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.*

\[
\begin{align*}
2x - 2 & \quad x^2 + 1 & \quad x^4 - x^2 \\
\sin(x) & \quad \arcsin(x) & \quad \sinh(x) \\
\cos(x) & \quad \arccos(x) & \quad \cosh(x) \\
\tan(x) & \quad \arctan(x) & \quad \tanh(x) \\
\ln(x) & \quad e^x & \quad \tan(x^2)
\end{align*}
\]

Find (include any integration constants and absolute signs):

\[
\begin{align*}
\int x^{-2}dx & = \int_1^2 x^{-2}dx = \int_1^x \xi^{-2}d\xi = \\
\int \frac{dx}{x} & = \int \frac{1}{1-x^2}dx = \int \frac{1}{1+x^2}dx = \\
\int \ln(x)dx & = \int xe^x dx = \int xe^{x^2}dx = \\
\mid 1 & 2 & 3 \\
2 & 3 & 4 \quad \lim_{x \to 0} \frac{\tan(x)}{x} = & \quad \frac{d}{dx} \int_x^2 xf(\xi)d\xi = \\
3 & 4 & 5
\end{align*}
\]

\[
2 + 1 + 0 - 1 - 2 - 3 - 4 \ldots - 99 - 100 = \quad e^2 + e^1 + e^0 + e^{-1} + e^{-2} + e^{-3} + e^{-4} + \ldots =
\]

Solve: \[
\frac{dy}{dx} = y \quad y(1) = 1
\]