<u>Math 114</u> Sequences & Series / Linear Systems Review

- [1] You must show the use of the appropriate sequence and/or series formulae.
 - [a] Find a_{364} for the arithmetic sequence $-28, -22, -16, -10, -4, \cdots$.
 - [b] Find a_{20} for the geometric sequence 5, -10, 20, -40, 80,
 - [c] Find a_{248} for the arithmetic sequence with $a_3 = 20$ and $a_{10} = -3$.
 - [d] Find the sum of the first 425 terms of the sequence in part [a].
 - [e] Find the sum of the first 15 terms of the sequence in part [b].
 - [f] Find the sum of the infinite geometric series $\frac{9}{20} \frac{3}{10} + \frac{1}{5} \cdots$.
 - [g] Convert 0.014141414... to a fraction.

[h] Find
$$\sum_{n=1}^{\infty} \frac{5}{2(3)^{n+1}}$$

[2] You started a new job which paid \$3,000 per month. After exactly 6 years, you left the job.

- [a] If you received a 0.4% raise each month, what was your monthly pay when you left ?
- [b] If you received a \$12 per month raise each month, what was your monthly pay when you left ?
- [c] In part [a], how much were you paid during the 6 years ?
- [d] In part [b], how much were you paid during the 6 years ?
- [3] You deposit \$2,000 into your retirement account at the beginning of every year for 30 years. The account earns 4.5% interest compounded annually. How much is in the account at the end of the 30 years ?
- [4] Solve the system $\frac{2x-3y}{3x+4y} = 51$ using elimination.

ANSWERS

- [1] [a] 2150 [b] -2621440[c] -785 27 [e] 54615 [d] 528700 [f] 100 7 [h] $\frac{5}{12}$ [g] 495
- [2] [a] 3983.04 (a_{72} of geometric sequence with $a_1 = 3000$, r = 1.004)
 - [b] 3852 (a_{72} of arithmetic sequence with $a_1 = 3000$, d = 12)
 - [c] 249743.49 (S_{72} of geometric series with $a_1 = 3000$, r = 1.004)
 - [d] 246672 (S_{72} of arithmetic series with $a_1 = 3000$, d = 12)

[3] 127504.78 (
$$S_{30}$$
 of geometric series with $a_1 = 2000(1.045)$, $r = 1.045$ OR $a_1 = 2000(1.045)^{30}$, $r = \frac{1}{1.045}$)

[4] (13, 3)