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 65º 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 $(6 \times 2.509) +$ three widths $(3 \times 3.6) +$ four heights $(4 \times 2.2) = 34.6$ 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 = $x$.

$x = \tan 20° \times 5 = 1.82$ 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 65º with the ground, what is the angle the longer one makes with the ground?

$h = \sin 65° \times 1.2 = 1.08757$

$h = \sin \theta \times 1.8$

so $\sin \theta \times 1.8 = 1.08757$

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

The angle formed is 37.2º

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

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

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

Return Bearing = 360 – 33.690 = 326.3