4.4 – Graphing Functions

MATH 2554 – Calculus I

Guideline for graphing functions

1. Identify the domain
2. Exploit symmetry (is my function even or odd?)
3. Find first and second derivatives
4. Find the critical and inflection points
5. Determine when f is increasing/decreasing and concave up/concave down
6. Determine the asymptotes and end behavior
7. Find the intercepts (if possible)
8. Graph!!

Example: Suppose a function f has a single critical point at $x = 0$, is increasing on $(-\infty, 0)$ and decreasing on $(0, \infty)$. Is this enough information to graph the function?

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Now suppose we're told that $f(x) = e^{-x^2}$. Show f has the properties above, and graph f accurately by determining its end behavior and inflection points.

Sketch the following functions:

1. $h(x) = x^4 + 8x^3 - 270x^2 + 1$,
2. $f(x) = x + 2\tan(x)$ on $(-3\pi/2, 3\pi/2)$,
3. $g(x) = x \ln x$ on $(0, \infty)$.

Homework Problems: Section 4.4 (pp.278-279)
#13,14,15,17,25-35 odd