

Trigonometry Problems

EXERCISE 6L

In these questions, give answers involving angles to the nearest degree.



- 1** A ladder, 6 m long, rests against a wall. The foot of the ladder is 2.5 m from the base of the wall. What angle does the ladder make with the ground?



- 2** The ladder in question 1 has a "safe angle" with the ground of between 60° and 70° . What are the safe limits for the distance of the foot of the ladder from the wall?



- 3** Another ladder, of length 10 m, is placed so that it reaches 7 m up the wall. What angle does it make with the ground?



- 4** Yet another ladder is placed so that it makes an angle of 76° with the ground. When the foot of the ladder is 1.7 m from the foot of the wall, how high up the wall does the ladder reach?

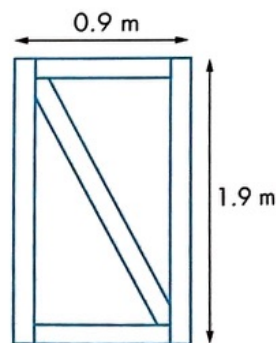


- 5** Calculate the angle that the diagonal makes with the long side of a rectangle which measures 10 cm by 6 cm.



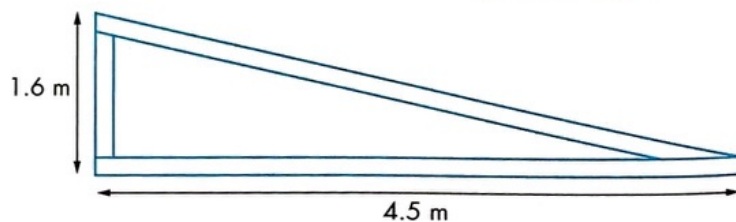
- 6** This diagram shows a frame for a bookcase.

- a** What angle does the diagonal strut make with the long side?
b Use Pythagoras' theorem to calculate the length of the strut.

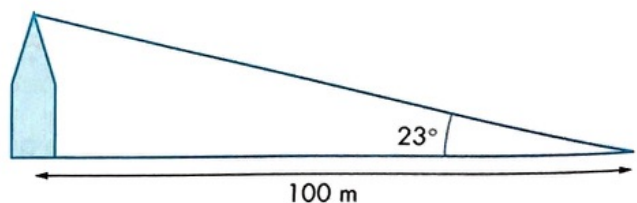


- 7** This diagram shows a roof truss.

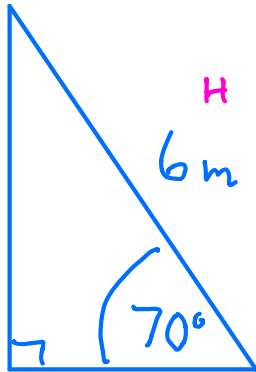
- a** What angle will the roof make with the horizontal?
b Use Pythagoras' theorem to calculate the length of the sloping strut.



- 8** Alicia paces out 100 m from the base of a church. She then measures the angle to the top of the spire as 23° . How high is the church spire?



- 2 The ladder in question 1 has a "safe angle" with the ground of between 60° and 70° . What are the safe limits for the distance of the foot of the ladder from the wall?



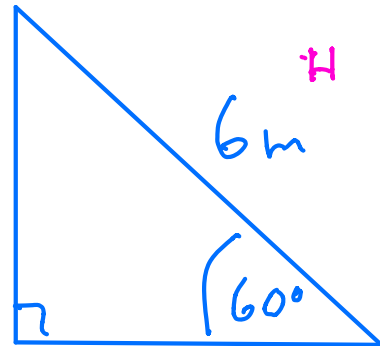
x

A

$$\cos 70^\circ = \frac{x}{6}$$

$$6 \cos 70^\circ = x$$

$$x = 2.05 \text{ m}$$



x

A

$$\cos 60^\circ = \frac{x}{6}$$

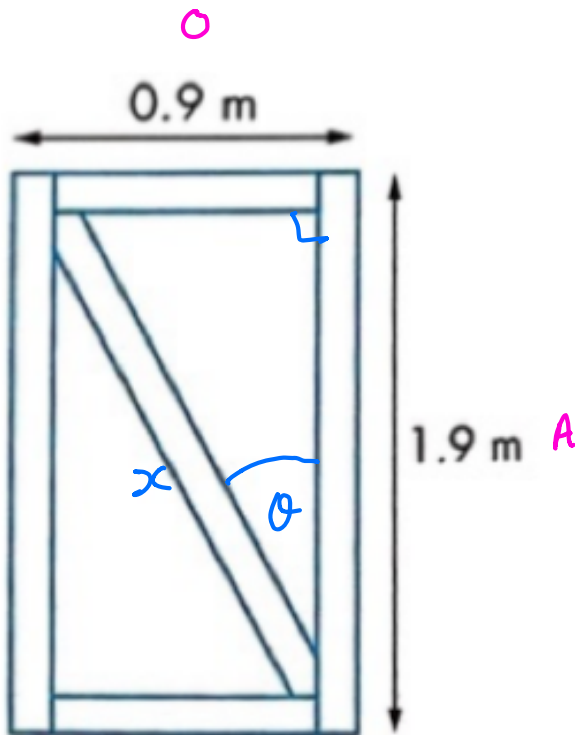
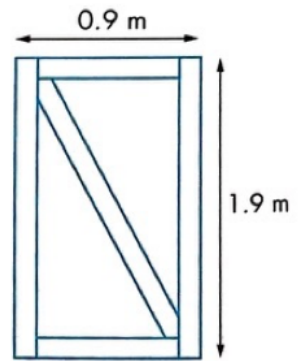
$$6 \cos 60^\circ = x$$

$$x = 3.00 \text{ m}$$

$$2.05 \text{ m} \leq x \leq 3.00 \text{ m}$$

6 This diagram shows a frame for a bookcase.

- a What angle does the diagonal strut make with the long side?
- b Use Pythagoras' theorem to calculate the length of the strut.



$$\tan \theta = \frac{0.9}{1.9}$$

$$\theta = \tan^{-1}\left(\frac{0.9}{1.9}\right)$$

$$\theta = 25.3^\circ$$

b)

$$x^2 = 0.9^2 + 1.9^2$$

$$x^2 = 4.42$$

$$x = \sqrt{4.42}$$

$$x = 2.10 \text{ m}$$