## Lesson 3.2.2

3-53. a. Your chance of getting the QH is $\frac{1}{52}$. The only way she could lose is if you picked the winner, so her chance of winning is $\frac{51}{52}$.

b. Switch. If you do not switch, you must pick the QH at the start $P(\text{win}) = \frac{1}{3}$, so if you switch $P(\text{win}) = \frac{2}{3}$

3-54. a. $\frac{13}{52} \cdot \frac{12}{51} \cdot \frac{11}{50} \cdot \frac{10}{49} \cdot \frac{9}{48} = 0.000495$

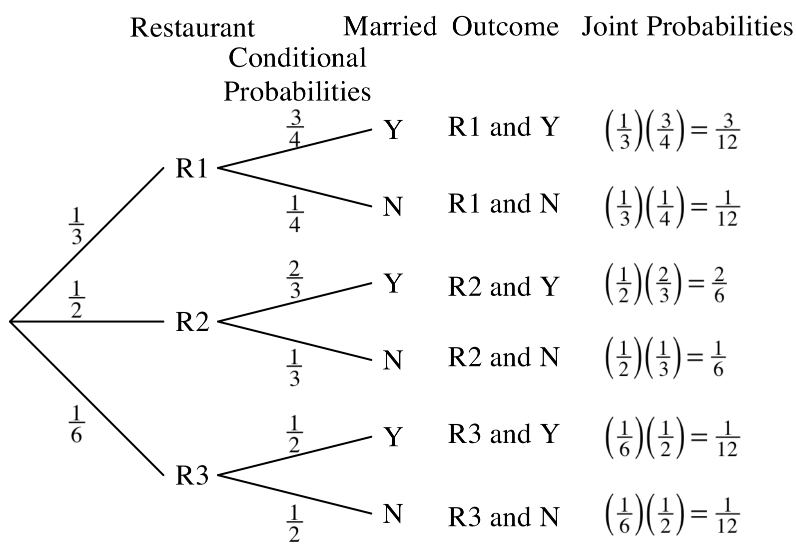
b. $1 - \frac{39}{52} \cdot \frac{38}{51} \cdot \frac{37}{50} \cdot \frac{36}{49} \cdot \frac{35}{48} = 0.7785$

c. 4 suits · 0.000495 = 0.001981

3-55. Independence or association can be demonstrated a number of ways. One example: (0.72)(0.55) ≈ 0.40 so the website answers are not associated.

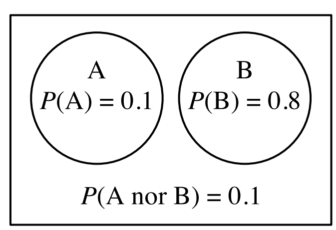
3-56. The joint probabilities can be determined with a tree diagram (see below) or a two-way relative frequency table.

$$P(\text{R3} \mid \text{married}) = \frac{P(\text{R3 and married})}{P(\text{married})} = \frac{\frac{1}{12}}{\frac{1}{4}+\frac{1}{3}+\frac{1}{12}} = \frac{1}{8}$$




3-57. Event A: on-time, Event B: marked tardy

a. Think of a Venn diagram with events A and B having no overlap. If together they cover $P(\text{A or B}) = 0.9$, then subtracting away $P(\text{A}) = 0.1$ leaves $P(\text{B}) = 0.8$.




b. For independent events $P(\text{A}) \cdot P(\text{B}) = P(\text{A and B})$. For any events: $P(\text{A or B}) = P(\text{A}) + P(\text{B}) - P(\text{A and B})$. Substitution gives:
$0.9 = 0.1 + P(\text{B}) - (0.1)P(\text{B})$. Solving for $P(\text{B})$: $P(\text{B}) = \frac{8}{9}$.

3-58. d = has enough platelets to donate and – = tests indicates insufficient platelets.

$P(\text{d} \mid -) = \frac{P(\text{d and } -)}{P(-)} = \frac{0.02 \cdot 0.95}{0.02 \cdot 0.95 + 0.98 \cdot 0.05} = 0.279$

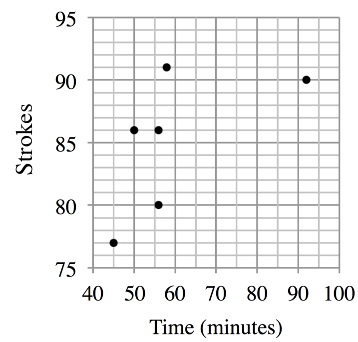
3-59. $P(\text{at least one}) = 1 - P(\text{none}) = 1 - (1 - 0.089)^{10} = 0.606$

3-60. a. $0.13 + 0.31 = 0.44$ b. $(0.13)(0.31) = 0.0403$

c. 0

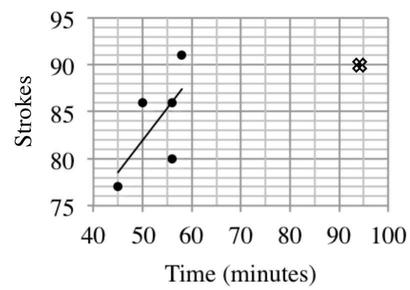
d. $0.13 + 0.31 - (0.13)(0.31) = 0.3997$

3-61. a. See scatterplot at right.
45 minutes + 77 strokes = 122




b. There is a weak to moderate positive linear association between Diego’s run time and the strokes taken for each match. There looks to be an outlier at 92 minutes.

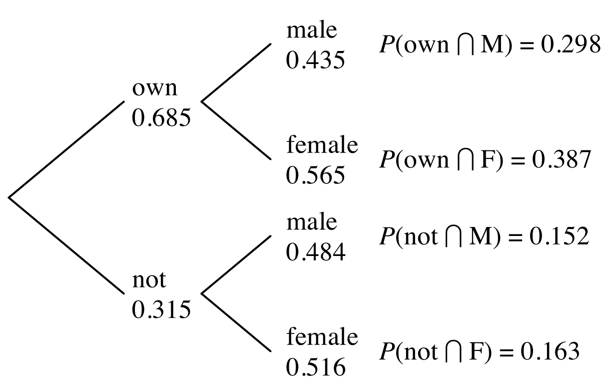
c. See graph below right.




d. Every minute of improvement in time reduces the number of strokes by 0.7, on average.

e. The variables are moderately associated, but that does not mean that one variable causes the other. It does seem reasonable that training for conditioning could improve Diego’s aim and confidence in his golf swing, however the potential exists that a better more accurate swing could also reduce the amount of running required on the course. It is not clear what causes what, or if the cause is due to a different confounding variable.

3-62. a.




hybrid car ownership

| | not | own | |
|---|---|---|---|
| Male | 0.152 | 0.298 | 0.450 |
| Female | 0.163 | 0.387 | 0.550 |
| | 0.315 | 0.685 | 1.000 |

b. *i*. $P(\text{own}) = 0.685$

*ii*. $P(\text{own} \mid \text{M}) = \left(\frac{0.298}{0.450}\right) = 0.662$

*iii*. $P(\text{M}) = 0.450$

*iv*. $P(\text{own or M}) = 0.685 + 0.450 - 0.298) = 0.837$

*v*. $P(\text{own and M}) = 0.298$