Attempt to answer these questions (when asked for examples use different examples from the ones given in class):

a- Given 100 cans of coke, 50 cans of sprite, 20 cans of Dr.Pepper, and 10 cans of mountain dew. Given a can what will your best guess be?

Sum = 100 + 50 + 20 + 10 = 180

P(Coke) = 100/180 = 10/18

P(Sprite) = 50/180 = 5/18

P(Dr.Pepper) = 20/180 = 2/18

P(Mountain Drew) = 10/180 = 1/18

So: **Given a can, the best guess will be Coke**.

b- Given 80 soft-cover books, 50 hard-cover books, 20 magazines, and 30 comics. Knowing that soft-cover books range from 100-500 pages, hard-cover books range from 200-600 pages, magazines range from 30-120 pages, comics range from 20- 100 pages. Given an item with 50 pages, what would your best guess be?

Sum = 80 + 50 + 20 + 30 = 180

P(Soft-cover books) = 80/180 = 8/18

P(Hard-cover books) = 50/180 = 5/18

P(Magazines) = 20/180 = 2/18

P(Comics) = 30/180 = 3/18

P(50 pages | Soft-cover books) = 0 (out of page ranges 100-500)

P(50 pages | Hard-cover books) = 0 (out of page ranges 200-600)

P(50 pages | Magazines) = 1/(210-30+1) = 1/91

P(50 pages | Comics) = 1/(100-20+1) = 1/81

We have: P(A|B) = (P(A)/P(B))*P(B|A),

and P(50 pages) = 1

so:

P(Soft-cover books | 50 pages)

= (P(Soft-cover books)/ P(50 pages))* P(50 pages | Soft-cover books)

= 0

P(Hard-cover books | 50 pages)

= (P(Hard-cover books)/ P(50 pages))* P(50 pages | Hard -cover books)

= 0

P(Magazines | 50 pages)

= (P(Magazines)/ P(50 pages))* P(50 pages | Magazines)

= P(Magazines)* P(50 pages | Magazines) = (2/18) * (1/91) = 0.001221

P(Comics | 50 pages)

= (P(Comics)/ P(50 pages))* P(50 pages | Comics)

= P(Comics)* P(50 pages | Comics) = (3/18) * (1/91) = 0.001831

The best guess will be Comics.

c- Given 10 soft-cover books, 40 hard-cover books, 20 magazines, and 30 comics. Knowing that soft-cover books have 200 pages, hard-cover books range from 300 pages, magazines range from 60 pages, comics range from 50 pages. What are the expected pages if you pick a random item?

Sum = 10 + 40 + 20 + 30 = 100

P(Soft-cover books) = 10/100 = 1/10 = 0.1

P(Hard-cover books) = 40/100 = 4/10 = 0.4

P(Magazines) = 20/100 = 2/10 = 0.2

P(Comics) = 30/180 = 3/10 = 0.3

E(pages) = 200*0.1 + 300*0.4 + 60*0.2 + 50*0.3 = 20 + 120 + 12 + 15 = 167

d- For problem c (above) what is the standard deviation?

$E(pages^2)$ = 200*200*0.1 + 300*300*0.4 + 60*60*0.2 + 50*50*0.3 = 41470

Variance = $E(pages^2) - E(pages)^2$ = 41470 – 167*167 = 13581

Standard deviation = Sqrt(variance) = Sqrt(13581) = 116.5375