Question #37072

What is the total force of a cylindrical water tower 35 meters high and 8 meters in radius?

Answer

The total force is equal to the weight

$F = P$

The weight is

$P = mg$ where m is the mass of the tower g is the acceleration due the gravity

$m = V\rho$ where V is the volume of the tower ρ is the density of water (1000 kg/m^3)

For cylindrical tower

$V = \pi R^2 H$ where H is the height R is the radius of the tower

The final equation is

$$F = \pi R^2 H \rho g$$

$$F = 3.14 * 8^2 * 35 * 1000 * 9.88 = 69{,}000{,}000\ N = 6.9 * 10^7\ N$$

Answer $6.9 * 10^7\ N$.