ANLGES OF ELEVATION& DEPRESSION QUESTIONS

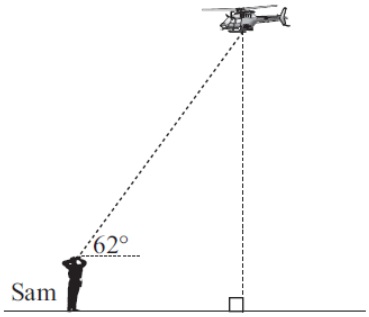
1 From a point 235 m from the base of a cliff, the angle of elevation to the cliff top is 25^o. Find the height of the cliff.

2 What angle will a 5 m ladder make with a wall if it reaches 4.2 m up the wall?

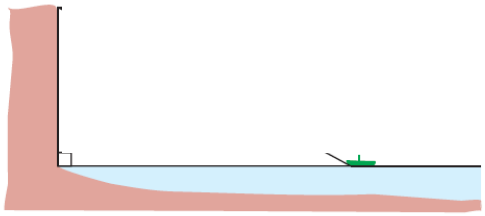
3 The angle of elevation from a fishing boat to the top of a lighthouse 25 m above sea-level is 6^o. Calculate the horizontal distance from the boat to the lighthouse.

4 A rectangular gate has a diagonal strut of length 3 m. The angle between the diagonal and a side is 28^o. Find the length of the longer side of the gate.

5 A model helicopter takes off from the horizontal ground with a constant vertical speed of 5 m/s. After 10 seconds the angle of elevation from Sam to the helicopter is 62^o. Sam is 1.8 m tall. How far is Sam's head from the helicopter at this time?



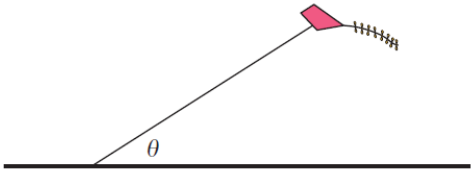
6



From a vertical cliff 80 m above sea level, a fishing boat is observed at an angle of depression of 6^o. How far out to sea is the boat?

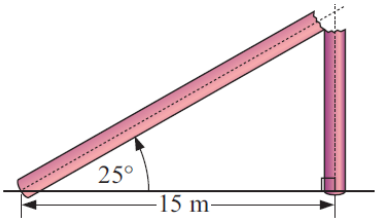
7 A railway line goes up an incline of constant angle 4^o over a horizontal distance of 4 km. How much altitude has the train gained by the end of the incline?

8 A kite is attached to a 50 m long string. The other end of the string is secured to the ground. If the kite is flying 35 m above ground level, find the angle θ that the string makes with the ground.

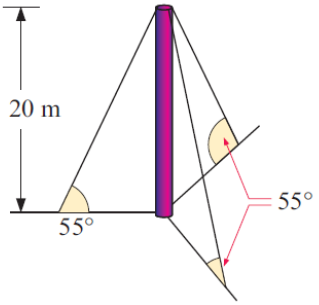


9 Antonio drew a margin along the edge of his 30 cm long page. At the top of the page the margin was 2 cm from the edge of the page, but at the bottom the margin was 3 cm from the edge of the page. How many degrees off parallel was Antonio's margin?

10 A goal post was hit by lightning and snapped in two. The top of the post is now resting 15 m from its base at an angle of 25^o. Find the height of the goal post before it snapped.



11



Three strong cables are used to brace a 20 m tall pole against movement due to the wind. Each rope is attached so that the angle of elevation to the top of the pole is 55^o. Find the total length of cable.

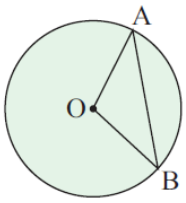
12 A rectangle has length 6 m and width 4 m. Find the acute angle formed where the diagonals intersect.

13 A tangent from point P to a circle of radius 4 cm is 10 cm long. Find:

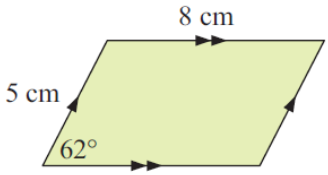
a the distance of P from the centre of the circle

b the size of the angle between the tangent and the line joining P to the centre of the circle.

14 AB is a chord of a circle with centre O and radius of length 5 cm. AB has length 8 cm. What angle does AB subtend at the centre of the circle, i.e., what is the size of angle AOB?



15 Find the area of the parallelogram:

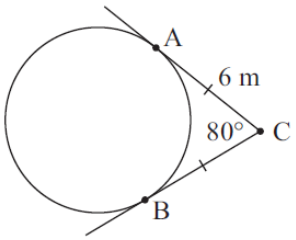


16 A rhombus has sides of length 10 cm, and the angle between two adjacent sides is 76^o. Find the length of the longer diagonal of the rhombus.

17 For the circle given, find:

a the radius of the circle

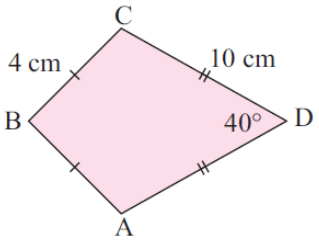
b the distance between A and B.



18 An aeroplane takes off from the ground at an angle of 27^o and its average speed in the first 10 seconds is 200 km/h. What is the altitude of the plane at the end of this time?

19 An observer notices that an aeroplane flies directly overhead. Two minutes later the aeroplane is at an angle of elevation of 27^o. Assuming the aeroplane is travelling with constant speed, what will be its angle of elevation after another two minutes?

20 Find the size of angle ABC.



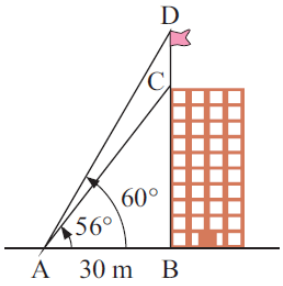
21 An isosceles triangle is drawn with base angles 24^o and base 28 cm. Find the base angles of the isosceles triangle with the same base length but with treble the area.

22 The angle of elevation from a point on level ground to the top of a building 100 m high is 22^o. Find:

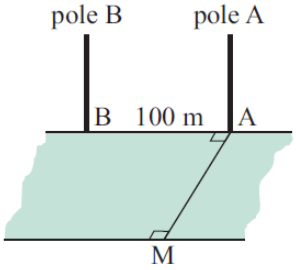
a the distance of the point from the base of the building

b the distance the point must be moved towards the building in order that the angle of elevation becomes 40^o.

23 From a point A which is 30 m from the base of a building B, the angle of elevation to the top of the building C is 56^o, and to the top of the flag pole CD is 60^o.
Find the length of the flag pole.



24



A man, M, positions himself on a river bank as in the diagram alongside, so he can observe two poles A and B of equal height on the opposite bank of the river.
He finds the angle of elevation to the top of pole A is 22^o, and the angle of elevation to the top of pole B is 19^o.
Show how he could use these facts to determine the width of the river, if he knows that A and B are 100 m apart.

25 A surveyor standing on a horizontal plain can see a volcano in the distance. The angle of elevation of the top of the volcano is 23^o. If the surveyor moves 750 m closer, the angle of elevation is now 37^o. Determine the height of the volcano.

ANSWERS

1 110 m	**2** 32.9^o	**3** 238 m	**4** 2.65 m
5 54.6 m	**6** 761 m	**7** 280 m	**8** $\theta \approx 44.4^o$
9 1.91^o	**10** 23.5 m	**11** 73.2 m	**12** 67.4^o

13 **a** 10.8 cm **b** 21.8^o **14** 106^o **15** 35.3 cm^2
16 15.8 cm **17** **a** ≈ 5.03 m **b** AB ≈ 7.71 m **18** 252 m
19 14.3^o **20** $\approx 118^o$ **21** 53.2^o **22** **a** 248 m **b** 128 m
23 7.48 m **24** 163 m **25** 729 m **26** 1.66 units
27 AB ≈ 8.66 m, BC ≈ 9.85 m, AC ≈ 6.43 m