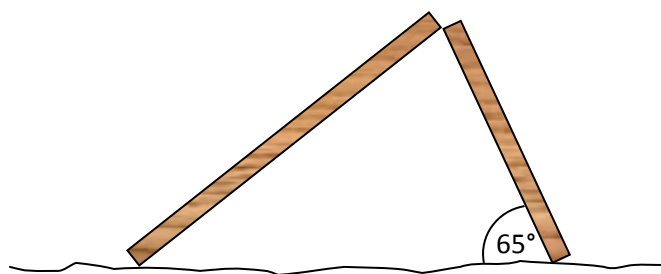


Extension Trigonometry Practice #2

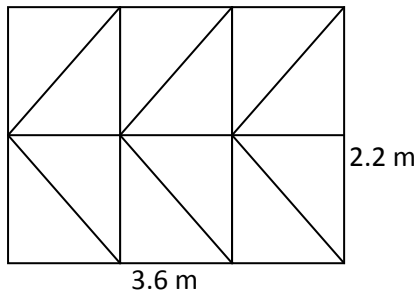
1. A builder erects an internal house wall 2.2 metres high and 3.6 metres wide. He forms it from 4 studs (vertical pieces of wood), each stud separated by dwangs (horizontal pieces) from the next at the base, top and half-way up. He then adds a diagonal brace inside each space. Approximately how much wood did he use? (you may work on the basis that the wood has no internal width)
2. If the maximum angle a wheelchair access ramp can make is 20° with the ground, and the ramp can start 5 metres back. How high can it reach?
3. Peter has two pieces of wood, one is 1.2 m long, and the other is 1.8 m. He leans them up against each other so the tips are touching. If the 1.2 m piece is at 65° with the ground, what is the angle the longer one makes with the ground?



4. A boat sails out 4 km east and then 6 km south. What is the return bearing if the boat is to return directly to where it started?

Answers: Extension Trigonometry Practice #2

1. A builder erects an internal house wall 2.2 metres high and 3.6 metres wide. He forms it from 4 studs (vertical pieces of wood), each stud separated by dwangs (horizontal pieces) from the next at the base, top and half-way up. He then adds a diagonal brace inside each space. Approximately how much wood did he use? (you may work on the basis that the wood has no internal width)



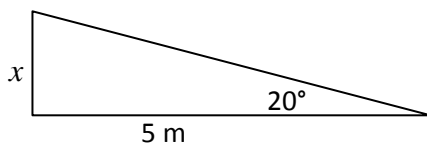
Each diagonal is $3.6 \div 3 = 1.2$ m wide and $2.2 \div 2 = 1.1$ m high.

Using Pythagoras, each diagonal = $\sqrt{1.2^2 + 1.1^2} = 2.506$ long.

total wood = 6 diagonals (6×2.509) + three widths (3×3.6) + four heights (4×2.2)

= **34.6 metres total**

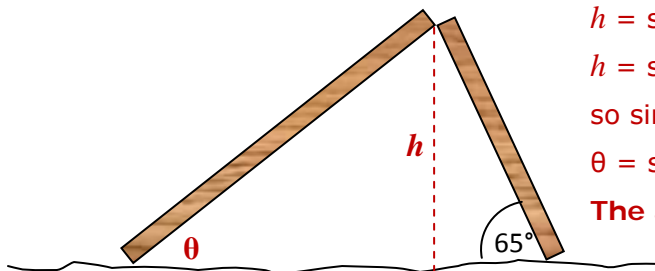
2. If the maximum angle a wheelchair access ramp can make is 20° with the ground, and the ramp can start 5 metres back. How high can it reach?



Maximum height = x .

$$x = \tan 20^\circ \times 5 = \mathbf{1.82 \text{ metres high}}$$

3. Peter has two pieces of wood, one is 1.2 m long, and the other is 1.8 m. He leans them up against each other so the tips are touching. If the 1.2 m piece is at 65° with the ground, what is the angle the longer one makes with the ground?



$$h = \sin 65^\circ \times 1.2 = 1.08757$$

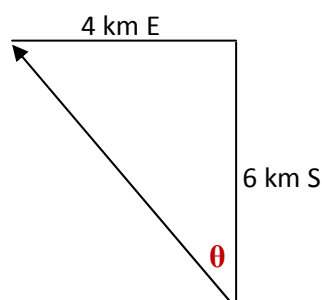
$$h = \sin \theta \times 1.8$$

$$\text{so } \sin \theta \times 1.8 = 1.08757$$

$$\theta = \sin^{-1}(1.08757 \div 1.8) = 37.17$$

The angle formed is 37.2°

4. A boat sails out 4 km east and then 6 km south. What is the return bearing if the boat is to return directly to where it started?



We have $O = 4$ and $A = 6$, so we use TOA

$$\theta = \tan^{-1}\left(\frac{4}{6}\right) = 33.690^\circ$$

But bearing is clockwise from North, and this is anti-clockwise from North.

Return Bearing = $360 - 33.690 = 326.3$