

CSE282 Online

Years ago, a businessperson wanted to know how he could find how much oil was left in his storage tank. His tank was spherical and was 6 feet in diameter. Well, an engineer suggested him to get an 8ft steel ruler and use it as a dipstick. Knowing the height to which the dipstick would become wet with oil, one would know the height h of the oil in the tank. The volume V of oil left in the tank then is:

$$V = \frac{\pi h^2 (3r - h)}{3} \text{ -----(1)}$$

where, r is the radius of the tank. But, he did not stop there. He wanted the engineer to design a steel ruler for him so that he would directly get the reading from the dipstick. How would you as an engineer design such a dipstick for him?

The problem is inverse of what he wanted originally. To design a dipstick, you would have to mark the height corresponding to a volume. To do that you would need to solve equation 1 for the height for a given volume and radius.

For today's online, solve the value of height h for a given volume of 4 ft^3 of oil. Use bisection method.