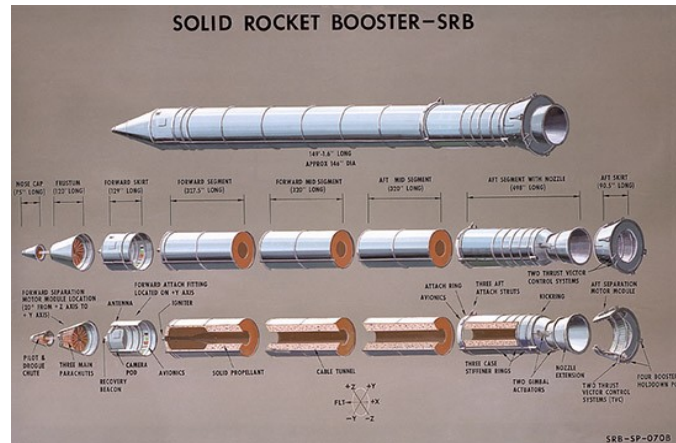


CS118

SRB

According to NASA¹, the shuttle's solid rocket boosters were each 149.16 feet long and 12.17 feet in diameter. They each contained 1,100,000 pounds (mass) of propellant.



Before the shuttle program completed, the SRB manager asked you to figure what amount of propellant (in kilograms) would be required if they changed the dimensions of the booster. Write a Python3 program that computes the mass of propellant (in **kilograms**) present for new lengths and diameters provided by the user (both in **feet**). These values should be obtained from the user using the `input()` function. Collect also a descriptive name from the user for the new dimensions, such as “My New SRB Design”, or something else. Assume the SRB is a perfect cylinder (with no nosecone) and the density of the propellant is constant for all configurations of the booster. That density is constant, but you will have to figure out what it is from the original SRB data.

Constraints:

- **Make variables for every rocket attribute** – even the original SRB's values.
- **Conversion factors should be stored in variables before being used.**
- **Your program must calculate all values from raw numbers** – you cannot externally compute a value and use it in the program. All calculated values should be stored in appropriately-named variables.
- **Use the math module constant `math.pi` for the calculations.**

Approach

Start by solving the problem by hand on a piece of paper. Identify the individual steps taken, and use them as the pieces of your algorithm. Once you have the algorithm figured out, place the steps in the Python3 program as comments. Beneath each algorithm step, place a Python3 command to fulfill that step of the algorithm. Run the program as you provide each command, checking the results by comparing to calculator values. Remember the result is to be in **kilograms**.

When the final results are computed, use `print()` with appropriate *placeholders* to display in the command window the computed results so that it follows this pattern – show the user-provided data to two decimal places and the new mass to 0 decimal places, and produce three lines of output:

```
The revised SRB structure named "My New SRB Design"
has a length of 250.00 feet and a diameter of 37.00 feet,
and requires 7700000 kg of propellant.
```

Your final mass will very likely be different as it depends on the conversion factor(s) you chose to use [and if you rounded for significant figures (*which is not required*)]. Compare your results to those of the provided `.PYC` code for a variety of inputs. Your results should be within 5% of the results from the `.PYC` code.