Lesson 6.2.4

6-65. $0.16 \cdot 50 = 8$. Mo should expect 8 trees to be infected. This can be generalized to $\mu = np$ for the expected value of the binomial distribution.

6-66. a. $\mu_Y = p$, and $\sigma_Y^2 = p(1-p)$

b. $\mu_X = np$, $\sigma_X^2 = np(1-p)$, $\sigma_X = \sqrt{np(1-p)}$.

6-67. The binomial distribution is symmetric if $p = 0.5$, skewed to the right for $p < 0.5$, and skewed to the left for $p > 0.5$. This effect is less pronounced as n gets larger. As n gets larger, the shape appears to be almost normally distributed.

6-68. Answers vary. Construct an argument that can be defended.

6-69. a. $P(X = 8) = 0.2548$

b. $\mu_X = 10(0.72) = 7.2$, $\sigma_X = \sqrt{10(0.72)(1-0.72)} \approx 1.420$. Out of 10 creations, students should expect about 7 to contain over 200 pieces. Anything within 1 or 2 of 7 would be considered typical.

6-70. a. Books at home and test scores are probably both associated with more reading; the actual cause.

b. Chess is game of strategy and an extracurricular activity. Those who play regularly may be more inclined to apply to Ivy League schools than non-chess players.

c. Students who live off campus probably commute to school and may spend more time driving to and from school than students who live on campus. The additional hours on the road may be the cause of more accidents.

6-71. Students may choose to make a two-way table or tree, however, the required joint probability is given. $P(\text{F} \mid \text{E}) = \frac{P(\text{F and E})}{P(\text{E})} = \frac{0.008}{0.04} = 0.2$

6-72. a. One possible value is –0.08. This value would mean that for every additional second a swimmer can hold their breath, their expected 500 free time decreases by 0.08 minutes.

b. This looks like a strong relationship. Estimates will vary. Perhaps $r = -0.9$ with $R^2 = 0.81$ "81% of the variation in the 500 yard swim time in these swimmers can be explained by its linear relationship with their breath holding time."

c. The correlation coefficient would decrease drastically with the addition of this outlier. Imagine the best-fit line "pinned" near the center of the scatterplot and free to rotate. The slope of the LSRL would become less steep as best-fit line rotates toward the new outlier.

6-73. $z = \frac{56.4-55.6}{3.3} = 0.24242$. See graph at right. Using a normal probability density function or table: $P(X < 56.4)$ or $P(z < 0.24242) = 0.5958$