
1.(1 pt) The force on a particle is described by $9x^3 - 2$ at a point x along the x -axis. Find the work done in moving the particle from the origin to $x = 9$. _____

2.(1 pt) A force of 6 pounds is required to hold a spring stretched 0.5 feet beyond its natural length. How much work (in foot-pounds) is done in stretching the spring from its natural length to 1.1 feet beyond its natural length? _____

3.(1 pt) Work of 4 Joules is done in stretching a spring from its natural length to 13 cm beyond its natural length. What is the force (in Newtons) that holds the spring stretched at the same distance (13 cm)? _____

4.(1 pt) A tank in the shape of an inverted right circular cone has height 6 meters and radius 3 meters. It is filled with 5 meters of hot chocolate.

Find the work required to empty the tank by pumping the hot chocolate over the top of the tank. Note: the density of hot chocolate is $\delta = 1460 \text{ kg/m}^3$

5.(1 pt) A trough is 9 feet long and 1 foot high. The vertical cross-section of the trough parallel to an end is shaped like the graph of $y = x^{10}$ from $x = -1$ to $x = 1$. The trough is full of water. Find the amount of work in foot-pounds required to empty the trough by pumping the water over the top. Note: The weight of water is 62 pounds per cubic foot.

6.(1 pt) A trough is 9 meters long, 1 meters wide, and 3 meters deep. The vertical cross-section of the trough parallel to an end is shaped like an isosceles triangle (with height 3 meters, and base, on top, of length 1 meters). The trough is full of water (density 1000 kg/m^3). Find the amount of work in joules required to empty the trough by pumping the water over the top. (Note: Use $g = 9.8 \text{ m/s}^2$ as the acceleration due to gravity.)

7.(1 pt) You are visiting your friend Fabio's house. You find that, as a joke, he filled his swimming pool with Kool-Aid, which dissolved perfectly into the water. However, now that you want to swim, you must remove all of the Kool-Aid contaminated water. The swimming pool is round, with a 18 foot radius. It is 8 feet tall and has 8 feet of water in it.

How much work is required to remove all of the water by pumping it over the side? Use the physical definition of work, and the fact that the weight of the Kool-Aid contaminated water is $\sigma = 64.3 \text{ lbs/ft}^3$

8.(1 pt) A circular swimming pool has a diameter of 18 m, the sides are 3 m high, and the depth of the water is 2.5 m. How much work (in Joules) is required to pump all of the water over the side? (The acceleration due to gravity is 9.8 m/s^2 and the density of water is 1000 kg/m^3 .)
