Jason Dorweiler CS225 Quiz6-7

Question 1: a. $a_n = 5n - 10$ recursive def: $a_{n+1} = 5(n+1) - 10$
$= a_{n+1} = a_n + 5$

b. $a_n = n^2 - n = a_{n+1} = (n+1)^2 - (n+1) = n^2 + 2n + 1 - n + 1$
$= n^2 - n + 2n = a_{n+1} = a_n + 2n$

question 2:
a. $S = \{x | x > 6 \, and \, odd\}$
Basis: $7 \in S$
Recursive: if $x \in S$ then $x + 2 \in S$

b. $S = \{\lambda | length(\lambda) = even\}$
Basis: $\lambda = 0, 0 \in S$ this holds since 0 is even.
Recursive: if $\lambda \in S$ then $\lambda + 2 \in S$

Question 3:
Basis step: This holds for the basis step since $(0, 1)$ and $(1, 0)$ both give 0+1
$= 1$.

Recursive step: suppose that a+b=2k+1 where k is an integer
(a+1)+(b+1)= 2k+1 = a+b+2 = 2k+1
= a+b=2k+3 = a+b=2(k+1)+1 which shows that a+b is always an odd integer.

Question 5:
a. You need to pick at least 9 balls
b. 10 red + 20 green + 20 yellow = 50 balls + 3 blue. So you would need to pick 53