MTH 166 Homework #12 Key

1a. $-1, 3, 7, 11, 15, \ldots$

b. $-4, 5, -6, 7, -8, \ldots$

c. $1/2, -1/3, 1/5, -1/9, 1/17, \ldots$

d. $4, 11, 25, 53, 109, \ldots$

e. $2, 3/2, 8/3, 15/2, 144/5, \ldots$

f. $1, -3, 9, -27, 81, \ldots$

g. $0, 1/2, 6/7, 9/8, 4/3, \ldots$

h. $7, 12, 19, 26, 33, \ldots$

i. $0, 1, 2, 3/2, 2/3, \ldots$

2.a. $5+10+15+20+25+30 = 105$

b. $(-1/3)^2 + (-1/3)^3 + (-1/3)^4 = 1/9 - 1/27 + 1/81 = 7/81$

c. $1+8+27+64+125 = 225$

d. $\frac{-1}{1} + \frac{1}{2} + \frac{-1}{6} + \frac{1}{24} - \frac{1}{120} = \frac{-19}{30}$

3a. $\sum_{n=0}^{15} n^2$

b. $\sum_{n=1}^{14} \frac{n}{n+1}$

c. $\sum_{n=0}^{13} (2n+5)$

d. $\sum_{n=1}^{11} 2^n$

e. $\sum_{i=1}^{n} \frac{i}{9^i}$

4a. $a_n = 5(3)^{n-1}$ or $\frac{5}{3}(3)^n$

b. $24(1/3)^{n-1} = a_n$ or $8(1/3)^n$

c. $a_n = -6(-5)^{n-1}$ or $(-6/5)(-5)^n$

d. $a_n = 1000(-1/2)^{n-1}$ or $(-2000)(-1/2)^n$

5a. $a_n = 3(4)^{n-1}$ starting at $n=1$

b. $5(-1/5)^{n-1} = a_n$

c. $12(-1/2)^{n-1} = a_n$

OR starting at $n=0$

a. $a_n = 3(4)^n$

b. $a_n = 5(-1/5)^n$

c. $a_n = 12(-1/2)^n$

6. a. for $n=1$ $(1) = 1$ ✓

assume for k, show $k+1$

$\sum_{i=1}^{k+1} (2i-1) = \sum_{i=1}^{k} (2i+1) + 2(k+1)-1 = k^2 + 2k + 1 = (k+1)^2$

which is what the formula predicts. ✓