Summary of Curve Sketching

1. Determine the domain of the function.

2. Check from the equation of the function whether the graph has any type of symmetry. (If $f(-x) = f(x)$, the graph is symmetric with respect to the y-axis; if $f(-x) = -f(x)$, the graph is symmetric with respect to the origin).

3. Find the x-intercepts (if possible) and the y-intercept.

4. Determine any vertical, horizontal or slant (oblique) asymptotes.

5. Find f', and determine the critical points. Find intervals on which f' is positive and where f' is negative to determine where f is increasing and where it is decreasing. Use the first derivative test (or the second derivative test) to classify the critical points.

6. Find f''. Determine intervals of concavity and any inflection points.

7. Find values of the function f at the points found above, and possibly at additional points, and plot these points.

8. Sketch the graph according to the information obtained above, including the behavior of the graph near asymptotes (if any).

Workshop Exercises: Graphing

Graph the following functions. Include all the information listed above.

1. $f(x) = -x^3 + 3x - 2$.
   (One x-intercept is 1).

2. $g(x) = x^{\frac{5}{3}} + 5x^{\frac{2}{3}}$.

3. $h(x) = \sin x + \cos x$, $-\frac{\pi}{2} \le x \le \pi$.
   (Also determine the absolute maximum and absolute minimum).

4. $f(x) = \frac{-x^2+x+2}{(x-1)^2}$.

5. $y = \frac{x^3}{2x^2-8}$.