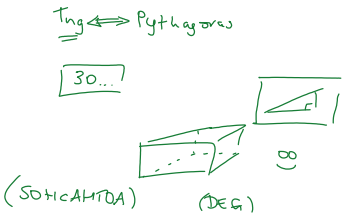
Applications in two dimensions

Wednesday, 21 February 2018 9:01 AM



Work to be complete once teaching has finished:

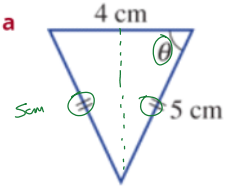
4.3 Applications in two dimensions	Exercise 4C	Understanding 1-4	2,3
Let's start: *Mountain peaks*		Fluency 5-8	5_8
Key ideas		Problem-solving 9-11	10, 11
Example 5, 6		Reasoning 12-15	14, 15
		Enrichment16	16

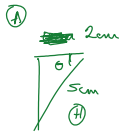
The great thing with Trigonometry and the one which seems to confuse people is when we have "real world applications". We see mingly have problems with trying to see **right angled triangles** in shapes! Either that, or we seem to have come to the belief that we can't add lines or change shapes to create right angled triangles.

If we look at the previous exercise, I know that some people wondered what was possible with some of the shapes:

Example:

a





CAH

$\cos\theta = \frac{Adj}{Hyp}$

$\cos\theta = \frac{2}{5}$

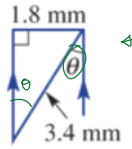
$\theta = \cos^{-1}\left(\frac{2}{5}\right)$

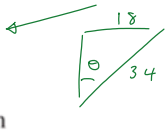
$\theta = 66.42^\circ$ (2 d.p)

Alternate
Co-inter
Vertically Opp
Corresponding

Example:

c



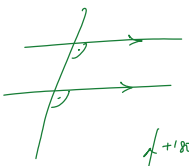


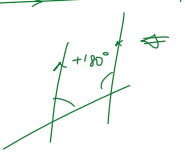
$\sin\theta = \frac{Opp}{Hyp}$

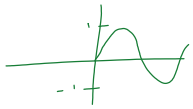
$\sin\theta = \frac{1.8}{3.4}$

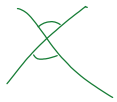
$\theta = \sin^{-1}\left(\frac{1.8}{3.4}\right) =$

$\theta = \sin^{-1}\left(\frac{3.4}{1.8}\right)$ ✗ Max

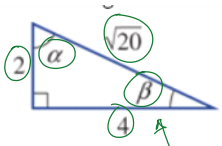


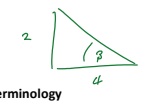


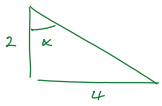




Example:







$\tan\theta = \frac{Opp}{Adj}$

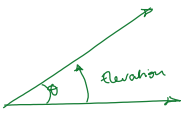
$\tan\theta = \frac{4}{2}$

$180 - 90 - \alpha = \beta$

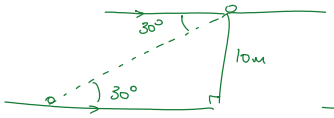
$\theta = \tan^{-1}\left(\frac{4}{2}\right) =$ °

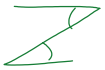
Terminology

Angles of elevation and depression



Same Value!

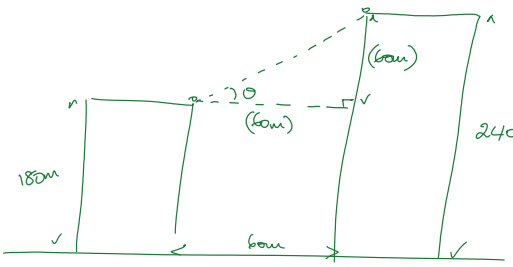




Questions in two-dimensions

First hint: **ALWAYS DRAW A DIAGRAM FROM THE QUESTION**

Two buildings are 60 metres aparts and are 180 metres and 240 metres high. Find the angle of elevation from the shorter building to the taller building. Express your answer correct to two decimal places.



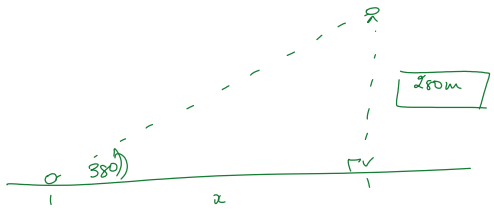
240 − 180
= 60m

$\tan\theta = \frac{Opp}{adj}$

$\tan\theta = \frac{60}{60}$

$\theta = 45^\circ$

A spaceship is hovering at an altitude of 280 metres. The angle of elevation from a bystander to the spaceship of 38°. Find the horizontal distance from the spaceship to the bystander to the nearest centimetre.



$\tan\theta = \frac{280}{x}$

$\tan 38° = \frac{280}{x}$

$x = \frac{280}{\tan 38°} = \_\_\_\_ m = \_\_\_\_ cm$

Where does this lead?

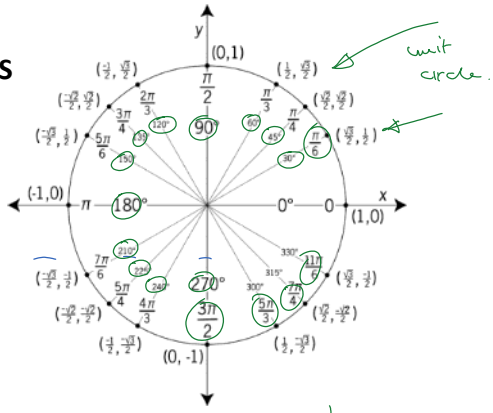
In **Methods Units 1 and 2** you take basic ideas of Trigonometry and extend it into something called the Unit Circle.
This is a clever way of finding all the values you can have for a sine, cosine and tangent ratio.

SQUARE ROOTS

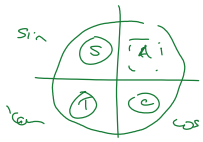
RADIANS

PI

QUADRANTS



ALL STATIONS TO CANBERRA



This is, for some people, a better way than using the graphs of trig functions I showed you last lesson.
Some people prefer to use the graphs!
Many times in Mathematics - there is more than one way to get to an answer - which is fine! Unless they state that you have to use a particular method.