

1. Answer this question – but hold the thought for later: If you flipped a coin 1000 times, would getting 550 heads make you suspicious that the coin was biased towards heads?
How about 600? What would be the lowest number that would make you suspicious?

2. For a probability distribution $P(x)$, write down the formulas for the

(a) mean: $\mu = \sum xP(x)$

(b) variance: $\sigma^2 = \sum [x^2P(x)] - \mu^2$

(c) standard deviation: $\sigma = \sqrt{\sum [x^2P(x)] - \mu^2}$

3. How do we determine if a value is unusual or not?

Use the **Range Rule of Thumb**: Usual values are within 2 standard deviations of the mean.

maximum usual value = $\mu + 2\sigma$

minimum usual value = $\mu - 2\sigma$

4. **Ex** The California prison system hires an optometrist to visit the prison 1 day per week and give the prisoners eye exams. Let x be the number of patients seen on a single visit. The following probability distribution is found from past data.

x (# patients)	$P(x)$
0	0.06
1	0.08
2	0.09
3	0.11
4	0.12
5	0.20
6	0.24
7	0.04
8	0.03
9	0.02
10	0.01

- (a) Find the mean and standard deviation.
- (b) Is it unusual to see 0 patients?
- (c) Is it unusual to see 10 patients?
- (d) If the job was being transferred to a new optometrist, how many patients would s/he **expect** to see?

5. 58% of undergraduates at College A are female. A student committee is formed by randomly selecting 15 students. For this population, the probability of getting x number of females on a committee of 15 is given below.

x	$P(x)$
0	0+
1	0+
2	0+
3	0.003
4	0.011
5	0.034
6	0.077
7	0.138
8	0.190
9	0.204
10	0.169
11	0.106
12	0.049
13	0.016
14	0.003
15	0+

(a) Is it unusual to have 5 females on a committee of 15 people from this school?

(b) Is it unusually low to have 5 females on a committee of 15 people from this school?

(c) Based on the result of part(b), would you suspect that the committee was not randomly chosen (and perhaps females discriminated against)? Explain.

[Stop Here]

6. A manager of a small consulting firm keeps a daily log of the number of referrals the firm receives. After several years, he organizes the data into the following probability distribution.

x	$P(x)$
0	.25
1	.35
2	.15
3	.15
4	.10

- (a) On any given day, what is the most likely number of referrals?
- (b) What is the probability that the firm will get at least 2 referrals?
- (c) What is the probability that the firm will get fewer than 4 referrals?
- (d) What is the probability that the firm will get at most 4 referrals?
- (e) Is it unusual for the firm to get more than 3 referrals?
- (f) What is the mean?
- (g) If someone asked you how many referrals to *expect* in one day, what would you answer?
- (h) What is the minimum usual value and the maximum usual value?

7. Complete the chart so that you get a probability distribution that makes sense:

x	$P(x)$
1	0.1
2	0.2
3	0.1
4	