

# Homework 1 (Posted 8th January, Due before class 15th January)

**Problem 1: 20 pts** Consider the following functions:

1.  $f_1(x) = \frac{x^3}{200} + \frac{x^2}{400}$

2.  $f_2(x) = 4\log_2 x$

3.  $f_3(x) = x$

4.  $f_4(x) = 2^{x-10}$

5.  $f_5(x) = \frac{x^3}{200}$

6.  $f_6(x) = 2^{\sin x}$  (here  $x$  is in degrees).

Write a program to generate a table of values of  $f(x)$  versus  $x$  for each of these functions, starting from  $x = 1$ . Use your tables to plot these functions. The objective is to compare the values of these functions for large  $x$ . Choose the upper bound for the range of  $x$  in your plot suitably. Order these functions in increasing order for (a)  $x = 1$  (b)  $x = 4$  (c)  $x = 8$  (d)  $x = 12$  (e)  $x = 16$  (f)  $x = 24$  (g)  $x = 32$ . Is it possible to give an increasing order for these functions for any large value of  $x$  (say any  $x$  greater than 32)?

Now plot  $\frac{f_1(x)}{f_5(x)}$  versus  $x$ . Can you say anything about the value of  $\frac{f_1(x)}{f_5(x)}$  for large  $x$ ? Repeat this problem for  $\frac{f_2(x)}{f_4(x)}$ .