MAT 137
Tutorial #9– Graphing
January 9–10, 2017

Sketch the graph of the functions below. Your graph does not need to be exact, but it needs to contain all the important points and all the important characteristics. Specifically, if applicable:

- Find the domain, and the points of intersection with the axes.

- Find the intervals where the function is increasing or decreasing. Find the critical points, and classify them as local maxima, local minima, or neither.

- Study the concavity of the function and find the inflection points.

- Study the behaviours as $x \to \infty$ and as $x \to -\infty$. Also find all the asymptotes, and the points of intersection with the asymptotes.

- Study any other important points and the behaviour near them. For example, endpoints of the domains, points of discontinuity, vertical tangent lines, corners, cusps, ...

1. $f(x) = x^3 - 3x$

2. $f(x) = x^6(x+3)^3$

3. $f(x) = \dfrac{2x^2}{x^2 - 1}$

4. $f(x) = x\sqrt{4 - x^2}$

5. $f(x) = \dfrac{e^x}{e^x + 1}$

6. $f(x) = \dfrac{\sin x}{1 + 2\cos x}$

7. $f(x) = \ln(1 - \ln x)$

You won't have time to finish all of these during tutorial; you should continue working on them later. You need to get enough practice to develop good intuition about graphing in order to do well on Test 3.

If you need to check your answers, you can use `http://wolframalpha.com`, but do not go there until you are done. If you need to see examples solved in detail, you have plenty in section 4.8 of the textbook.