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) Does this function have any symmetry?

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

(d) What behaviour occurs for this function at $\pm\infty$?

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

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

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

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

(i) Sketch the graph of the function

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) Does this function have any symmetry?

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

(d) What behaviour occurs for this function at $\pm\infty$?

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

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

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

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

(i) Sketch the graph of the function

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) Does this function have any symmetry?

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

(d) What behaviour occurs for this function at $\pm\infty$?

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

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

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

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

(i) Sketch the graph of the function