## Math 189, Fall 2024, Homework 7

## Randall Holmes

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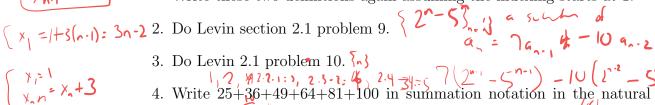
This homework set is due on Wednesday October 16.

1. Consider the sequence 1,4,7,10,13...

Give a closed form definition for this sequence (assuming the indexing starts at 0).

Give a recursive definition of the sequence (assuming the indexing starts at 0).

Write these two definitions again assuming the indexing starts at 1.



Write out 
$$\sum_{i=3}^{8} i^3 + i^2$$
 as a sum.

36+80+150+252+392+576

5. Do 2.1 problem 18 in Levin.

6. How many terms are there in the arithmetic sequence

Compute

 $x_n = 1 + 3n$   $x_0 = 1$   $x_{nn} = x_n + 3$ 

$$2 + 5 + 8 + \ldots + 152$$

using our methods for summing arithmetic sequences.

$$\left(\frac{152+2}{2}\right) \cdot 51 = 3977$$

- 7. Express the decimal number 3.3333333 as the sum of a geometric sequence in the natural way. What is the first term of this sequence? What is the common ratio of this sequence? Write the sequence in
- summation notation.  $3+\frac{1}{3}+\frac{1}{20}+\frac{1}{3000}+\frac{1}{30000}+\frac{1}{30000}+\frac{1}{30000}+\frac{1}{300000}+\frac{1}{3000000}$ 8. Verify the calculus formula  $1+x+x^2+\ldots=\frac{1}{1-x}(|x|<1)$  using the formula for the sum of a geometric sequence. Start by computing the sum  $1 + x + x^2 + ... + x^n$  using the formula, then explain what the fact that |x| < 1 does for you (what happens when n gets large?)
- 9. Do Levin, 2.2, problem 14 1 + (1 + 8 + 12 + ... + 4(n-1)) 1 + (1 +