1) 8th term is 4; 18th term is -96. Find the sum of the first 30 terms.

$\frac{(-96-4)}{(18-8)} = -10 = d$

$a_n = a + d(n-1), a_8 = a + d(8-1), 4 = a - 10*(8-1), 74 = a$

$a_{30} = 74 + -10(30-1) = -216$

$S_n = \frac{n}{2}(a + a_n) = S_{30} = \frac{30}{2}(74 - 216) = -2130$

Find the sum of the following series:

2) 1+3+5+ … +59

a=1,d=2

$a_n = a + d(n-1), 59 = 1 + 2(n-1), n = 30$

$S_n = \frac{n}{2}(a + a_n), S_{30} = \frac{30}{2}(1 + 59) = 900$

3) $\frac{1}{16} + \frac{3}{64} + \frac{9}{256} + \ldots + \frac{6561}{1048576}$

$a = \frac{1}{16}, d = \frac{(\frac{3}{64})}{(\frac{1}{16})} = \frac{3}{4}$

$a_n = a*r^{(n-1)}, \frac{6561}{,1048576} = \frac{1}{16}*\left(\frac{3}{4}\right)^{(n-1)}, \frac{(\frac{6561}{1048576})}{(\frac{1}{16})} = \left(\frac{3}{4}\right)^{(n-1)}, \frac{ln(\frac{6561}{65536})}{ln(\frac{3}{4})} = n-1, n = 9$

$S_n = a\left(\frac{1-r^n}{1-r}\right), S_{59} = \frac{1}{16}*\left(\frac{1-(\frac{3}{4})^9}{1-\frac{3}{4}}\right) = .23123$

4) $\sum\limits_{k=1}^{\omega} 8\left(\frac{2}{3}\right)^{k-1}$

$S = \frac{a}{1-r} = \frac{8}{1-\frac{2}{3}} = 24$