SECTION 4.5 CURVE SKETCHING (DAY 2)

1. Follow the guidelines from the previous worksheet to sketch the graph of

$$f(x) = \frac{2}{x} + \ln(x).$$

(Note: $f'(x) = \frac{x-2}{x^2}$ and $f''(x) = \frac{4-x}{x^3}$)

(a) What is the function's domain?

(b) (if defined) Determine the y-intercept. Determine the x-intercepts if it's not too hard.

(c) (if defined) What behavior occurs for this function as $x \to \pm\infty$?

(d) Does the function have any vertical asymptotes? Where?

(e) Find intervals where f is increasing/decreasing and identify critical points.

(f) Classify each critical point as a local min/max/neither.

(g) Find intervals where f is concave up/concave down and identify points of inflection

(h) Collect all the information you have determined into a handy list.

(i) Sketch the graph of the function
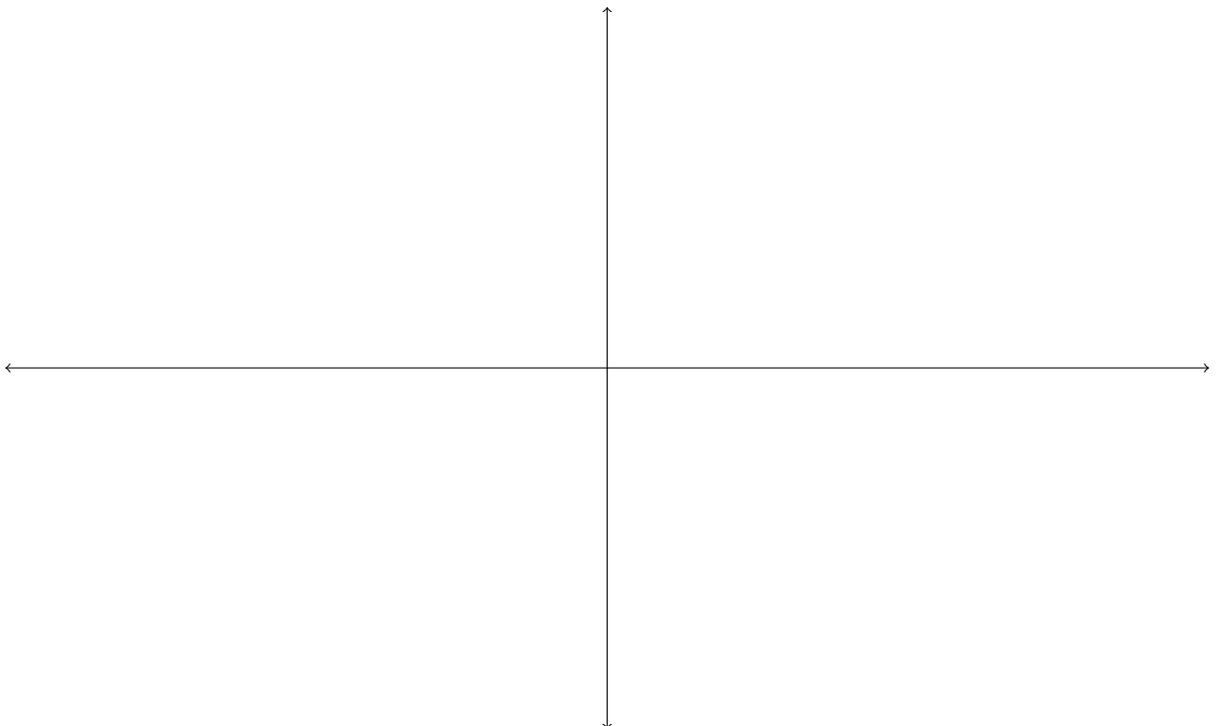
OPTIONAL EXTRA PRACTICE

2. Follow the guidelines from the previous worksheet to sketch the graph of

$$f(x) = x\sqrt{4 - x^2}.$$ (Note: $f'(x) = \dfrac{2(2 - x^2)}{\sqrt{4 - x^2}}$ and $f''(x) = \dfrac{-2x^3}{(4 - x^2)^{3/2}}$)

(a) What is the function's domain?

(b) Find a few choice values of x to evaluate the function at. (What's the y-intercept?)

(c) What behavior occurs for this function as $x \to \pm\infty$?

(d) Does the function have any vertical asymptotes? Where?

(e) Find intervals where f is increasing/decreasing and identify critical points.

(f) Classify each critical point as a local min/max/neither.

(g) Find intervals where f is concave up/concave down and identify points of inflection

(h) Collect all the information you have determined into a handy list.

(i) Sketch the graph of the function

4
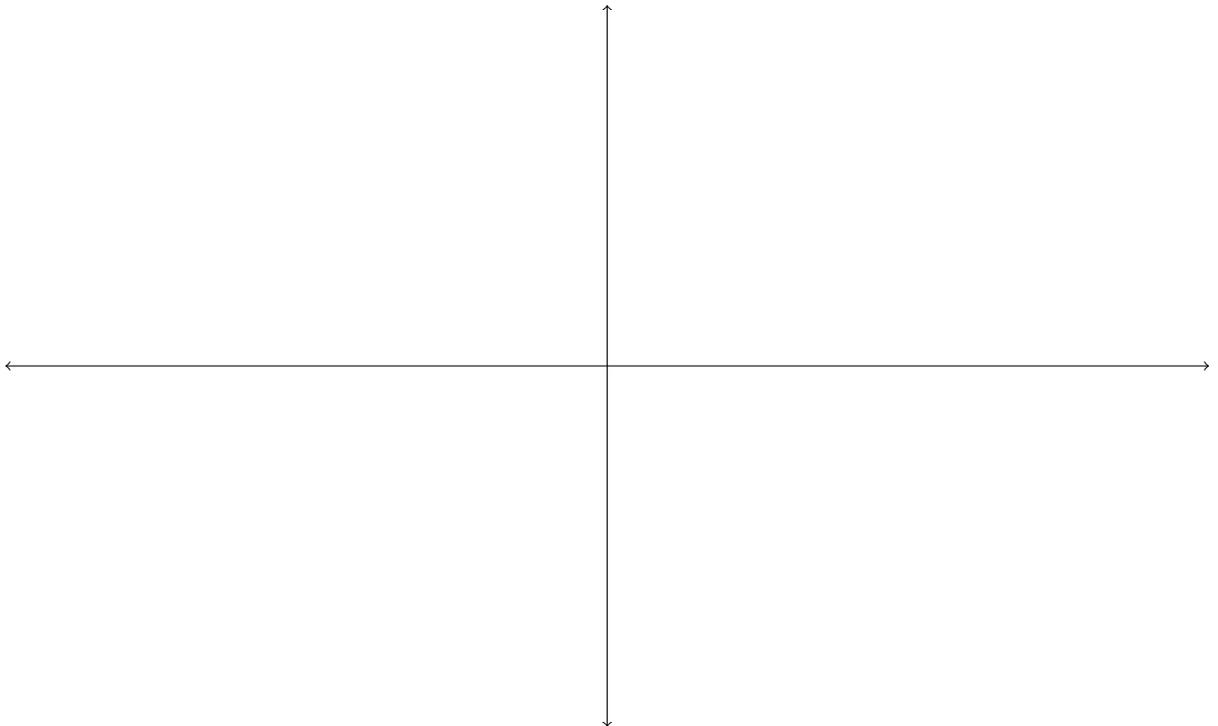
3. Follow the guidelines from the previous worksheet to sketch the graph of

$$f(x) = \frac{x}{\sqrt{9 + x^2}}.$$

(Note: $f'(x) = \frac{9}{(9 + x^2)^{3/2}}$ and $f''(x) = \frac{-27x}{(9 + x^2)^{5/2}}$)

(a) What is the function's domain?

(b) Find a few choice values of x to evaluate the function at.

(c) What behavior occurs for this function as $x \to \pm\infty$?

(d) Does the function have any vertical asymptotes? Where?

(e) Find intervals where f is increasing/decreasing and identify critical points.

(f) Classify each critical point as a local min/max/neither.

(g) Find intervals where f is concave up/concave down and identify points of inflection

(h) Collect all the information you have determined into a handy list.

(i) Sketch the graph of the function

Section 4-5 (day 2)