Hand in the solution to this test on 8/29/03 (5% of your final grade). If your performance is insufficient, you will need to hand in a corrected version; however, only your initial grade counts. Please note: This test must have been *accepted* before Exam 1 Calculus, or you also receive a 0 grade for exam 1. *Read carefully. And look it up. Answer questions in order from left to right, top to bottom.*

Neatly draw the graph of the following functions, showing the locations of 0 and ±1 on each axis. Give the derivative. Indicate non-principal values as a broken line. Make sure that you give enough of the curves to *clearly* demonstrate *all* features. *Make sure that you have answered all parts, including derivatives.*

$$x - 2 \qquad\qquad x^2 - 4 \qquad\qquad x^3 - x$$

$$\sin(x) \qquad\qquad \arcsin(x) \qquad\qquad \sinh(x)$$

$$\cos(x) \qquad\qquad \arccos(x) \qquad\qquad \cosh(x)$$

$$\tan(x) \qquad\qquad \arctan(x) \qquad\qquad \tanh(x)$$

$$\ln(x) \qquad\qquad e^x \qquad\qquad \sin(\pi x^2)$$

Find (include any integration constants and absolute signs):

$$\int x^{-2}\mathrm{d}x = \qquad\qquad \int_1^2 x^{-2}\mathrm{d}x = \qquad\qquad \int_1^x \xi^{-2}\mathrm{d}\xi =$$

$$\int \frac{\mathrm{d}x}{x} = \qquad\qquad \int \frac{1}{1-x^2}\mathrm{d}x = \qquad\qquad \int \frac{1}{1+x^2}\mathrm{d}x =$$

$$\int \ln(x)\mathrm{d}x = \qquad\qquad \int xe^x\mathrm{d}x = \qquad\qquad \int xe^{x^2}\mathrm{d}x =$$

$$\begin{vmatrix} 1 & 4 & 7 \\ 2 & 5 & 8 \\ 3 & 6 & 1 \end{vmatrix} = \qquad\qquad \lim_{x\to 0} \frac{\sin(x)}{x} = \qquad\qquad \frac{\mathrm{d}}{\mathrm{d}x}\int_0^x \frac{\sin(x\xi)}{\xi}\mathrm{d}\xi =$$

$$1 + 2 + 3 + 4 \ldots + 1000 = \qquad\qquad\qquad x + x^2 + x^3 + x^4 + \ldots =$$

$$\text{Solve}: \quad \frac{\mathrm{d}y}{\mathrm{d}x} = -y \qquad y(0) = 1$$