

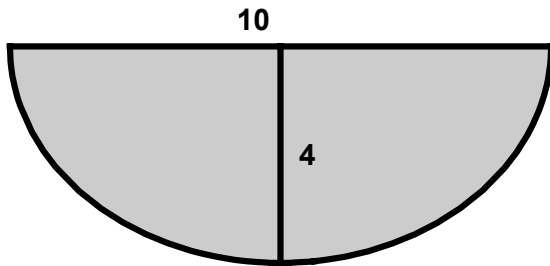
7.5 Applications from Science and Statistics

Finding the force of a fluid on a plate submerged in a liquid

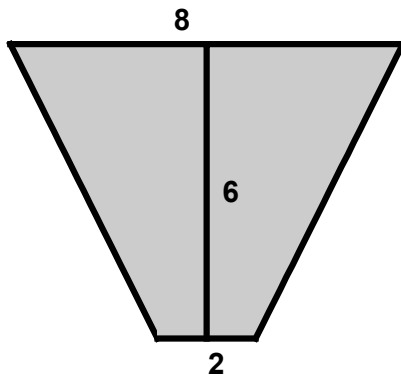
$$F = \int_c^d \rho L(y) h(y) dy \quad \text{where } \rho \text{ is the density of the fluid, } L(y) \text{ is the length of a function representing}$$

the length of the plate, and $h(y)$ represents the depth.

1. The vertical end of a tank containing water with a density of $62.5 \frac{\text{lbs}}{\text{ft}^3}$ is shown. Find the force of the water on one end of the tank.



2. The vertical end of a tank containing water with a density of $62.5 \frac{\text{lbs}}{\text{ft}^3}$ is shown. Find the force of the water on one end of the tank.

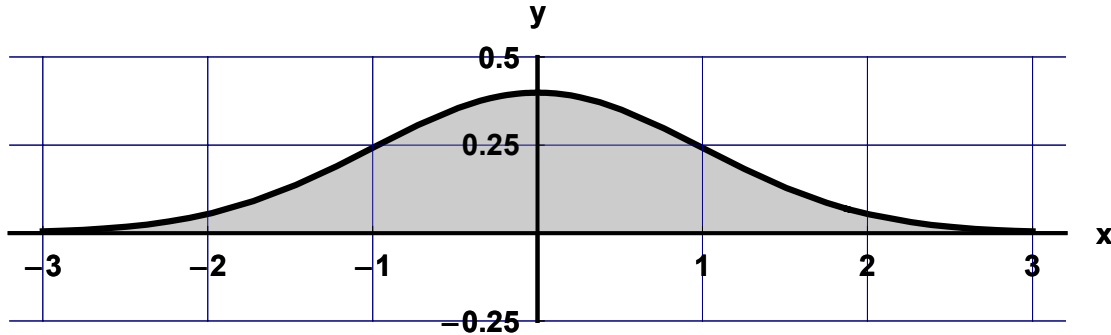


The normal probability density function for a population with mean μ and standard deviation σ is

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

for this function,

$$\int_{\mu-\sigma}^{\mu+\sigma} f(x) dx = 0.68, \quad \int_{\mu-2\sigma}^{\mu+2\sigma} f(x) dx = 0.95, \quad \int_{\mu-3\sigma}^{\mu+3\sigma} f(x) dx = 0.997, \quad \text{and} \quad \int_{-\infty}^{\infty} f(x) dx = 1$$



3. The mean gpa at Monta Vista is 2.9 with a standard deviation of 0.7. What proportion of students at Monta Vista :

- (a) Have gpa's less than 2.9?
- (b) Have gpa's between 3.5 and 3.9?
- (c) Have gpa's less than 2.0?
- (d) Have gpa's off exactly 3.1?

4. The mean score on the SAT at Monta Vista is 1210 with a standard deviation of 180. What proportion of MV students scored :

- (a) above 1210?
- (b) between 800 and 1100?
- (c) greater than 1420?
- (d) exactly 1300?

Work = change in kinetic energy, or $W = \frac{1}{2} m v^2$ when the body that is in motion starts at rest

Remember that: weight = mass x acceleration, so

Newtons are measured in kilograms x $\frac{\text{meters}}{\text{sec}^2}$ and pounds are measured in slugs x $\frac{\text{feet}}{\text{sec}^2}$

5. A 2 ounce tennis ball is served at a speed of $160 \frac{\text{ft}}{\text{sec}}$ (about 109 mph). How much work was done on the ball to make it go that fast?