

MATH 120  
Exam 1  
Version 1  
January 30, 2002

Name \_\_\_\_\_

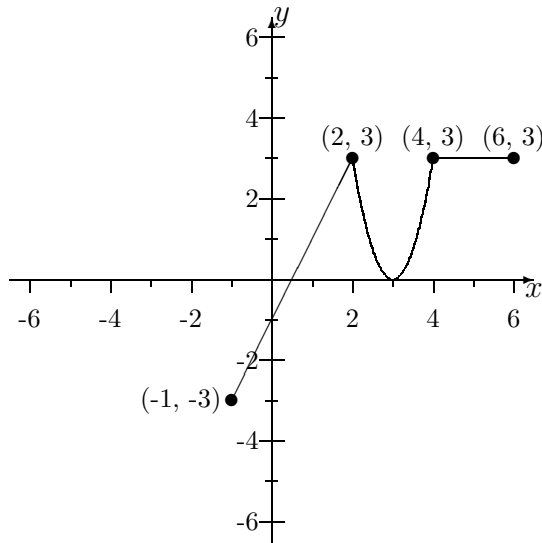
Section \_\_\_\_\_

1	10	
2	10	
3	6	
4	12	
5	12	
Total	50	

- You are allowed to use a scientific calculator with no graphing capabilities and one sheet of notes.
- Complete all questions.
- Show all your work.
- Raise your hand if you have a question.
- You have 50 minutes to complete the exam, an average of 10 minutes per problem.

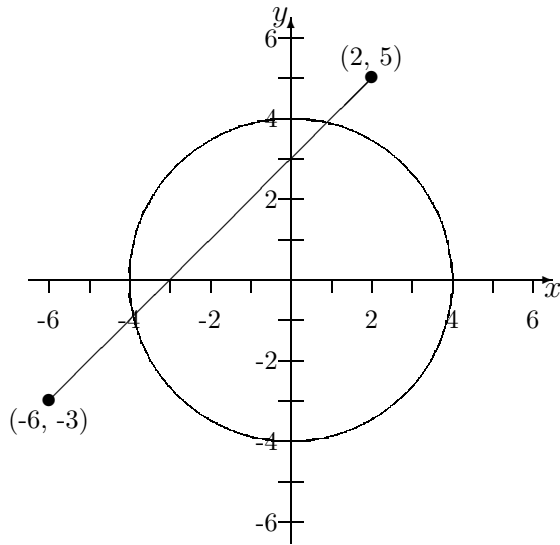
GOOD LUCK!

1. (10 points) The following is the graph of a function  $f(x)$ .



- (a) State the domain and range of  $f(x)$ .
- (b) Name an interval on which  $f(x)$  is positive and increasing.
- (c) Sketch the graph of  $g(x) = f(2x) - 3$ . Clearly label your axes and at least four points on the graph.

2. (10 points) The following depicts a straight piece of string and circular pool of paint. What length of string sits in the paint? (Units are inches.)



3. (6 points) Suppose  $f(x) = 2x$  and  $(f \circ g)(x) = x^2$ . Find the value of  $g(4)$ .

4. (12 points) A company produces and sells knee braces. The cost in dollars of making  $x$  braces is given by the function

$$C(x) = 110 + 2.5x.$$

The money (revenue) brought in by the sale of  $x$  braces is given by the function

$$R(x) = -0.25x^2 + 25x.$$

- (a) Find the value(s) of  $x$  at which cost is \$20 more than revenue.

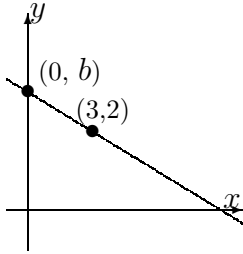
- (b) The profit obtained by selling  $x$  braces is given by

$$P(x) = R(x) - C(x).$$

How many braces should they sell in order to get the maximum profit?

- (c) What is the largest possible profit?

5. (12 points) The line  $\ell$  passes through the point  $(3,2)$  and through each of the coordinate axes, forming a triangle in the first quadrant. The  $y$ -intercept of  $\ell$  is a constant,  $b$ .



**IMPORTANT:** The answer to each of the following questions will be in terms of the number  $b$ .

- (a) Compute the slope of  $\ell$ .
- (b) The equation for  $\ell$  is  $y = mx + b$ , where  $m$  is your answer from part (a). Use this equation to find the  $x$ -intercept of  $\ell$ .
- (c) Find the area of the triangle.