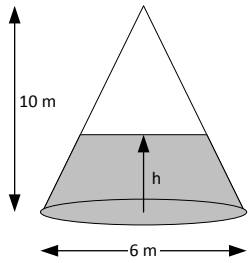
# Tank Volumes

(level 3.3)

**PROBLEM:** A water tank has the geometry shown below. The total volume of the cone is

$$V_{CONE} = \frac{1}{3}\pi R^2 H$$




where *R* is the radius of the cone's base and *H* is the height of the cone-shaped tank. What is the volume of water in the tank when the height of the water is h?

1. **BASIC:** synthesize a well-formed solution which delineates how to determine the volume of water occupied in the tank when it reaches height *h*. Provide a solution for *h* = 5 m.
2. **BASIC:** Based on your answer to question 1, code a computer program which takes as user input *h* and outputs water volume.
3. **ADVANCED:** Modify your program in part 2 to yield a value for volume at *h* = 1m, 2m, 3m…*H*=10m.
4. **CHALLENGE:** Modify your program in part 2 to be a function called `tankV()`. The function should take input arguments R, H and h and output water volume, V. (HINT: your function signature should look like the following: )

   ```
   V = tank(R,H,h)
   ```

   Use the function you create in a program which calculates the total volume of water in a plant which has 4 cone-shaped tanks with the following parameters:

| Tank # | R | H | h |
|---|---|---|---|
| 1 | 3 | 10 | 4 |
| 2 | 2 | 25 | 4 |
| 3 | 3 | 15 | 7 |
| 4 | 4 | 20 | 2 |