Calculus I
Exam 1, Fall 2002

1. Find the equation of the line which goes through the point (0,7) and is perpendicular to the line given by the equation $2x + 3y = 10$.

2. Find the derivatives of the following functions:

a) $f(x) = 8x^3 + 3x^2 - \dfrac{1}{x}$

b) $g(x) = \dfrac{2x+5}{x-1}$

3. Find the derivatives of the following functions:

a) $f(x) = (\sin(2x) + \cos(5x))^2$

b) $g(x) = (1 - x^2)^{15}$

4. Find the equation of the line tangent to the curve $y = x^3 - x^2 + 1$ at (2,5).

5. A body is fallng toward the surface of the earth. Let $s(t),\ v(t)$ represent the distance fallen and the velocity of the object (relative to its position at time $t = 0$, where the direction of increasing s is downward) at time t. Then we have the formula

$$s(t) = 16t^2 + v(0)t\ ,$$

If the velocity at time $t = 0$ is 12 ft/sec, at what time will the object have a velocity of 100 ft/sec?