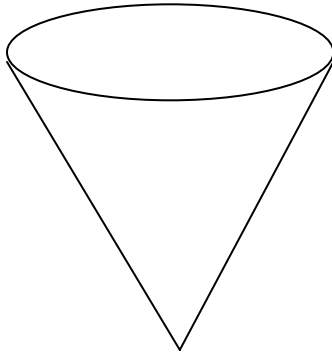


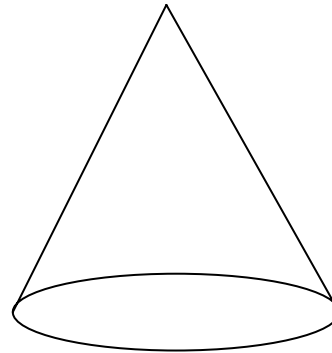
HOW MUCH WORK IS REQUIRED?

Write-Pair-Share

A **right circular conical water tank** 10 feet high with a radius of 6 feet is buried with the narrow end down (**orientation #1**) so that the top of the tank is at ground level. The tank is full of water.



Orientation #1



Orientation #2

A certain amount of work is required to pump the water out of the water tank having **orientation #1** (up to ground level). If the tank were instead buried with the narrow end up (**orientation #2**), how much relative work would be done in pumping the full tank of water up to ground level?

Part 1

In particular, when compared to the work required for orientation #1, the **work required to empty the water tank having orientation #2** would be:

CIRCLE ONE: **A. MORE** **B. LESS** **C. SAME AMOUNT**

Note: Please make a mathematical conjecture concerning the above question and do not perform any computations.

After making your decision concerning the three possible answer choices, please discuss your conjecture with your nearest neighbor and explain to each other the underlying reasoning. You don't necessarily have to agree with each other's assessment, but do have a candid discussion; you are free to change your initial reasoning in light of your neighbor's explanation.

Part 2

Afterwards, **please record your conjecture and reasoning in written form**; a single paragraph will be sufficient.

Part 3

Please answer the following questions with the help of a graphing calculator:

1. Calculate the amount of work required to pump the water out of the tank in **orientation #1**. Please construct and label a diagram of the cone and include an incremental layer of water and the various features of interest (radius, height, etc.)
2. Calculate the amount of work required to pump the water out of the tank in **orientation #2**. Please construct and label a diagram of the cone and include an incremental layer of water and the various features of interest (radius, height, etc.)
3. Do your calculations uphold your conjecture (from Parts 1 and 2) concerning the relative amount of work required for the tank having **orientation #2**? If not, please explain in more detail.