ESP Math 182 **Spring 2018**

Worksheet 13

27 February 2018

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1. **Warm up:**

   (a) What is a sequence? Give an example of a sequence.

   (b) What is a series? Give an example of a series.

2. Find the first four terms in the following sequences, starting at $n = 1$.

   (a) $x_n = 2n + 1$

   (b) $a_n = (-2)^n$

   (c) $b_n = 2 + (1 - n)^n$

   (d) $c_n = 2c_{n-1} + c_{n-1}^2$ where $c_1 = 2$

3. Reindex the formulas of the sequences above with m so that the term for $n = 1$ previously is now for $m = 0$.

4. Find a general formula for the nth term of the following sequences. The first term given in each sequence is for $n = 1$.

   (a) $16, 25, 36, 49, \ldots$

   (b) $\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \ldots$

   (c) $1, \frac{-1}{4}, \frac{1}{27}, \frac{-1}{256}, \ldots$

   (d) $-1, 1, -1, 1, -1, 1, \ldots$

   (e) $0, 1, 0, 1, 0, \ldots$

   (f) $1, 1, 2, 2, 3, 3, 4, \ldots$

   (g) $e, \frac{e}{\pi}, \frac{e^2}{\pi}, \frac{e^2}{\pi^2}, \frac{e^3}{\pi^2}, \ldots$

5. Using the periodicity of the cosine function, find formulas for the sequence in part (d) using:

   (a) cos (b) $|\cos|$