Instructor: Prof. A. Suciu   Name: _____

MTH 1124   Calculus 2   Winter 2001

QUIZ 3

Instructions: Put your name in the blanks above. Put your final answers to each question in the designated spaces on these pages. Show your work—if there is not enough room, use another sheet.

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(1) [4 points] Compute: $\displaystyle \int \left(\frac{5\sqrt{x}}{x} + \frac{x^2 - 1}{x} \right) dx =$

(2) [4 points] Find the solution to the initial value problem

$$\frac{dy}{dx} = x + \sin x, \quad y(\pi) = 2.$$

(3) [6 points] On the Moon, the acceleration due to gravity is about 1.6 m/sec^2. A rock is dropped from the top of a 1000-meters lunar mountain, with initial velocity 0.

(a) Find the velocity of the rock, $v(t)$, at time t.

(b) Find the height of the rock, $s(t)$, at time t.

(c) When does the rock hit the Moon?

(4) [3 points] Let $\operatorname{erf}(x) = \dfrac{2}{\sqrt{\pi}} \displaystyle\int_0^x e^{-t^2}\, dt$, for $x \geq 0$. Find $\dfrac{d}{dx}\left(x^3 \operatorname{erf}(x)\right)$.

(5) [3 points] Let $F(x) = \displaystyle\int_2^x \dfrac{t}{1+\sqrt{t}}\, dt$, for $x \geq 2$.   Find $F'(9)$.