**Question 1**

A, B, C, D are filled equally in that array.

So P(probability) will be 1/4.

**A)** The expected number (average number) of trials for a success = 1/P

So it’s 4/1 = 4

Reference: Slide number 13.

**B)** The expected number (average number) of trials for k successes = k/P

k = 10, P = 1/4

So the answer is 40.

Reference: Slide number 15.

**C)** Worst case is scan whole array, best case is all k elements are found at first k scan. Average time complexity will be average number of array locations to inspect before find k D. So it is

**Question 2**

1 + (1/2 + 1/2) + (1/4 + 1/4 +1/4 +1/4) + … = log(n+1) =

S = 1 + (1/2 + 1/3) + (1/4 + 1/5 + 1/6 + 1/7) + … + 1/n =

So, it is clear that S<= log(n+1). This S is O(log(n+1))

**Question 3**

S = 1/2 + 2/4 + 3/8 + 4/16 + 5/32 + …

S/2 = 1/4 + 2/8 + 3/16 + 4/32 + …

S – S/2 = 1/2 + 1/4 + 1/8 + 1/16 + 1/32 + …

S/2 = 1/2 + 1/4 + 1/8 + 1/16 + 1/32 + …

S=1+1/2+1/2 + 1/4 + 1/8 + 1/16 + 1/32 + … =>

S=a+ar+ar2+ar3+…arn-1 where a=1, r=1/2

Let us apply geometer series formula:

where n is infinite => **S=2(1-0)=2**