

4-5 CURVE SKETCHING

(PART 1)

GUIDELINES OF ALL CURVE SKETCHING PROBLEMS For each item below, write out in your own words how you actually find that item.

A. **Domain.** Find the domain of the function.

B. **Intercepts** Find any x - or y -intercepts.

C. **Symmetry** Determine if the function is even or odd.

D. **Asymptotes** Identify any vertical or horizontal asymptotes.

E. **Intervals of Increase or Decrease** Determine the intervals where the function is increasing and where the function is decreasing.

F. **Local Maximum and Minimum Values** Identify any local maximums and minimums and where they occur.

G. **Concavity and Points of Inflection** Find the intervals where the function is concave up and where the function is concave down. Identify any inflection points.

H. **Sketch the Curve** Plot the curve. Include and label all the bits and pieces above.

(g) Find the intervals of concavity/inflection points.

(h) Sketch the curve.

★ Check your answers using a graphing device!

PRACTICE PROBLEM 2 Sketch the curve $y = \frac{x}{\sqrt{9+x^2}}$. [Note: $y' = \frac{2(2-x^2)}{\sqrt{4-x^2}}$, $y'' = \frac{2x(6-x^2)}{(4-x^2)^{3/2}}$]

(a) Find the domain.

(b) Find the x and y -intercepts.

(c) Find the symmetries/ periodicity of the curve.

(d) Determine the asymptotes.

(e,f) Determine where the function is increasing/ decreasing and find the local maximum/ minimum values

(g) Find the intervals of concavity/inflection points.

(h) Sketch the curve.