**Assignment One**
**Computational Physics**
**Kigali Institute of Science and Technology**
December 2011

**This assignment is due at the beginning of class on Thursday, 22 December.**

1. Consider the function $g(x) = \frac{1}{2}x^2 - 32$
   (a) Sketch the function $g(x)$, and use algebra to find the largest root of $g(x)$
   (b) By hand, carry out the first three steps in the bisection method to find the largest root of $g(x)$. Start with the interval $[0, 10]$.
   (c) **Third-year Students do this problem:** By hand, carry out the first three steps in Newton's method to find the largest root of $g(x)$. Start with $x_0 = 1$.
   (d) **Fourth-year Students do this problem:** By hand, carry out the first three steps in Newton's method to find the largest root of $g(x)$. Start with $x_0 = 100$.
2. Find the first three non-zero terms in the Taylor expansion of $\sin(x)$ about $x = 0$.
3. What would you need to type to have matlab evaluate $3e^{-2}$?
4. In one or two sentences, explain what `x = 0:0.2:2` means in matlab.