

APPLICATIONS - WORK:

PROBLEM 1 - It is reported that the Great Pyramid of Egypt was built in 20 years. If the stone making up the pyramid has density 200 pounds per cubic foot. Find the total work done in building the pyramid (aka. lifting the stones into place). The dimensions of the pyramid are that it has a square base with length 755 feet and is 410 feet high.

$$WORK = (FORCE)(DISTANCE)$$

1. Draw a picture of the pyramid and label the sides:
2. Show that the work to lift a small horizontal layer into place at height h_i is given by: $Work = 200s_i^2h_i\Delta h$ where s_i is the length of the square sides of the slice at that height.
3. Show that we can write: $s_i = \frac{755}{410}(410 - h_i)$
4. Write down and solve the integral that give the total work to build the pyramids. How much work had to be done per year? Imagine this in terms of your own life. How many times would you have to lift 100 pounds up to your shoulders, about 5 feet, to "Build a Pyramid?"