

Hand in the solution to this test on the date stated above (5% of your final grade). *Read carefully. And look it up. Answer questions in order from left to right, top to bottom.* You must work alone. You probably want to consult a math handbook.

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.*

$$x - 2$$

$$x^2 - 4$$

$$x^3 - x$$

$$\sin(x)$$

$$\arcsin(x)$$

$$\sinh(x)$$

$$\cos(x)$$

$$\arccos(x)$$

$$\cosh(x)$$

$$\tan(x)$$

$$\arctan(x)$$

$$\tanh(x)$$

$$\ln(x)$$

$$e^x$$

$$\sin(\pi x^2)$$

Find (include any integration constants and absolute signs):

$$\int x^{-2} dx =$$

$$\int_1^2 x^{-2} dx =$$

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

$$\int \frac{dx}{x} =$$

$$\int \frac{1}{1-x^2} dx =$$

$$\int \frac{1}{1+x^2} dx =$$

$$\int \ln(x) dx =$$

$$\int x e^x dx =$$

$$\int x e^{x^2} dx =$$

$$\begin{vmatrix} 1 & 4 & 7 \\ 2 & 5 & 8 \\ 3 & 6 & 1 \end{vmatrix} =$$

$$\lim_{x \rightarrow 0} \frac{\sin(x)}{x} =$$

$$\frac{d}{dx} \int_0^x \frac{\sin(x\xi)}{\xi} d\xi =$$

$$1 + 2 + 3 + 4 \dots + 1000 =$$

$$x + x^2 + x^3 + x^4 + \dots =$$

Solve : $\frac{dy}{dx} = -y \quad y(0) = 1$