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.
$$S = \{x | x > 6 \text{ and odd} \}$$

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 a+b = odd.

Recursive step: suppose that a+b=k where k is an odd integer, then a+b=2k+1. (a+1)+(b+1)=2k+1=a+b+2=2k+1=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 $53\,$