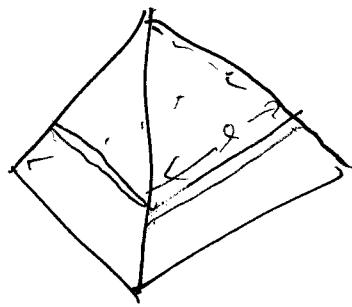


P. 5



11/30  
①

Square base

755 ft by 755 ft.

height = 410 ft.

Rock "density" of 200 lbs/ft<sup>3</sup>

How much work to build it.

horizontal slices.

slice work = slice weight  $\times$  height

$\uparrow x$  base  $x = 0$

height =  $x$

slice weight = 200  $\times$  slice vol

slice vol =  $l^2 \Delta x$

$l$  = side length = linear function of  $x$

$l(410) = 0$        $l(0) = 755$

$l(x) = 755 - \frac{755}{410} x$

work =  $\int_0^{410} 200 \left( 755 - \frac{755}{410} x \right)^2 x dx$

# Pressure

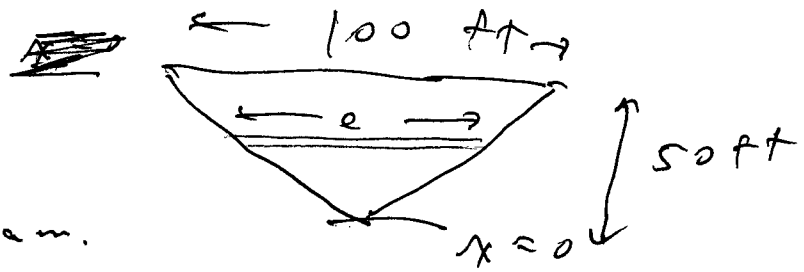
11/30  
only

In water the pressure depends on depth

$$p = 62.4 \frac{\text{lbs}}{\text{ft}^3} h$$

$h =$  depth

Example Dam  
water level is at top of dam.



What is total force on dam?  
 $x=0$  is bottom of dam.

~~depth~~  $\text{depth} = 50 - x$

slice area =  $l \Delta x$

$l = 0$  at  $x = 0$ ,  $l = 100$  at  $x = 50$

$l(x) = 2x$

~~slice~~ slice area =  $2x \Delta x$

~~slice~~ slice force =  $62.4 (50 - x) 2x \Delta x$

total force =  $\int_0^{50} 62.4 (50 - x) 2x dx$