MATH 120E
Exam 2 - Version 1
November 16, 2001

Name _____

Section _____

1	10	
2	9	
3	8	
4	8	
5	15	
Total	50	

- You are allowed to use a scientific calculator with no graphing capabilities.
- Complete all questions.
- Show all your work.
- You have 50 minutes to complete the exam.

GOOD LUCK!

1. (10 points)

   (a) Sketch the graph of

$$g(x) = \frac{x+4}{x-3}.$$

   Clearly label the zeros, asymptotes, and the y-intercept.

   (b) Compute $g^{-1}(10)$.

2. (9 points) Recall the basic step function

$$u(t) = \begin{cases} 0 & \text{if } t < 0 \\ 1 & \text{if } 0 \leq t \leq 1. \\ 0 & \text{if } 1 < t \end{cases}$$

(a) Sketch the graph of $f(t) = 5u(t)$.

(b) Sketch the graph of $g(t) = -u(t-3)$.

(c) Find the mult-part formula for $h(t) = 5u(t) - u(t-3)$.

3. (8 points) The numbers on a circular clock face are evenly spaced 3 inches from the center of the clock. At 7:45, the minute hand points directly at the 9, while the hour hand points $\frac{3}{4}$ of the way between the 7 and the 8. What is the angle, in radians, between the hands?

4. (8 points) Pat flies a kite, holding the string 4 feet off the ground and keeping the kite steady at 100 feet off the ground. The angle between the string and the horizontal is $57°$. How long is the string?

5. (15 points) Terry takes a ride on a ferris wheel with radius 30 feet. At time $t = 0$ seconds, Terry is at the lowest point on the wheel, 5 feet off the ground. The wheel spins counter-clockwise with constant angular speed. It takes 7 seconds for Terry to reach the top of the wheel for the first time.

   (a) How fast is the wheel spinning in RPM?

   (b) How many miles does Terry travel in the first 1.5 minutes? (Recall: 1 mile = 5280 feet)

   (c) Let $D(t)$ be Terry's height above the ground after t seconds. Find the formula for $D(t)$, writing it as a sinusoidal function in standard form.