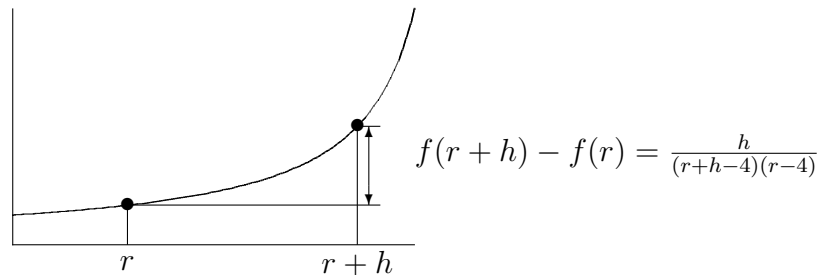


MATH 112
 Winter 2003
 Sample Exam I

1. Below is a portion of the graph of a function $f(x)$.



- (a) Compute $f(3.5) - f(3)$.
- (b) Compute the slope of the secant line from $x = 2$ to $x = 2.05$.
- (c) Find a value of h such that

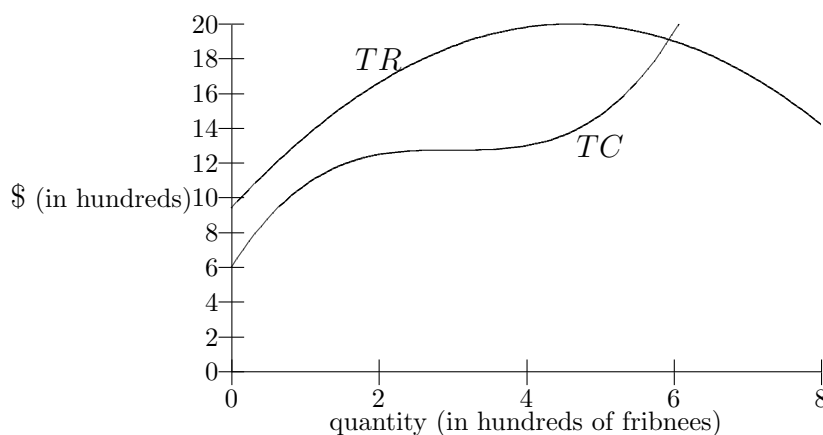
$$\frac{f(1+h) - f(1)}{h} = 12.$$

- (d) Find a formula for the slope of the tangent line to $f(x)$ at $x = r$.
- (e) Compute $f'(3.8)$.

2. You manufacture fribnees. Below is a graph of TR and TC , which are given by the formulas:

$$TR : R(q) = -0.5q^2 + 4.6q + 9.42$$

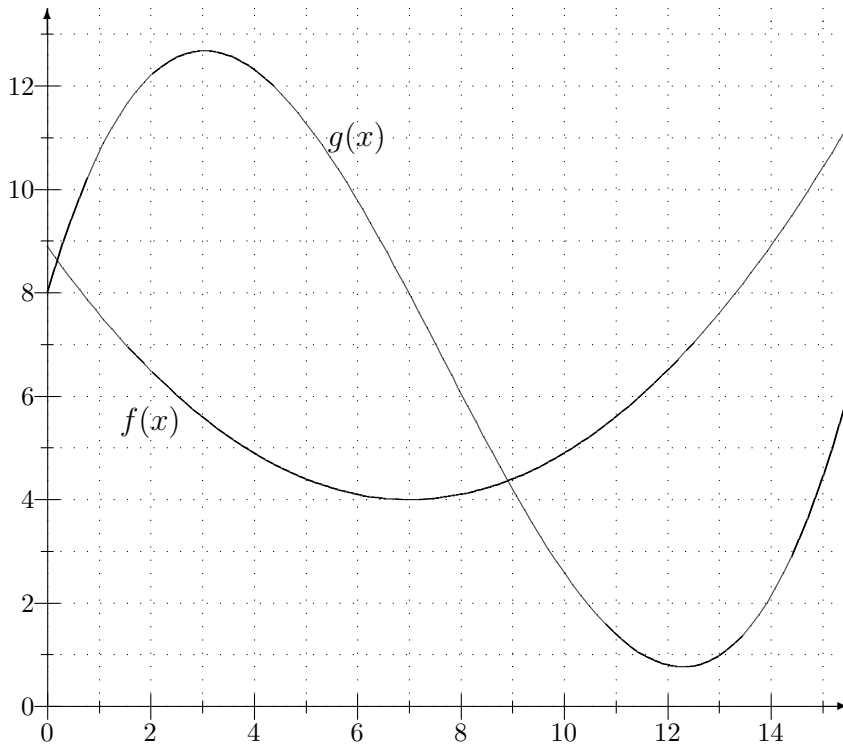
$$TC : C(q) = 0.25q^3 - 2.25q^2 + 6.75q + 6$$



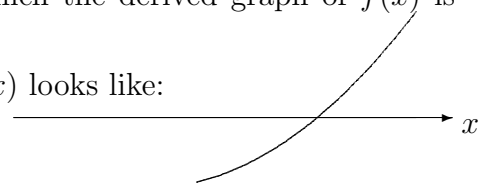
- (a) Name an interval over which MR and MC are both positive and decreasing.
- (b) Use the Derivative Rules to find formulas for MR and MC . Sketch their graphs.

- (c) What quantity maximizes profit?
- (d) At what quantity is TR greatest?
- (e) At what quantity is MC lowest?
- (f) How would your answers to parts c) and e) change if Fixed Cost was \$200 rather than \$600?

3. (12 points) The graphs of $f(x)$ and $g(x)$ are given below.



- (a) Give all values of x between 0 and 15 for which the derived graph of $f(x)$ is above the x -axis.
- (b) Name an interval over which the graph of $g'(x)$ looks like:



- (c) The formula for $f(x)$ is

$$f(x) = 0.1x^2 - 1.4x + 8.9.$$

Compute and simplify

$$\frac{f(2+h) - f(2)}{h}.$$

Write your answer in the form

$$(\quad)h^2 + (\quad)h + (\quad).$$

- (d) If possible, name an interval on which $g(x)$ and $f'(x)$ are *both* decreasing.