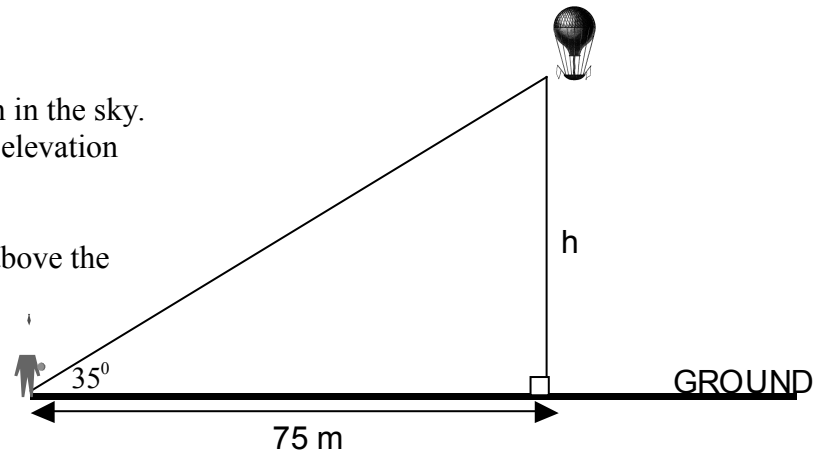


# Trigonometry

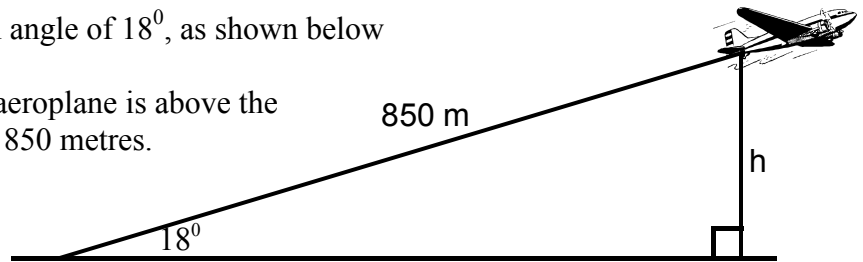
1. Michael is looking at a hot air balloon in the sky.  
From Michael's position the angle of elevation to the balloon is  $35^\circ$ .

Calculate  $h$ , the height the balloon is above the ground.



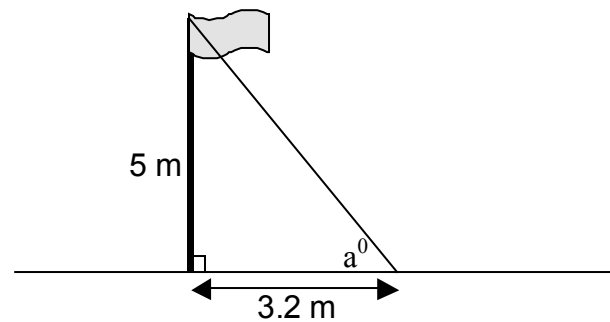
2. An aeroplane takes off at an angle of  $18^\circ$ , as shown below

Calculate the height,  $h$ , the aeroplane is above the ground after it has travelled 850 metres.

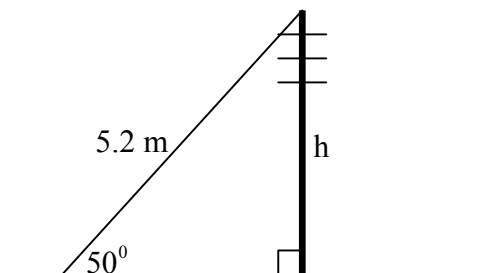


3. A flagpole 5 metres high is supported by a metal wire which is connected to the ground, 3.2 metres from the flagpole.

Calculate the size of the angle the wire makes with the ground.

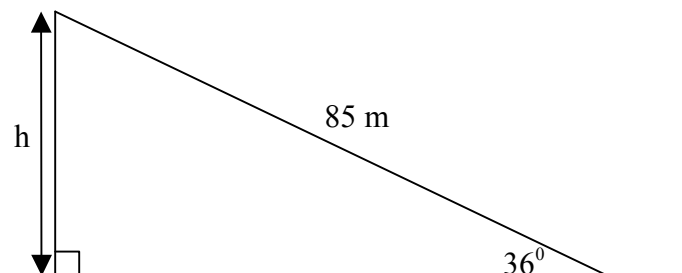


4. A wire 5.2 metres long is connected to a telegraph pole for support. The wire makes an angle of  $50^\circ$  with the ground.  
Calculate  $h$ , the height of the pole.



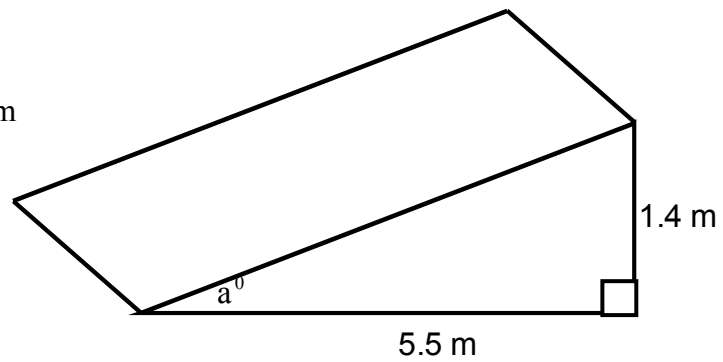
5. The diagram shows an artificial ski slope.  
The length of the slope is 85 metres and the slope makes an angle of  $36^\circ$  with the horizontal.

Calculate the vertical height  $h$ , of the slope.

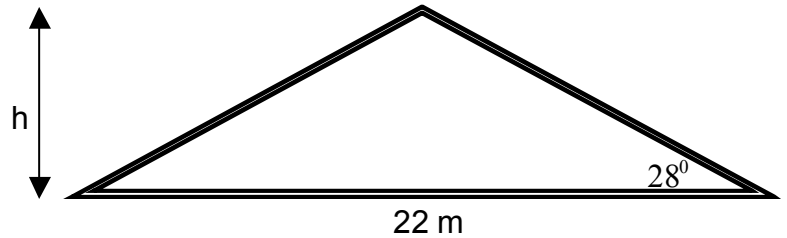


6. A ramp 5.5 metres long is at a height of 1.4 m at its highest point.

Calculate,  $a^\circ$ , the angle the ramp makes with the ground.

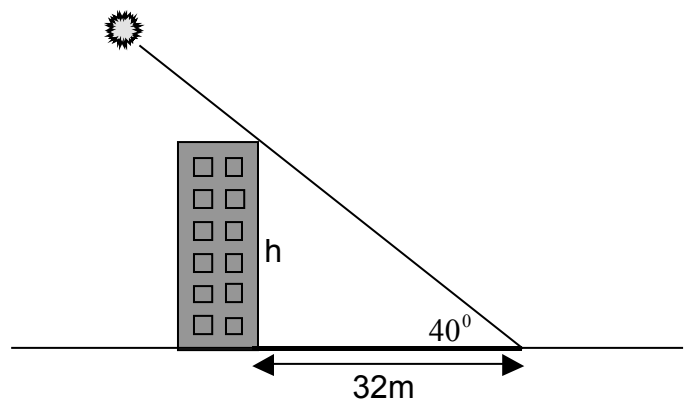


7. The diagram shows the end view of the roof of a house which is in the shape of an isosceles triangle. Calculate  $h$ , the height of the roof.



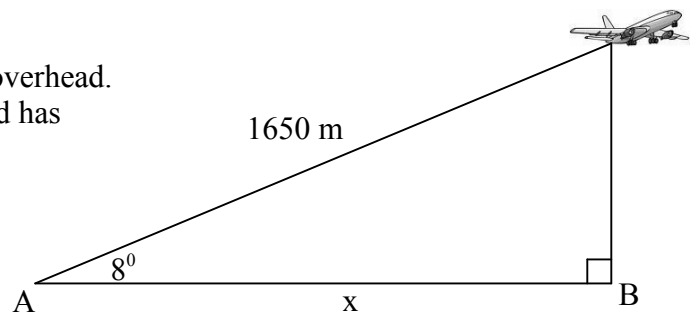
8. In the diagram a block of flats casts a shadow 32 metres long. This occurs when the Sun has an angle of elevation of  $40^\circ$ .

Calculate the height,  $h$ , of the block of flats.



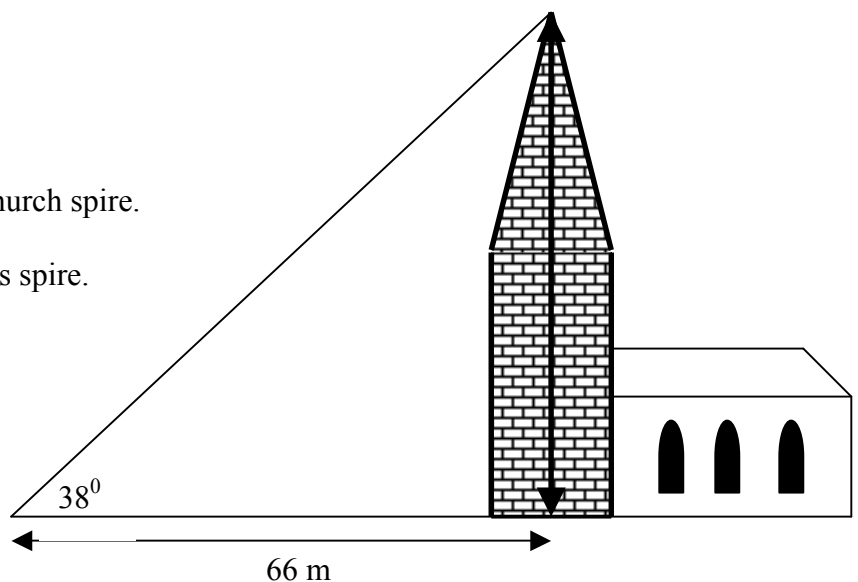
9. An observer at B sees an aeroplane directly overhead. The aeroplane has taken off from point A and has flown 1650 metres. The angle of take-off was  $8^\circ$ .

Calculate  $x$ , the distance the observer is from the take-off point.

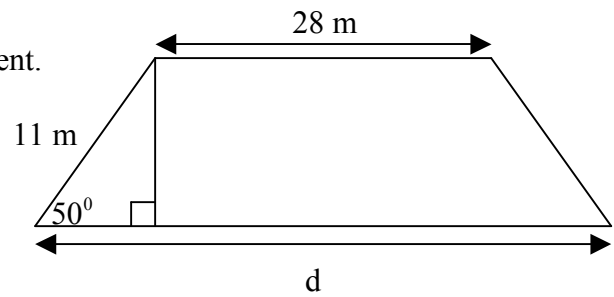


10. The diagram opposite shows a church spire.

Calculate the vertical height of this spire.

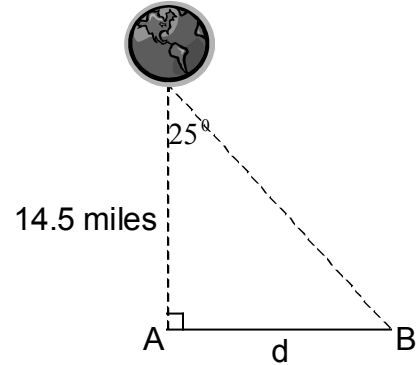


11. The diagram shows a symmetrical railway embankment. Given the information in the diagram, calculate the distance  $d$ .



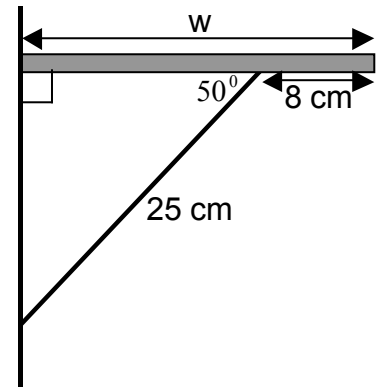
12. Two satellites, A and B, are orbiting the Earth. At noon, one day, satellite A is 14.5 miles above the Earth, as shown.

Use the diagram to find the distance  $d$ , between the the satellites.



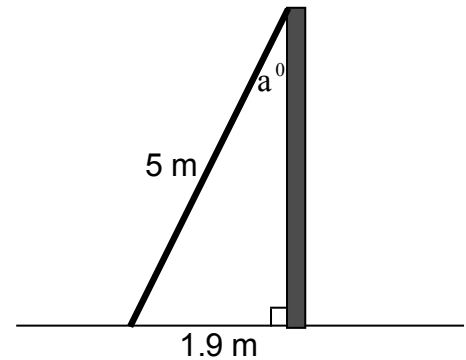
13. A wooden shelf is supported by a metal bracket. The metal bracket is connected to the shelf at an angle of  $50^\circ$ , as shown.

Calculate  $w$ , the width of the shelf.

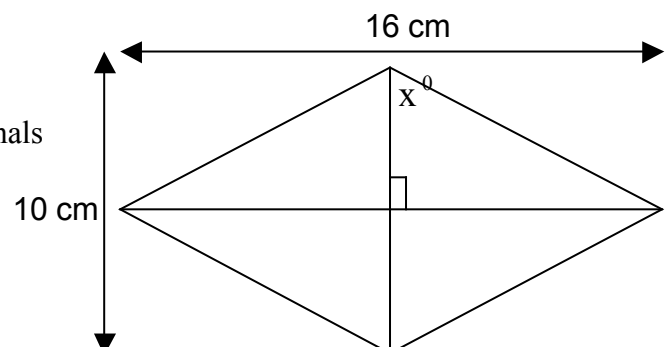


14. A ladder 5 metres long is resting against a wall. The foot of the ladder is 1.9 metres from the bottom of the wall, as shown.

Calculate,  $a^\circ$ , the size of the angle between the ladder and the wall.

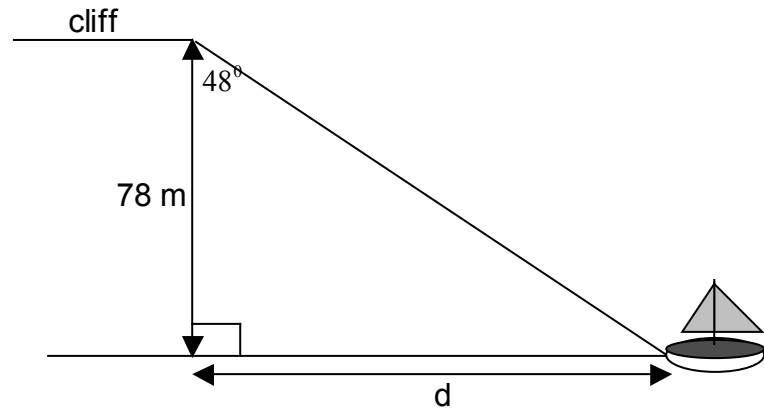


15. The diagram shows a rhombus with diagonals 16 cm and 10 cm. Calculate the size of angle  $x^\circ$ .



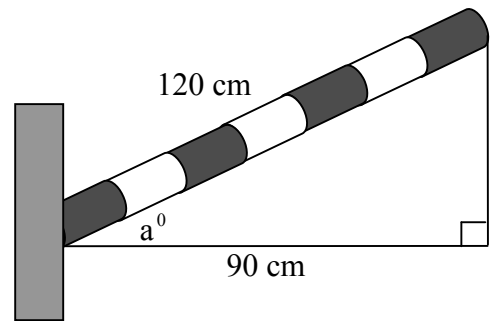
16. The diagram shows a small boat out at sea.  
From the top of a cliff the angle to the boat is  $48^\circ$ .

Use the information in the diagram to find how far the boat is from the base of the cliff.



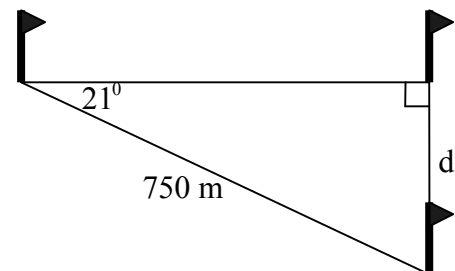
17. A barber's pole 120 centimetres long is connected to a wall. The end of the pole is 90 centimetres from the wall.

Calculate the angle the pole makes with the wall.



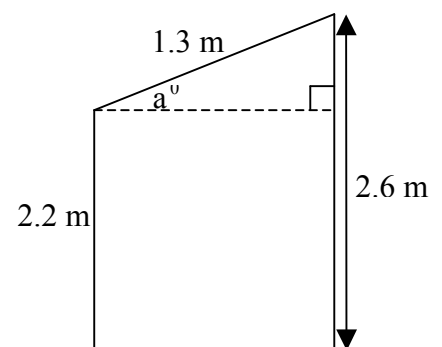
18. The diagram shows 3 points on an orienteering course. The points form a right-angled triangle.

Given the information in the diagram, calculate  $d$ .



19. The diagram shows the side view of a garden shed.  
The back wall of the shed is 2.6 metres high and the front wall is 2.2 metres high.  
The sloping roof of the shed is 1.3 metres long.

Calculate the size of angle  $a^\circ$ , the angle the roof makes with the horizontal.



20. A flagpole  $DE$ , 3 metres high, is situated at the corner of a rectangular field,  $ABCD$ .

The flagpole casts a shadow over the field.  
The shadow reaches  $M$ , the midpoint of  $BC$ .

Calculate the size of the shaded angle.

