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)

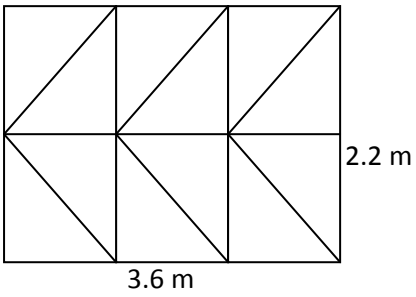
2. If the maximum angle a wheelchair access ramp can make is 20º with the ground, and the ramp can start 5 metres back. How high can it reach?

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)



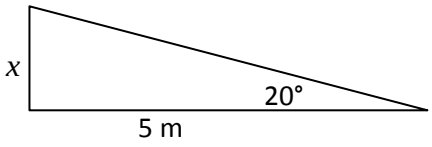
Each diagonal is 3.6 ÷ 3 = 1.2 m wide and 2.2 ÷ 2 = 1.1 m high.

Using Pythagoras, each diagonal = $\sqrt{1.2^2 + 2.2^2}$ = 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 20º with the ground, and the ramp can start 5 metres back. How high can it reach?



Maximum height = x.

x = tan 20° × 5 = **1.82 metres high**

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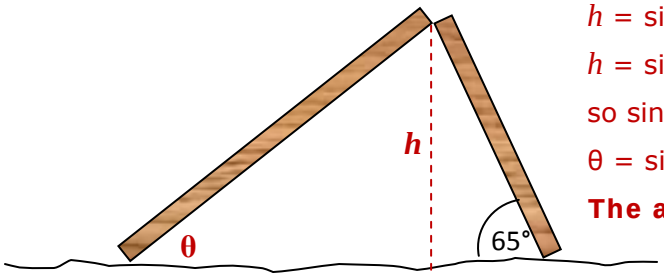


h = sin 65° × 1.2 = 1.08757

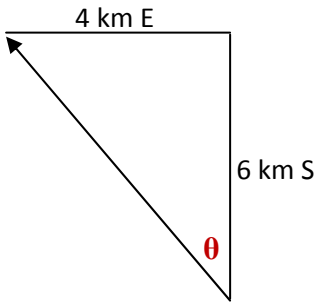
h = sin θ × 1.8

so sin θ × 1.8 = 1.08757

θ = $\sin^{-1}$(1.08757 ÷ 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

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

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

Return Bearing = 360 – 33.690 **= 326.3**