

Math 22 Section 9

Quiz 11

1. Find the first four terms of the sequence $a_n = \frac{1}{1+a_{n-1}}$ with

$$a_1 = 1$$

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$$a_2 = \frac{1}{1+a_1} = \frac{1}{2}$$

$$a_3 = \frac{1}{1+a_2} = \frac{1}{1+\frac{1}{2}} = \frac{1}{\frac{3}{2}} = \frac{2}{3}$$

$$a_4 = \frac{1}{1+a_3} = \frac{1}{1+\frac{2}{3}} = \frac{1}{\frac{5}{3}} = \frac{3}{5}$$

2. Find an expression for the n th term of the sequence $\frac{3}{4}, \frac{4}{5}, \frac{5}{6}, \frac{6}{7}, \dots$

$$\frac{n+2}{n+3}$$

3. Write the sum $2 + 4 + 6 + \dots + 20$ in sigma notation.

$$\sum_{n=1}^{10} 2n$$

4. Find the 11th term of the arithmetic sequence 3, 7, ...

$$a = 3, d = 4$$

$$a_n = a + (n - 1)d$$

$$a_{11} = 3 + (11 - 1)4 = 3 + 40 = 43$$

5. Find the sum of the first 10 terms of the arithmetic sequence 5, 15, ...

$$a = 5, d = 10$$

$$S_n = \frac{n}{2}[2a + (n - 1)d]$$

$$S_{10} = \frac{10}{2}[2(5) + (10 - 1)10] = 5(10 + 90) = 500$$

Extra Credit

Find the sum

$$\sum_{k=1}^{\infty} \left(\frac{1}{3}\right)^k$$

$$a = \frac{1}{3}, r = \frac{1}{3}, \text{ so } \sum_{k=1}^{\infty} \left(\frac{1}{3}\right)^k = \frac{a}{1-r} = \frac{\frac{1}{3}}{1-\frac{1}{3}} = \frac{\frac{1}{3}}{\frac{2}{3}} = \frac{1}{2}$$