Math 190 Homework 2: Due Monday September 28

The assignment is due at the beginning of class on the due date. You are expected to provide full solutions, which are laid out in a linear coherent manner on stapled pieces of paper. Your stapled work must be your own and must be self-contained. Your assignment must be stapled with your name and student number at the top of the first page. Staple your assignment.

Questions:

1. Find all $x \in [0, 2\pi)$ satisfying

$$\sin x \cos x = \sqrt{2} \sin x.$$

2. Find all $x \in [0, 2\pi)$ satisfying

$$2 \cos^2 x + (2 + \sqrt{3}) \cos x = -\sqrt{3}.$$

3. Find all (real) zeros of the function

$$h(x) = \sin \left(\frac{1}{x} \right).$$

4. Final all (real) x satisfying

$$2x^{1/3} + 5x^{4/3} = 0.$$

5. Let

$$f(x) = \sqrt{2x + 1} \quad \text{and} \quad g(x) = \begin{cases} -1 & \text{if} \quad x < 0 \\ 0 & \text{if} \quad x = 0 \\ 1 & \text{if} \quad x > 0 \end{cases}$$

   (a) The composition f(g(x)) has only two possible outputs. Find the two values and explain your answer.

   (b) The composition g(f(x)) also only has two outputs. Find these values as well. Explain.