Math 190 Homework 2: Due Monday September 25 - 2017

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

   \[ \cos \left( \frac{17\pi}{6} \right) = -\frac{\sqrt{3}}{2}. \]

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

   \[ \sqrt{2} \cos^2 x + (\sqrt{2} + 1) \cos x + 1 = 0. \]

4. Consider the following functions

   \[ g(x) = 2 \sin(2017x) \]

   and

   \[ f(x) = \begin{cases} 
   1 - 3x^2 & \text{if } x > 2 \\
   5 & \text{if } -2 \leq x \leq 2 \\
   e^{\frac{x}{2}} & \text{if } x < -2 
   \end{cases} \]

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

Remark: The range of a function is the set of all possible output values of said function.