Math 141 **Test #1** **Fall 2004**

1. (10 pts) Solve the inequality p. D3: 33

$$|x - 5| < 2$$

and express your answer in interval notation.

2. (10 pts) Find the center and radius of the circle with equation p. D15: 41

$$x^2 + y^2 + 2x - 4y - 4 = 0.$$

3. (10 pts) Find the equation of the line that passes through the point $(2, 5)$ and is perpendicular to the line with equation p. 17: 62

$$3x - 4y = 12.$$

4. (10 pts) Find the domain and range of the function p. 27: 16

$$f(x) = \sqrt{100 - x^2}.$$

State each using interval notation.

5. (10 pts) Complete the following table and use the results to estimate the limit. p. 54: 1

$$\lim_{x \to 1} \frac{2\sqrt{x} - x - 1}{x - 1}.$$

x	0.9	0.99	0.999	1.001	1.01	1.1
$f(x)$						

6. (32 pts) Find the following limits, if they exist. p. 65: 51, 53

   (a) $\lim_{x \to 3} \frac{x^2+2x}{x^2-2x}$

   (b) $\lim_{x \to 3} \frac{x^2-6x+9}{x-3}$

   (c) $\lim_{x \to 1} \frac{\sqrt{x}-1}{x-1}$

   (d) $\lim_{x \to 0^-} \sqrt{x}$

7. (8 pts) Let p. 76: 31

$$f(x) = \begin{cases} 2x + 1, & x \leq 2 \\ 3x, & x > 2. \end{cases}$$

For each of the following, determine whether the statement is true or false.

   (a) f is continuous at 2.

   (b) f is continuous on the open interval $(0, 2)$.

   (c) f is continuous on the open interval $(1, 3)$.

   (d) f is continuous on the closed interval $[0, 2]$.

8. (10 pts) Find the following limit. Determine whether it equals a real number, equals ∞, equals or $-\infty$, or does not exist. p. 85: 33

$$\lim_{x \to 1} \frac{x^2}{x - 1}.$$