

Homework Assignment 8: Due at the beginning of class 10/10/01

In this problem, the two functions f and g are defined by the graphs shown below. The x -intercept of f is located at $x=2$. The x -intercepts of g are located at $x=1$ and $x=3$. As shown in Figure 1, the domain of the function f is the interval $[-2, 3]$, and the domain of the function g is the interval $[0, 4]$. Questions 1, 2, 3 and 4 utilize the information contained in these graphs.

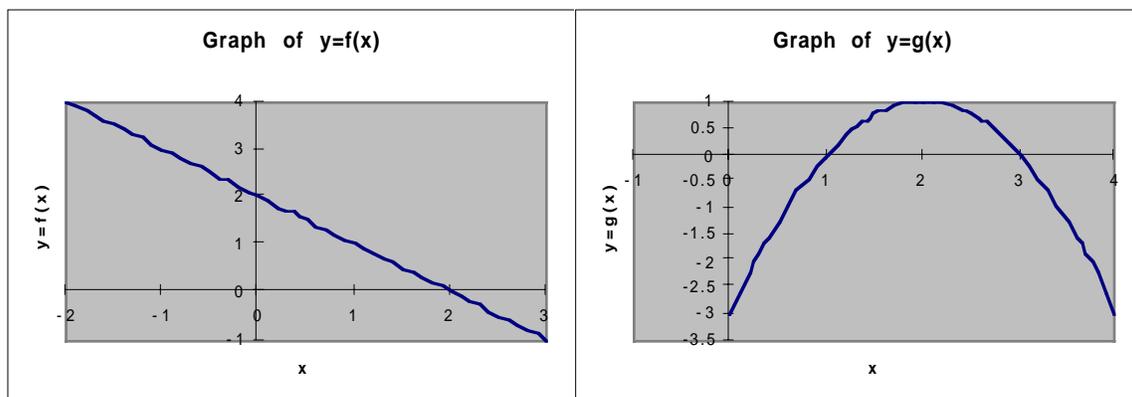


Figure 1: Graphs of $y = f(x)$ and $y = g(x)$ for Questions 1, 2, 3 and 4.

1. Using a suitable set of axes, plot a graph showing:

$$y = g(f(x))$$

concentrating on the interval between $x = -1$ and $x = +1$.

2. Using a suitable set of axes, plot a graph showing:

$$y = f(x) - g(x).$$

As part of your answer, describe the set of x -values that you can assign y -values to when sketching the graph of $y = f(x) - g(x)$.

3. Consider two new functions, h and p , defined by the equations:

$$h(x) = \frac{f(x)}{g(x)} \quad \text{and} \quad p(x) = \frac{g(x)}{f(x)}.$$

What are the domains of the functions h and p ? In each case, briefly explain why some points from the interval $[-2, 4]$ are excluded from the domain of each function.

4. Using a suitable set of axes, plot a graph showing:

$$y = h(x)$$

concentrating on the interval between $x = 0$ and $x = 3$.

Nowadays, many people are interested by investing, the stock market and financial matters in general. Unfortunately, many people who invest in the stock market do so with little research into the companies that they buy stock in. In Question 5, you will obtain some real financial data and create a graph showing a company's profits as a function of time.

In order to get full credit on Question 5, you will need to display the data that you found and also cite your source(s).

You can obtain a lot of financial data about companies from the internet. If you have never done this before, I suggest that you go to the New York Stock Exchange web site's listing of publicly traded companies:

<http://www.nyse.com/listed/listed.html>

Choose a company that is listed on the New York Stock Exchange (NYSE) and note its three letter abbreviation (or "symbol"). For example, the symbol for AOL-Time Warner is "AOL", for Disney the symbol is "DIS" etc.

- When you have the symbol for a company that is traded on the NYSE, you need to obtain an "Income Statement" for that company. If you were interested in AOL-Time Warner, you could do a search using something like:

<http://www.google.com>

and the key words: "AOL income statement". (That is, search using the "symbol" for the company along with the words "income" and "statement.") You can also obtain financial statements from most finance or investment oriented web sites.

- Once you have an income statement, locate the numbers for "Total Revenues" and "Total Costs" (or "Total Expenses"). These are the numbers that you will need for Question 5.

5. Citing your sources, collect data for the total revenue and total costs for a publicly traded company. Your data should cover the company's performance **for at least three years**. Summarize your data in a table and use it to plot graphs showing:

- The company's total revenue as a function of time,
- The company's total costs as a function of time, and,
- The company's profit as a function of time.