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 $\pm 1$ 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.

1) $2 x-2$
2) $x^{2}+1$
3) $x^{4}-x^{2}$
4) $\sin (x)$
5) $\arcsin (x)$
6) $\sinh (x)$
7) $\cos (x)$
8) $\arccos (x)$
9) $\cosh (x)$
10) $\tan (x)$
11) $\arctan (x)$
12) $\tanh (x)$
13) $\ln (x)$
14) $e^{x}$
15) $\tan \left(x^{2}\right)$

Find (include any integration constants and absolute signs):
16) $\int x^{-2} \mathrm{~d} x=$
17) $\int_{1}^{2} x^{-2} \mathrm{~d} x=$
18) $\int_{1}^{x} \xi^{-2} \mathrm{~d} \xi=$
19) $\int \frac{\mathrm{d} x}{x}=$
20) $\int \frac{1}{1-x^{2}} \mathrm{~d} x=$
21) $\int \frac{1}{1+x^{2}} \mathrm{~d} x=$
22) $\int \ln (x) \mathrm{d} x=$
23) $\quad \int x e^{x} \mathrm{~d} x=$
24) $\int x e^{x^{2}} \mathrm{~d} x=$
25) $\left|\begin{array}{lll}1 & 2 & 3 \\ 2 & 3 & 4 \\ 3 & 4 & 5\end{array}\right|=$
26) $\lim _{x \rightarrow 0} \frac{\tan (x)}{x}=$
27) $\frac{\mathrm{d}}{\mathrm{d} x} \int_{x}^{2} x f(\xi) \mathrm{d} \xi=$
28) $2+1+0-1-2-3-4 \ldots-99-100=$
29) $e^{2}+e^{1}+e^{0}+e^{-1}+e^{-2}+e^{-3}+e^{-4}+\ldots=$
30) Solve : $\frac{\mathrm{d} y}{\mathrm{~d} x}=y \quad y(1)=1$

