

Math 120ABC - Autumn 2002
Mid-Term Exam Number One
October 24, 2002

Name: _____

Section: _____

1	10	
2	10	
3	10	
4	10	
5	10	
6	10	
Total	60	

- Complete all questions.
- You may use a calculator during this examination. Other calculating devices are not allowed.
- You may use one hand-written 8.5 by 11 inch page of notes.
- Show all work for full credit.
- You have 50 minutes to complete the exam.

1. Let $f(x) = 2x^2 + 3x + 5$. Assuming $h \neq 0$, simplify the expression

$$\frac{f(x+h) - f(x)}{h}$$

as much as possible.

2. An airplane is flying due north from airport A. Airport B is located 15 miles west and 300 miles north of airport A. The airplane will be on airport B's radar when the plane is within 113 miles of airport B. For what distance of its flight will the airplane be on the radar?

3. On a certain island in the year 1850 there were 1040 sparrows. A survey in 1900 showed there to be 2100 sparrows. Assuming that the population of sparrows always changes as a linear function of time, answer the following two questions:

(a) How many sparrows were there in the year 1935?

(b) In what year will there be 3000 sparrows on the island?

4. A trucker is paid by the mile. For the first 60 miles of a trip, the trucker gets paid 40 cents per mile. For each mile over 60 miles and under 300 miles, the trucker gets 45 cents per mile. For miles over 300, the trucker gets 50 cents per mile. Suppose the trucker travels at a constant speed to 60 miles per hour. Write a multipart function for the amount of money the trucker makes on a trip as a function of time.

5. Let $f(x) = 2x + 3$, and $g(x) = bx + 5$. What should b be so that $f(g(x)) = g(f(x))$ for all x ?

6. Suppose you have 300 meters to enclose a rectangular pasture. One side of the pasture will be along a straight river so requires no fencing. Also, you want to use some of the fencing to split the pasture into two parts, as illustrated. What is the largest area the pasture can have?