

2. A water tank has the shape of an inverted cone (tip down) with a base radius of 3 meters and a height of 8 meters. If water is being added to the tank at a rate of 2 cubic meters per hour, then find the rate at which the water level is rising when the depth of the water is 5 meters. Approach this problem in phases:

Phase I: Draw a picture to represent a generic point in time; introduce the relevant variables; find the relationship between the volume of the water and its height.

Phase II: Differentiate with respect to t and solve for the required rate.

Phase III: Plug in the particular instance in time and find the required rate.