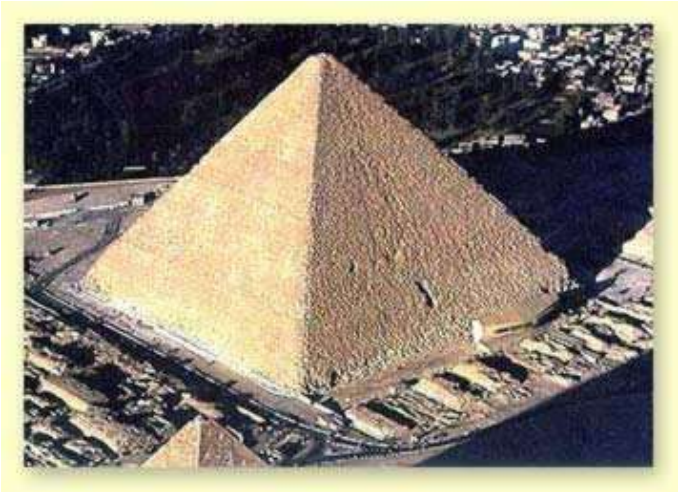
Pyramid and sphere questions

1.



The Great Pyramid of Khufu has sides of length 230 m and is 147 m high
It contains 2.4 million blocks of stone, density 2400 kg/m^3

(a) What is the mass of each block, if they are all the same?
(b) The world production of concrete is $6x10^9$ m^3/year. How many pyramids per year could this produce?

2. A few of the blocks are granite (density 3000 kg/m^3) and have a mass of 70 tonnes. If they have sides in proportion 2:3:8, what are the dimensions of these blocks? (see proportion notes).

3. I want to build the world's tallest pyramid.
I will use high-strength concrete. This can support a weight of 130 million Newtons per square metre and has density 2400 kg/m^3. [A 1 kg mass has a weight on Earth of 9.81 N].
How high can my pyramid be?
(This is an exercise in writing and solving an equation. The length of the sides (use *L*) should just cancel out)

4. The Moon is 2000 miles diameter.
(a) What are its volume and surface area?
(b) A recent Horizon programme suggested mining Helium 3 from the surface of the moon; there is apparently enough there to run future nuclear fusion power stations for "several hundred years". Comment on this suggestion.