MATH 111D - Autumn 2001
EXAM II - Version 1

Name _____ Section _____

Show all your work on these pages, using the back if you run out of room. Write your answers on the answer sheet provided.

1. (15 points) A bicyclist, Roy, traveling on a path passes a giant spider's web at time $t = 0$. Roy's speed at time t is given by the function $S(t) = 2t + 17.6$, where time is measured in seconds and speed is measured in feet per second.

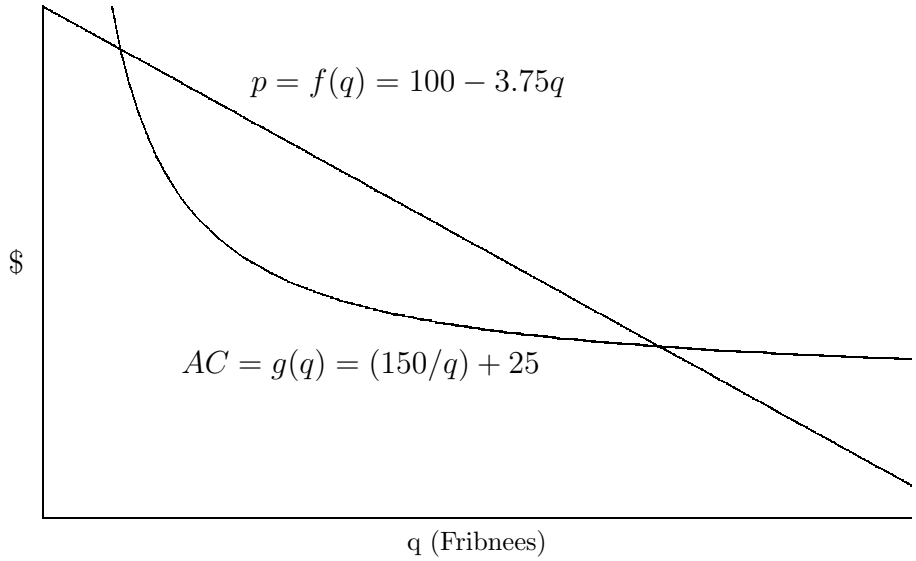
   (a) When is Roy traveling at a rate of 50 feet per second?

   (b) In general, if the speed of an object is $S(t) = mt + k$ feet per second, then its distance from the starting point is given by $D(t) = \left(\frac{m}{2}\right) t^2 + kt$ feet. Use this formula to find Roy's distance from the web after 20 seconds.

   (c) Use your answer to part (b) to compute Roy's average (incremental) speed over the 12-second interval starting at $t = 3$ seconds.

   (d) When is Roy 1428 feet from the web?

2. (20 points) The graph below shows a function $f(q)$, where $p = f(q)$ is the price per Fribnee for a purchase of q Fribnees. The graph also shows a function $g(q)$, where $AC = g(q)$ is the average cost per Fribnee when q Fribnees are produced.



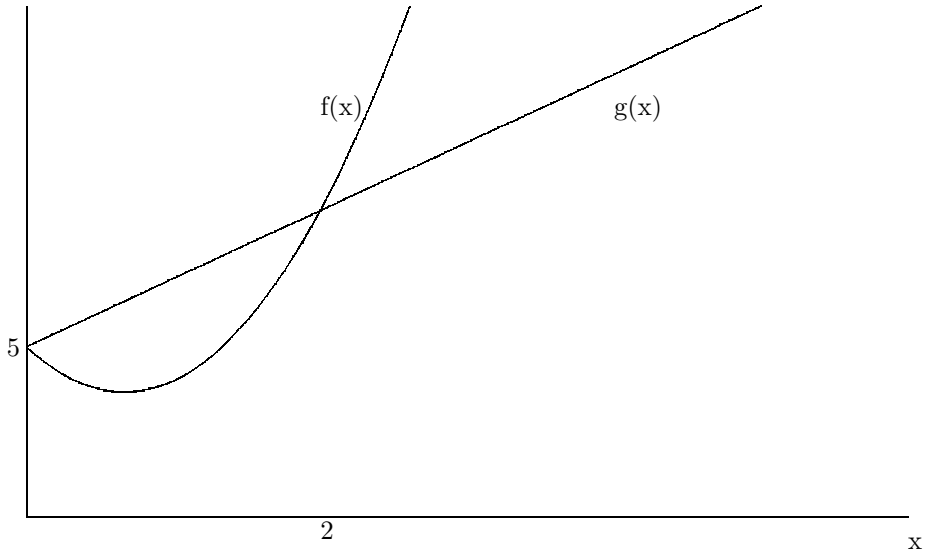
   (a) What is the total revenue for an order of 5 Fribnees?

   (b) For what value of q is the total cost equal to \$300.

   (c) Find the quantity q at which profit is the greatest.

   (d) What is the greatest profit?

3. (15 points) Let $f(x) = 3x^2 - 4x + 5$. The graph of $f(x)$ is given below.



(a) Compute $f(x+1) - f(x)$. Write it in the form

$$(\quad)x + (\quad).$$

(b) For what value of x is $\dfrac{f(x) - f(0)}{x} = 15$?

(c) $f(x) = g(x)$ when $x = 0$ and $x = 2$. Develop the linear formula for $g(x)$.

(d) Find the time(s) at which $g(x) - f(x)$ is equal to 1.

(e) What is the largest value of $g(x) - f(x)$?