Module 7: Developing the personal maths skills of teachers and assessors

Developmental task

Space and shape

Academic context

Over the course of 3,500 years there were 118 pyramids constructed by the Pharaohs of Ancient Egypt. The construction of the pyramids, and the statistics associated with them, have been a constant source of fascination to mathematicians and archaeologists alike.

The majority of all Egyptian pyramids are now in such a state of ruin that it is very difficult to assess the original height of the pyramid even if the base measurements can be accurately determined.

With the few preserved pyramids that exist there are a number of methods that can be used. One of these involves measuring the slope of the remaining casing stones on the faces of the pyramids.

Theories about the construction of the pyramids abound. As an archaeologist, you are interested in the following theories:

1. The distance around the base of a pyramid equals the circumference of a circle whose radius is the height of the pyramid.

2. The ratio of height to base of pyramids is either 7:11 or 2:3 depending on the angle of slope.

Extract and apply data from the table below to investigate these two theories.

Present your results – do they support the theories? What other factors may you need to take into account? What might you do to explore your findings further?

Pyramid	Angle of sloping face to the horizontal	Measurements of base (in metres, bases are square except the first)
Great Pyramid (Khufu)	51.87°	230.25 x 230.39
Khafre*	53.13°	215
Nyuserre	51.85°	79.9
Teti	53°	78.5
Pepi II	53°	78.75
Ahmose	60°	52.5
Menkaure	51.19°	103.4
Sneferu	51.8°	144

* Khafre has been preserved as a result of its casing stones and the height has been measured at 143.5m (see fig 1)

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