Week 3 Solutions to evens (odds in book)

All 2-7 (review exercises) have solutions in the back of the book.

3.2.4  a) 2  c) \( \frac{1}{10} \)  e) \( \frac{1}{5} \)
     b) 0  d) \( \frac{1}{2} \)

3.2.14

If the sample is representative and conditions next year are similar enough to last year, then

\[
P(\text{selected driver has accident}) = \frac{136}{400} = .341
\]

This is concerning for that age bracket.

3.3.2  a) disjoint  b) disjoint  c) not disjoint

3.3.8

Let \( A \) be the event that the selected person's birth day is in October, and assume that being born on any day is equally likely (not true in reality). Then

\[
P(\complement A) = 1 - P(A) = 1 - \frac{31}{365} = \frac{334}{365} = .915
\]

3.3.10

\[
P(\text{man or survived}) = \frac{1360 + 352 + 318 + 29 + 27}{2223} = .929
\]

3.3.16  \( n = 100 \)

\[
P(\text{group A or group B}) = \frac{35 + 8 + 2 + 5}{100} = .5
\]
3.4.2  a) independent (as long as your calculator doesn't plug in, isn't wedged in the refrigerator's compressor, etc...)

3.4.6  \[ P(\text{not pregnant or test neg}) = \frac{3 + 11 + 5}{99} = \frac{19}{99} \approx 0.195 \]

3.5.8  assuming that boys and girls are equally likely

let A be the event at least one girl child

\[ P(A) = 1 - P(A^c) = 1 - 0.5^{12} \approx 0.999756 \]

if the parents have no girls, then under our assumptions, their chance of this happening is VERY small

3.5.20  \[ P(\text{Man or Woman | died}) = \frac{1360 + 104}{1360 + 104 + 35 + 18} = 0.965 \]

3.5.26  a) \[ P(\text{HIV | test neg}) = \frac{P(\text{HIV} \cap \text{test neg})}{P(\text{test neg})} \]

by Bayes

\[ \frac{P(\text{test neg} | \text{HIV}) \cdot P(\text{HIV})}{P(\text{test neg} | \text{HIV}) \cdot P(\text{HIV}) + P(\text{test neg} | \text{HIV}^-) \cdot P(\text{HIV}^-)} \]

\[ = \frac{0.05 \cdot 1}{0.05 \cdot 1 + 0.95 \cdot 0.0058} \approx 0.0058 \]

b) \[ P(\text{test negative | HIV}) = \frac{1}{0.05} = 0.05 \]

3.6.10  retrospective