Lesson 6.2.2

6-42. There are a fixed number of trials. The probability of “yes” on each trial is always the same. The trials were independent. The trials could all be recorded as “yes” or “no.”

6-43. There are 30 trees (30 “trials”). The probability of disease is always 0.16. The infections are independent, and the trees are all either infected or not.

6-44. $P(X = 5) = \binom{30}{5}(0.16)^5(1 - 0.16)^{25} = 0.1912$

6-45. $\binom{100}{30} = 2.9372 \times 10^{25}$. $\binom{1000}{150} = 1.3432 \times 10^{182}$. Note: This last calculation will likely return an error rather than the number here. There does seem to be a limitation. These are unreasonably large numbers to be working with, even at a relatively small number of trials.

6-46. Binomial pdf: $n = 1000$, $p = 0.16$, $X = 150$; $P(X = 150) = 0.02418$

6-47. See tables below. The cdf table is accumulating the pdf table. Instead of reporting $P(X = k)$, the cdf function reports $P(X \leq k)$.

Number of Ys	0	1	2	3	4
Binomial pdf	0.4096	0.4096	0.1536	0.0256	0.0016

Number of Ys	0	1	2	3	4
Binomial cdf	0.4096	0.8192	0.9728	0.9984	1

6-48. a. $\frac{8}{30} \cdot \frac{7}{29} \cdot \frac{6}{28} = 0.0138$

b. No, it cannot. The trials are not independent due to a small sample size and sampling without replacement. Also, the probability of a candy being pink changes as you eat the candies.

6-49. a. $P(X \leq 4) = 0.7279$

b. $P(X = 3) = 0.2201$

6-50. a. X is a continuous random variable. Its value can take on any real number within its domain.

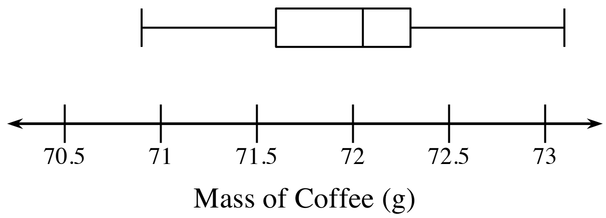
b. $P(X < 5.8)$ = normalcdf(-10^99, 5.8, 5.85, 0.017) ≈ 0.001635

c. Y is discrete. It is the result of counting.

d. Binomial distribution, $n = 1000$, $p = 0.001635$, $P(X = 2) = 0.2608$.

6-51. a. Within one standard deviation of the mean is $\frac{34}{50}$ = 68% of the data. Within two standard deviations is $\frac{48}{50}$ = 96%. Within 3 standard deviations is 100%. This lines up closely with the expected 68-95-99.7 rule. In fact, with 50 measurements, it is as close as possible to the 68-95-99.7 rule.

b.



The boxplot is reasonably symmetric. This is in agreement with the conclusion to part (a).

