## TRIGONOMETRY 2

Read each question carefully, then draw a diagram.

1. A painter is using a ladder to paint a high factory wall. The ladder is 5 m long and for safety, must never be used at an angle to the vertical of less than 15° or more than 40°. If he can reach 1 m above the top of the ladder, what is the maximum height to the nearest tenth of a metre that he can paint? (Hint: what angle would give the painter the greatest height?)

2. Raj is building a garden shed of his own design. It has a simple sloping roof. The two walls on which the roof will rest are 3.2 m apart and one wall is 0.5 m higher than the other. Allowing 0.25 m for overhang at either end, how long (to the nearest hundredth) will the roof beams have to be? What will the slope of the roof be to the nearest degree with respect to the horizontal?

Sloping roof

Shed
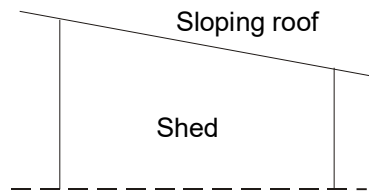
3.   Joan is welding a piece of modern sculpture. Part of the design includes an A-frame structure. Joan wants the two thin bars that make up the sides of the frame to form an angle of 54° at the top and she wants the frame to be 2.2 m high. How long will each bar have to be to the nearest thousandth? (Hint: you need a right triangle to use a trigonometric ratio.)

4.   A new ski-lift is being built at the slopes. The base of the lift is at an elevation of 2500 m, but the elevation of the top station is not accurately known. A survey of the site shows the base and the top station are 2450 m apart in horizontal distance and a line of sight to the top station angles up at 38°. Find the length of steel cable (to the nearest 10 m) that will be needed for the endless loop on which the chairs will hang. Allow for an additional 5% of the total length for sags, joining, etc.

5.   The roof of a small pup tent is made of a rectangular piece of material. If the tent is to be 2.2 m long, the roof sloping up at 48° to the horizontal and with the poles 1.4 m high, how many square metres of material will be needed to make the tent to the nearest hundredth?

ANSWER KEY

1. 4.2 m

2. roof beams are 3.73 m long, slope is 9°

3. 2.469 m

4. 6530 m

5. 8.27 m^2

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