

Math 1172 - Autumn 2015

Name: _____

Quiz 3 - In Class

Recitation Instructor: _____

SHOW ALL WORK!!! Unsupported answers might not receive full credit.

Problem 1 [6 points] An arch is to be modeled by the function $y = e^{-2x} + \frac{1}{16}e^{2x}$ on the interval $[-1, 1]$. Find the length of the arch. You do not need to simplify your final answer.

SHOW ALL WORK!!! Unsupported answers might not receive full credit.

Problem 1 [4 points] A tank is formed by revolving the graph of $y = 4x^2$ for $0 \leq x \leq 3$ (in *meters*) about the y -axis.

a) If the tank is filled with water to the level (height) of h meters, find the volume of the water in terms of h .

b) If the tank is losing water at the rate of $2 \frac{m^3}{s}$, at what rate is the level of the water **falling** when the level is at 1 meter? (Approximate to 2 decimal places.)

c) Given that the density of water is $1000 \frac{kg}{m^3}$, find the level of the water when there is 20,000 kg of water in the tank. (Approximate to 2 decimal places.)

d) If the tank contains 20,000 kg of water, how much work is done pumping all of the water to an exit pipe at the top of the tank? (Approximate to 2 decimal places.)