

**Math 120 – Fall 2006**  
**Exam 1**  
**October 19, 2006**

**Name:** \_\_\_\_\_

**Section:** \_\_\_\_\_

**Student ID Number:** \_\_\_\_\_

<b>1</b>	<b>14</b>	
<b>2</b>	<b>12</b>	
<b>3</b>	<b>12</b>	
<b>4</b>	<b>12</b>	
<b>Total</b>	<b>50</b>	

- You are allowed to use a calculator and one **hand-written** 8.5 by 11 inch page of notes. Put your name on your sheet of notes and turn it in with the exam.
- Check that your exam contains all the problems listed above.
- You must show your work on all problems. The correct answer with no supporting work may result in no credit. Unless otherwise indicated, your **final answer** must be correct to two digits after the decimal.
- If you need more room, use the backs of the pages and indicate to the grader that you have done so.
- Raise your hand if you have a question.
- **There are multiple versions of the exam.** Any student found engaging in academic misconduct will receive a score of 0 on this exam.
- You have 50 minutes to complete the exam.

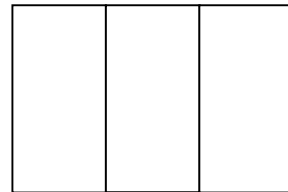
GOOD LUCK!

1. (14 points) A circular puddle has radius 3 feet. Harry, the guinea pig, plans to walk through the puddle and cool off.

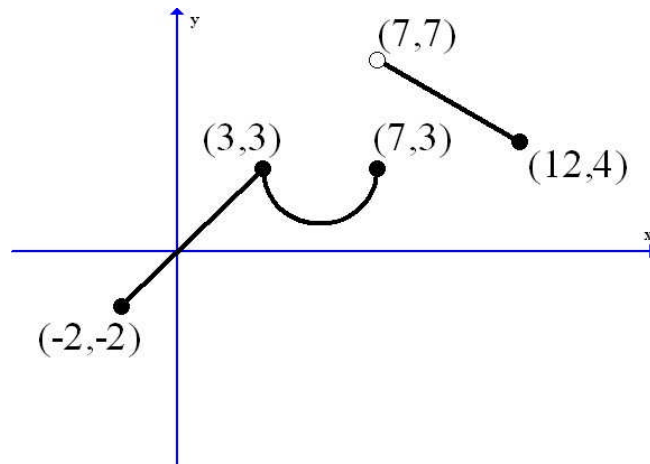
Harry is located 5 feet east and 4 feet north of the center of the puddle and he plans to walk directly toward the westernmost edge of the puddle. Harry walks at a constant speed of 1.3 ft/sec.

How long, in seconds, will it take Harry to first enter the puddle?

2. (12 points) Phil has 923 feet of fencing to make a rectangular enclosure. He also wants to use some fencing to split the enclosure into three parts with two interior fences that are parallel (this situation is illustrated below). What dimensions should the enclosure have to give the maximum possible total area?



3. (12 points) Consider the function,  $f(x)$ , given by the graph below which consists of two line segments and a lower semicircle.



a) Find the multipart formula for  $y = f(x)$ .

b) Compute the value  $f(4)$ .

4. (12 points) Let  $f(x) = 3 - x^2$  and  $g(x) = \begin{cases} 6x^2 & , \text{ if } x < 2 \\ x + 10 & , \text{ if } x \geq 2 \end{cases}$ .

a) Evaluate and simplify  $\frac{f(x+a) - f(x)}{a}$ . (Simplify as much as possible)

b) Give a multipart formula for the composition  $f(g(x))$ .

c) Give all values of  $x$  that satisfy  $g(x) = 6$ .