the building, the new angle of elevation is 55°. Find the height of the building.

Unless the question tells you otherwise, assume the ground is level.

11 A car is traveling at a constant speed on a straight highway. A passenger in the car sees a bridge spanning the highway ahead at an angle of elevation of 5°. Ten seconds later, the angle of elevation of the bridge is 17°. How much more time will elapse before the car passes directly under the bridge?