

TEST PREP on 6.4 and 6.5 - Dr. Loveless

- These problem comes *directly* from the Dr. Loveless Exam archive on my review materials page. You can find solutions in that archive.
- Try to put yourself in an exam like situation as you attempt these. Could you do this on an exam?

Remember: Please ask your TA for the participation code and enter it in the quiz!

Note: If you haven't started the 6.4 homework, then these may be too tough, but please discuss the initial set up of the first problem with your TA before moving on to homework questions. Dr. Loveless has lots of online resources to help with 6.4 (more examples, practice sheets, etc), so check those out if you are struggling.

Spring 2016 - Exam 2 - Problem 5 - Dr. Loveless: *Work - Cable and Pumping*

5. For the problems below include units in your final answers.

- (a) A 30 meter cable with density $\frac{1}{4.9}$ kg/m is hanging over the side of a tall building. How much total work is done in lifting the cable to the top of the building?
(Remember, the acceleration due to gravity is $g = 9.8 \text{ m/s}^2$).

- (b) The portion of the graph $y = 3x$ between $x = 0$ feet to $x = 1$ feet is rotated around the y -axis to form a container (so the container is a cone). The container is full of a liquid that has density 90 lbs/ft^3 .
Find the work required to pump all of the liquid out over the side of the container.

Fall 2009- Exam 2 - Problem 5 - Dr. Loveless: *Work - Pumping and "Leaky Bucket"*

5. For both questions below, give the correct units for your final answer.

- (a) A well is in the shape of a cylinder of radius 2 feet and depth 10 feet. The well is half full of water. Find the work required to pump all the water up and out of the top of the well. (Remember, the weight of water is 62.5 lbs/ft^3 .)

- (b) A small rocket is blasting off from the ground. As it burns through fuel, the rocket gets lighter. The weight (force) of the rocket when it is x meters off the ground is given by $F(x) = 40 + 50e^{-x/2}$ in Newtons. Find the work done by the rocket in the first 8 meters as it blasts off from the ground.

Winter 2015 - Exam 2 - Problem 4(b) - Dr. Loveless: Average Value

- 4.(b) The temperature for a particular object after t minutes is given by $T(t) = 4te^{-2t}$ degrees Celsius. Find the average temperature from $t = 0$ to $t = 3$ minutes.

Fall 2009 - Exam 2 - Problem 4 - Dr. Loveless: Average Value

4. A student finds if she studies for x hours for an exam, the percentage score she gets is given by $f(x) = \frac{100x}{x+1}$.
(For example, if she studies for 4 hours, she will get a grade of $f(4) = \frac{100(4)}{(4)+1} = 80$ percent).
- (a) Find the average value of this function on the interval $[4,10]$.

- (b) How many hours would she need to study to get exactly the average percentage score value from part (i)? (Give your answer accurate to two digits after the decimal).