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?