MAT – 112: Calculus I and Modeling
EFY 1

Thomas R. Cameron

January 17, 2018

Instructions

Please complete each of the following problems. You should work in groups of three, or at most four, and hand in only one submission per group. Be sure that your arguments are well justified and presented clearly.

Problem 1. Consider the flat-tax example given in class. Given a tax rate of r and gross income g, the amount taxed is

$$a = r \cdot g,$$

and net income is given given by

$$n = (1 - r)g.$$

For $r < 50\%$, $r = 50\%$, and $r > 50\%$, sketch a plot of n and a as a function of g on a single graph, where the x-axis denotes gross income and the y-axis denotes dollars.

Problem 2. Given the line $\mathcal{L}$ described by the equation $y = 2x + 1$. Find the equation of a line perpendicular to $\mathcal{L}$ that goes through the point $(1, 3)$.

Problem 3. Consider a closed rectangular box with length l, width w, and height h. Suppose that $w = l$ and the total surface area of the box must equal 100 ft^2. Find a function for the volume of the box in terms of its length. Then, sketch a plot of this function over the appropriate domain.
You may use desmos or any other plotting software as an aide.