

Section 6.7 - Fluid Pressure and Forces

1. Force and Pressure (Getting force from pressure - pressure is force per unit area)

- At any point, pressure is exerted equally in all directions
- Pressure increases with depth (Pressure = Mass density $\cdot g \cdot$ Depth or $p = \delta gh$)
- Force = Pressure \cdot Area
- If the pressure is not constant, we divide the surface into small pieces in such a way that the pressure is nearly constant on each one to obtain a definite integral for the force on the surface. We divide the surface into horizontal strips, each of which is at an approximately constant depth.

2. Example #1:

A vertical gate in a dam has the shape of an isosceles trapezoid 8 feet across the top and 6 feet across the bottom, with a height of 5 feet. The top of the gate is 4 feet below the surface.

- (a) What is the water pressure at the base of the dam?
- (b) What is the fluid force on the gate if the top of the gate is 4 feet below the surface of the water?