

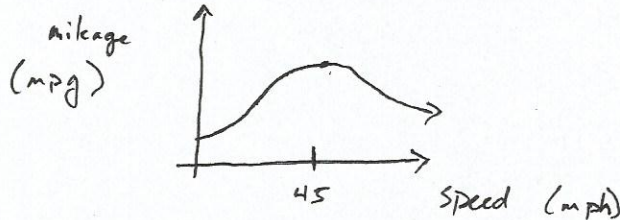
MTH 124 Quiz 1

4 September 2013

Name: *Key*

Instructions: Answer the following three (3) questions. In order to receive full credit, you must show all your work.

1. (3 pts.) The gas mileage of a car (in miles per gallon) is a function of its speed (in miles per hour). The gas mileage is highest when the car is traveling at 45 miles per hour, and lower otherwise. Illustrate this graphically, including units where appropriate.



2. (3 pts.) a) Consider the following two tables of data. One table comes from a linear function, and the other does not. Which table represents data from a linear function, and why?

No! Table 1

x	1	2	3	4
y	4	8	16	32

$$\frac{\Delta y}{\Delta x} = \frac{4}{1} = 4$$

Yes! Table 2

x	1	2	3	4
y	4	9	14	19

$$\frac{\Delta y}{\Delta x} = \frac{16}{1} = 16$$

- b) For the table representing a linear function, find a linear equation representing y in terms of x .

$$f(x) = mx + b \Rightarrow f(x) = 5x + b$$

$$\text{Slope} = \frac{\Delta y}{\Delta x} = \frac{5}{1} = 5$$

$$m = 5$$

$$x = 1: f(1) = 4 = 5 + b$$

$$\Rightarrow b = -1$$

$$f(x) = 5x - 1$$

3. (4 pts.) Define a function $f(x) = 2x^2 - 1$. Find the average rate of change of f between $x = -1$ and $x = 2$, and illustrate this graphically.

$$\text{Ave. ROC} = \frac{\Delta y}{\Delta x} = \frac{f(2) - f(-1)}{2 - (-1)} = \frac{7 - 1}{2 + 1} = \boxed{2}$$

$$f(2) = 2 \cdot 2^2 - 1 = 7$$

$$f(-1) = 2 \cdot (-1)^2 - 1 = 1$$

