

Stat 145 Homework Solutions: Chapter 9

Problem 9.1

If a very large number of five-card hands were dealt, about $\frac{4}{1000} = 0.4\%$ would contain a straight.

Problem 9.7

- (a) 0
- (b) 1
- (c) 0.01
- (d) 0.6 (or 0.99)

Problem 9.9

(a) There are sixteen possible outcomes:

{HHHH, HHHM, HHMH, HMHH, MHHH, HHMM, HMHM, HMMH,
MHHM, MHMH, MMHH, HMMM, MHMM, MMHM, MMMH, MMMM}

(b) $S = \{0, 1, 2, 3, 4\}$

Problem 9.13

The probability is $1 - (0.686 + 0.256) = 0.058$.

Problem 9.14

The following models are illegitimate assignments of probability: Model 1 (probabilities do not sum to 1), Model 3 (probabilities do not sum to 1), and Model 4 (probabilities are greater than 1). The only legitimate assignment of probability is Model 2, as all probabilities are between 0 and 1 and the probabilities sum to 1.

Problem 9.20

- (a) $P(X \geq 3)$ means "the probability that the student's grade is an A or a B."
- (b) $P(X < 2) = 0.09 + 0.07 = 0.16$

Problem 9.22

(a) $Y \geq 10$

(b) The probability is:

$$\begin{aligned} P(Y \geq 10) &= P\left(\frac{Y - 6.8}{1.6} \geq \frac{10 - 6.8}{1.6}\right) \\ &= P(Z \geq 2) \\ &= 1 - .9772 \\ &= .0228 \end{aligned}$$

Problem 9.27

The first probability is $0.134 + 0.119 = 0.253$. The second probability is $1 - 0.253 = 0.747$.

Problem 9.29

(a) $1 - (0.210 + 0.156 + 0.112 + 0.112 + 0.099 + 0.076) = 0.235$

(b) $0.210 + 0.156 = 0.366$

Problem 9.31

There are six outcomes, each equally likely, so the probability is $\frac{1}{6} \approx 0.167$.

Problem 9.35

(a) The eight arrangements are:

{BBB, BBG, BGB, GBB, GGB, GBG, BGG, GGG}

Each outcome is equally likely, so the probability of any one outcome is $\frac{1}{8} = 0.125$.

(b) There are three outcomes that contain two girls, so $P(X = 2) = \frac{3}{8} = 0.375$.

(c) The distribution of X is as follows:

X	$P(X)$
0	0.125
1	0.375
2	0.375
3	0.125

Problem 9.43

(a) The probability is:

$$\begin{aligned}P(Y > 300) &= P\left(\frac{Y - 300}{35} > \frac{300 - 300}{35}\right) \\&= P(Z > 0) \\&= 1 - .5 \\&= .5\end{aligned}$$

(b) The probability is:

$$\begin{aligned}P(Y > 370) &= P\left(\frac{Y - 300}{35} > \frac{370 - 300}{35}\right) \\&= P(Z > 2) \\&= 1 - .9772 \\&= .0228\end{aligned}$$