**Homework 5 Solutions**
**Chapter 8: #11, 18**
**Chapter 8: #33, 39**
**Chapter 8: # 45b, 59b, 67a**

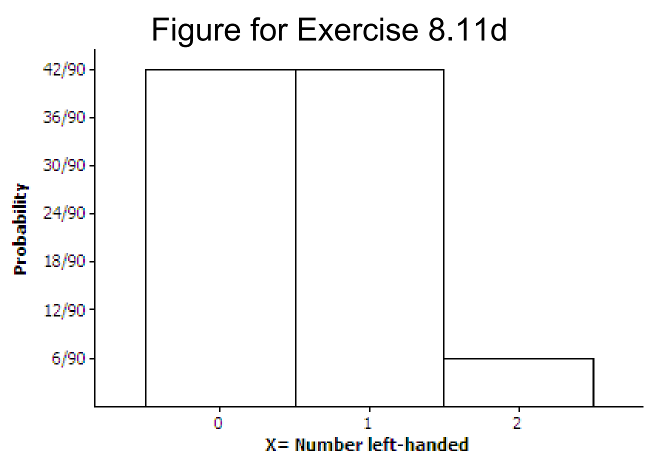
**Assigned Mon, October 26**

**8.11** **a.** Simple events are {RR, RL, LR, LL}
**b.** Probability of RR = (7/10)(6/9) = 42/90 (see Section 7.4, Rule 3).
Probability of RL = (7/10)(3/9) = 21/90
Probability of LR = (3/10)(7/9) = 21/90
Probability of LL = (3/10)(2/9) = 6/90

**c.** Note that $P(X=1)$ is the sum of probabilities for RL and LR.
The probability distribution is:

| *k* | 0 | 1 | 2 |
|---|---|---|---|
| *P(X=k)* | 42/90 | 42/90 | 6/90 |

**d.**




**8.18** **a.** \$30, the cost of the insurance.
**b.** $X$ = \$0 with probability .90 (the probability he doesn't need to be towed during a year), and X = \$100 with probability .10 (the probability he needs to be towed during a year).
**c.** If he buys insurance, E($X$) = \$30.
If he does not buy insurance, E($X$) = \$0 × .90 + \$100 × .10 = \$10.
In the long run, he's better off to not buy the insurance. The average cost per year, without insurance will be \$10, which is less than the \$30 per year cost of the insurance.

**Assigned Wed, October 28**

**8.33** **a.** Yes. $n = 10$ and $p = .5$.
**b.** No. $p$ is not the same from trial to trial.
**c.** No. The "trials" (cities) are not independent of each other as they will tend to have the same weather.
**d.** No. The "trials" (children) are not independent of each other because they are in the same class and flu is contagious.

**8.39** Use a binomial distribution with $n = 10$, $p = .5$. Let $X$ = number of games won by human. The answers can be found using any of the methods discussed in Section 8.4, including the use of R Commander, a graphing calculator, or Excel. (You could also define X = number of games won by the computer.)
**a.** $P(X = 5) = .2461$.
**b.** $P(X = 3) = .1172$. If computer wins 7 games, then human wins 3 games.
**c.** $P(X \geq 7) = .1719$, calculated as $P(X = 7) + P(X = 8) + P(X = 9) + P(X = 10)$ $= .1172 + .0439 + .0098 + .0010 = .1719$.
Equivalently, $P(X \geq 7) = 1 - P(X \leq 6) = 1 - .8281 = .1719$.

**Assigned Fri, October 30**

**8.45b.** $P(30 \leq X \leq 60) = .5$ (because the interval from 30 to 60 is one-half of the interval of possible outcomes of 0 to 60 and the distribution is uniform.)

**8.59b.** For 60, $z = \frac{60-65}{2.7} = -1.85$ while for 70, $z = \frac{70-65}{2.7} = 1.85$. So, $P(60 \leq X \leq 70)$
$= P(-1.85 \leq Z \leq 1.85) = P(Z \leq 1.85) - P(Z \leq -1.85) = .9678 - .0322 = .9356$

**8.67a.** Answer = .9015. For a binomial random variable with $n = 1000$ and $p = .60$,
$\mu = np = 1000(.60) = 600$, and $\sigma = \sqrt{1000(.60)(1-.60)} = 15.492$.
For $X = 620$, $z = \frac{620-600}{15.492} = 1.29$. $P(Z \leq 1.29) = .9015$.

NOTE: Your answers might differ slightly for 8.59b and 8.67a if you used Excel or R Commander because they don't round off until the end.