

# NCEA Level 2 Mathematics (Homework)

## 3. Trigonometry

### Reading

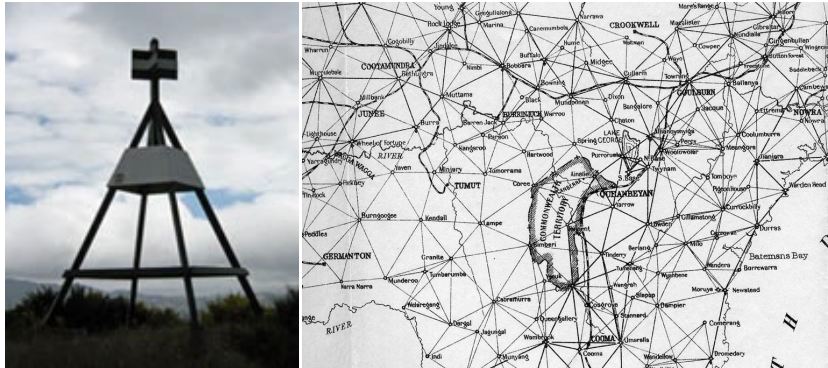
Go and watch...

<https://www.youtube.com/watch?v=o6KlpIWbcbw>

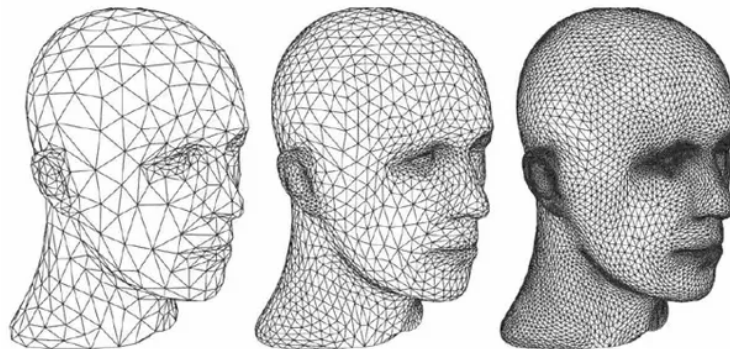
### What's it good for?

People use the geometry of triangles for...

- Physics: physicists and engineers use trigonometry to calculate how forces and stresses are transmitted in systems that involve angles.
- Geography: triangulation is used to measure the areas and topography of large areas of land.



- Computer graphics: complicated 3D shapes are usually modelled with a large number of triangles or other polygons, to simplify and speed up shading and other algorithms.



## Questions

[This is a sample Ministry of Education L2 assessment task for this standard.]

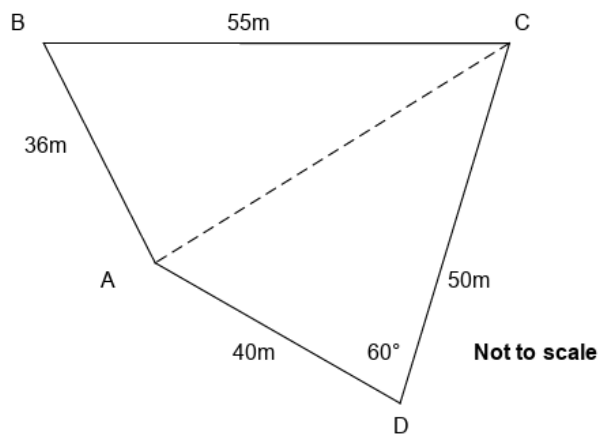
Your school is selling some unused land to raise money for a new gymnasium. The buyer will only purchase the land if the school can demonstrate that the land can be subdivided into four sections of at least  $400\text{ m}^2$  each. The buyer will not purchase the land if all of the sections are triangular. This assessment activity requires you to determine the dimensions of appropriate subdivisions so that the sale can proceed.

Given the land diagram below,

1. Calculate the length of the pipeline running through the land.
2. Demonstrate that the land can be divided into four sections each of more than  $400\text{ m}^2$  such that not all are triangular.
3. Show one possible way of dividing the land into four sections each of more than  $400\text{ m}^2$  such that not all are triangular.

The quality of your reasoning, using a range of methods, and how well you link this context to your solutions will determine the overall grade. Clearly communicate your method using appropriate mathematical statements so that the new owner can easily verify the dimensions of the sections.

### Resource 1: Land Diagram



The unused land bounded by ABCD needs to be split into four sections.  
The pipeline running through the land is between points A and C.