

MATH 1200- Reiber Worksheet 1 Name: _____

DUE Wednesday, April 8 at 11:59pm Denver time.

Instructions: Complete this worksheet yourself, using your notes from class and the textbook. Your worksheet should represent your OWN work. Include all your steps. You may print and write on this, or just write all answers up by hand on your own paper & scan, take photos & paste into Word, or type/draw work onto a copy of this PDF using annotation software or OneNote. *You do not have to print up the worksheet. Writing your answers as numbered responses in order is also fine.*

Upload your final work as a PDF or Word document. No other formats will be accepted.

If your work is not legible, you will be asked to re-submit a working file for late credit.

1. The table below gives the approximate US national debt $D(t)$ in year t , in billions of dollars, in 1990 and 1995.

t	1990	1995
$D(t)$	3233	4974

- a. **[3pts]** If we let $t = 0$ correspond to 1990, use the data determine the linear function $D(t)$ that could estimate the national debt in year t . Write your answer in slope-intercept form. You may round all coefficients to three decimal places in your work.
- b. **(1pts)** What does the y intercept of $D(t)$ tell you in this example?
- c. **(2pts)** What does the slope of $D(t)$ mean in real-world terms? (Give an answer with appropriate units)
- d. **(3pts)** If the model is accurate, in what year will the national debt reach 100 trillion (100,000 billion) dollars?

2. [10pts] An eyeglass company is in the process of re-launching their accessory line with a new DU-themed eyeglass case. The research department presents the following price-demand equation $p = 45 - 0.005x$ where x is the number of eyeglass cases retailers are likely to buy at \$ p per case. Additionally, the financial department determines the fixed production costs per month are \$3400 while the variable monthly cost function is $V(x) = 7x - 0.003x^2$ where x is the number of cases the company produces and $V(x)$ is the total cost to the company of making x headphone sets.

- a. [2pts] Find the cost function for the eyeglass cases.
- b. [2pts] Determine the revenue function, $R(x)$, which computes the revenue realized from the sale of x eyeglass cases.
- c. [2pts] Find and simplify the profit function, $P(x)$, which computes the total profit from the manufacture and sale of x eyeglass cases.
- d. [1pts] What is the total profit from manufacturing and selling 3500 eyeglass cases? Give your answer as a quantity with correct units.
- e. [3pts] How many eyeglass cases must the company sell to break even? Find your answer using algebra & include your steps.