**Calculus I, Mathematics 1210-90**

**Examination 1, February 12,14, 2004**

**You may use graphing calculators. Each problem is worth 20 points. You MUST show your work. Just the correct answer is not sufficient for any points**.

1. Find the value of $x$ where the graphs of these two functions have parallel tangent lines:

$$f(x) = x^2 - 3x + 2 \ , \qquad g(x) = 2x^2 - 11x - 17 \ .$$

2. Find the derivatives of the following functions:

*a)* $$f(x) = (x+1)(\frac{1}{x} + 1)$$

*b)* $$g(x) = (\tan(3x) - 1)^2$$

3. Find the slope of the line tangent to the curve

$$y = x^2 - 3x + 1/x$$

at the point (3,1/3).

4. Let $y = x^3 - 48x + 1$. Find the $x$ coordinate of the points at which the graph has a horizontal tangent line.

2. On the planet Garbanzo in the Weirdoxus solar system, the equation of motion of a falling body is

$$s = s_0 + v_0 t - 10t^3$$

where $s_0$ is the initial height above ground level and $v_0$ is the initial velocity. Distance is measured in garbanzofeet. If a ball is thrown upwards from ground level at an initial velocity of 120 garbanzofeet/second, how high does the ball rise?