§5.2 Homework Solutions

1 a) [BB] b) $a_1 = 5$, $a_{k+1} = a_k - 2 \ \forall k \geq 1$ c) $a_1 = 4$, $a_2 = 1$, $a_k = a_{k-2} - a_{k-1} \ \forall k \geq 2$

d) $a_1 = 1$, $a_{k+1} = a_k + (-1)^{k+1} k$. 2 a) [BB] 4) [BB] 6) [BB]

20) a) $a = 116$, $d = -7$. So $a_{300} = 116 + 299(-7)$

b) If -480 is in the sequence then $116 - 7n = -480$ has an integer solution. It doesn't so -480 is not in the sequence.

c) Sum $= \frac{300}{2}(2 \times 116 + 299(-7)) = -279150$.

26) a) $a = -3072$, $r = -\frac{1}{2}$ So $a_{13} = -3072(-\frac{1}{2})^{12}$ and $a_{20} = -3072(-\frac{1}{2})^{19}$.
b) Sum $= -3072\dfrac{(1-(-\frac{1}{2})^9)}{1-(-\frac{1}{2})}$.

27) $a = 48$ and $ar^5 = -\frac{3}{2} \Rightarrow r^5 = \frac{-3}{96} = -\frac{1}{32} \Rightarrow r = -\frac{1}{2}$.
So sum of first 10 terms $= \dfrac{48(1-(-\frac{1}{2})^{10})}{1-(-\frac{1}{2})}$ = whatever

40) a) Each year amount is multiplied by $(1+i)$.
So $S_1 = P$, $S_{n+1} = S_n(1+i) \ \forall n \geq 1$.

b) $S_n = P(1+i)^{n-1}$ (a geometric sequence).

55) a) [BB]

b) Any such ~~sequence~~ line of length n either ends with F or FM

The number of lines of length n ending with F equals the number of lines of length $n-1$ (~~without~~ just add an F to the end)

The number of lines of length n ending with FM equals the number of lines of length $n-2$ (take any such line and add two people FM to the end of it).

So $a_n = a_{n-1} + a_{n-2}$, $a_1 = 2$, $a_2 = 3$ is the recursive definition.

This is just the usual Fibonacci sequence with the first two terms missing.