

Math 190 Homework 2: Due Monday September 26

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. Your 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.

Questions:

1. Using the relevant graphs/triangles/unit circle explain why

$$\cos\left(\frac{8\pi}{3}\right) = -\frac{1}{2}.$$

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

$$\cos x - \sin x = 0.$$

Ensure your answer is fully justified. Consider supporting your answer with a picture.

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

$$2\sqrt{2}\sin^2 x + (\sqrt{2} + 2)\sin x + 1 = 0.$$

4. Consider the following functions

$$g(x) = 2\sin(2016x)$$

and

$$f(x) = \begin{cases} x^3 - 7x & \text{if } x > 2 \\ 7 & \text{if } -2 \leq x \leq 2. \\ e^{4x} & \text{if } x < -2 \end{cases}$$

Determine the *range* of the function $f(g(x))$. Ensure your answer is fully justified.

5. Find all (real) zeros of the function

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