Guidelines for Sketching a Curve

- A. **Domain**: Of course!
- B. **Intercepts**: (i) y-intercept: (0, f(0)); (ii) x-intercept: Solve the equation f(x) = 0. Only the real solutions. Be aware that in most of cases you will not be able to solve this equation.
- C. **Symmetry**: If f is even, then we get the portion of the graph on the left hand side of y-axis for free. The same is true for an odd function. We just need to flip the portion of the graph over the x-axis and then y-axis to get the portion on the left hand side. But this feature rarely occurs.
- D. **Asymptotes**: (i) Horizontal Asymptote (HA) is found by finding the limits $\lim_{x\to\infty} f(x)$ and $\lim_{x\to-\infty} f(x)$; (ii) Vertical Asymptote (VA) happens at x=a when $\lim_{x\to a^{\pm}} f(x)=\pm\infty$; (iii) Slant Asymptote (SA): The function of the form f(x)/g(x) has a slant asymptote y=mx+b if the quotient and the remainder obtained upon dividing f(x) by g(x) using the long division method is mx and b respectively.
- E. Intervals of Increase or Decrease: Use the Increasing/Decreasing test.
- F. Local Maximum and Minimum Values: Use the first derivative test.
- G. Concavity and Points of Inflection: Use the Concavity test.
- H. Sketch the Curve.