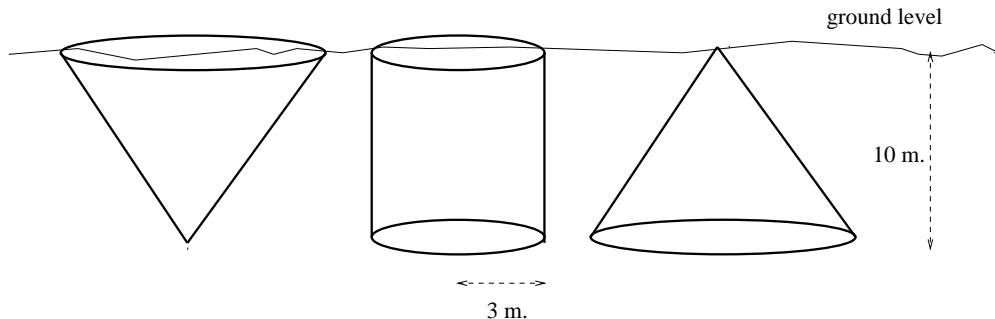


1. Use the shell method to find the volume of a right circular cone. I hope your answer is the same as what we got in class!
2. A sort of raindrop is obtained by revolving the profile curve

$$y = \sqrt{x}(x - C)^2 \text{ for } 0 \leq x \leq C$$

about the  $x$ -axis. Here  $C$  is a positive constant.

- a) Sketch the profile curve and the solid of revolution.
  - b) For which value of  $C$  will the raindrop have volume 1? What are the approximate dimensions (length and diameter) of this raindrop?
3. A homogeneous liquid whose density is  $300 \text{ kg/m}^3$  fills three buried containers. The containers, drawn below, are each 10 meters tall. The top of each container is at ground level. All three containers have the *same* volume. The middle container is a cylinder, and the other two are circular cones. Which container needs the *least* amount of work to empty (that is, to pump the liquid to ground level)? Which container needs the *most* work to empty? Justify your assertions by computing the work necessary in each case. You may also discuss *why* your answer is correct!



4. Electrons repel each other with a force which is inversely proportional to the square of the distance between them; call the proportionality constant  $k$  in the units to be used. Suppose one electron is fixed at  $x = 0$  on the  $x$ -axis.
  - a) Find the work done in moving a second electron along the  $x$ -axis from the point  $x = 10$  to the point  $x = 1$ .
  - b) Find the work done in moving the second electron along the  $x$ -axis from the point  $x = M$  to the point  $x = 1$ .
  - c) What happens to your answer in b) (which should depend on  $M$ ) as  $M \rightarrow +\infty$ ?

---

One problem will be selected for a writeup to be handed in at the next recitation meeting. Please see Professor Greenfield's Math 152 webpage to learn which problem to hand in.