Assignment 5

Due Monday, August 24

1. For the following sequences write out the \( n \)th term:

   (a) \( \{1, 2, 3, 4, \ldots \} \)
   (b) \( \{1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \ldots \} \)
   (c) \( \{1, \frac{1}{2}, 4, \frac{1}{8}, 16, \ldots \} \)
   (d) \( \{0, -\frac{1}{2}, \frac{2}{3}, -\frac{3}{4}, \frac{4}{5}, \ldots \} \)
   (e) \( \{-1, 1, -1, 1, -1, \ldots \} \)
   (f) \( \{\frac{2}{1}, \frac{3}{2}, \frac{4}{3}, \frac{5}{4}, \ldots \} \)

2. For each of the following subsets of the plane, state whether it is open, closed, or neither, and justify your answer:

   (a) \( \{(x, y) : -1 < x < +1, y = 0\} \)
   (b) \( \{(x, y) : x \text{ and } y \text{ are integers}\} \)
   (c) \( \{(x, y) : x + y = 1\} \)
   (d) \( \{(x, y) : x + y < 1\} \)
   (e) \( \{(x, y) : x = 0 \text{ or } y = 0\} \)

3. Show that \( \mathbb{R}^m \) and the empty set satisfy the definitions of an open set and of a closed set in \( \mathbb{R}^m \).