Worksheet # 9 **Name:** _____
Date: 01/11/2021
Math 1A: Fall 2021

Problem 1

Consider the function $f(x) = \sqrt{x} - \ln x$, defined on the interval $(0, \infty)$.

1. On what interval(s) is $f(x)$ increasing? Decreasing?
2. On what interval(s) is $f(x)$ concave up? Concave down?
3. Find all local and global minima and maxima of $f(x)$.

Problem 2

Is $\sqrt{x} > \ln x$ for all $x > 0$?

Problem 3

Let $g(x) = \sin^3(x)$ on the interval $(-\pi, \pi)$.

1. On what interval(s) is $f(x)$ increasing? Decreasing? What are its critical numbers?
2. Determine whether each critical point is a local minimum, a local maximum, or neither.
3. Sketch a graph of $f(x)$.

Problem 4

1. Find two positive numbers whose product is 100 and whose sum is a minimum.
2. A poster is to have an area of 180 in^2 with 1-inch margins at the bottom and sides and a 2-inch margin at the top. What dimensions will give the largest printed area?