Problem 1:
When evaluated on any computer or calculator, four expressions "\((4.0/3.0 - 1.0)\cdot3.0 - 1.0\)", "\((10.0/3.0)\cdot3.0 - 10.0\)", "\(((10.0/3.0)\cdot3.0 - 5.0) - 5.0\)", and "\((2.0/3.0 - 0.5)\cdot3.0 - 0.5\)
reveal something about the machine’s floating-point arithmetic. Provide examples from at least three different arithmetics, including at least one hand-held calculator, and explain what they reveal. You may use MATLAB 6.x’s `system_dependent('setprecision', xx)` on a Windows PC to get some of those examples.

Problem 2:
For \(x > 0\) the function \(f(x) := \begin{cases} \arctan(\log(1/x))/\arccos(x)^2 & \text{if } x < 1 \\ \frac{1}{2} & \text{if } x = 1 \\ \arctan(\log(x))/\arccosh(x)^2 & \text{else} \end{cases}\)
has a smooth graph; in fact, for \(x\) sufficiently near 1 this \(f(x)\) has a Taylor Series
\[f(1+z) = \frac{1}{2} - \frac{z}{6} + \frac{z^2}{20} + \frac{124z^3}{945} + \ldots .\]
Supply a MATLAB program to compute \(f(x)\) for \(x > 0\) as well as you can using only MATLAB’s floating-point (not MAPLE’s). How (in)accurate is your program, and why do you think so?

Problem 3:
The three vector norms we use most often are 
\[\|x\|_{\infty} := \max_j |x_j|, \quad \|x\|_2 := \sqrt{\left(\sum_j |x_j|^2\right)}, \quad \text{and} \quad \|x\|_1 := \sum_j |x_j| .\]
Exhibit the values of \(M_{ij} := \max_{x \neq 0} \|x\|_i/\|x\|_j\) for all six pairs \((i, j)\) with \(i \neq j\), and justify them.