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HW #4 Stats

5.4
This is empirical probability as it is only a short test of an experiment rather than a long run frequency, based on probability theory.

5.6
This is theoretical as the outcome is based on probability theory rather than an experiment

5.10
a, d, e cannot be probabilities since they are greater than 1 3 is not in the range 0-1

5.12
a) $\frac{1}{2}$ b) $\frac{1}{4}$ c) $\frac{12}{52}$ d) $\frac{4}{52}$ e) $\frac{8}{52}$

26 Black Cards / 52 total; 13 diamonds / 52 total; 12 Face cards / 52 total; 4 aces / 52 total; 8 King/Queen / 52 total

5.16
a) $\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{8}$ TTT
b) HTT, TTH, THT $\frac{3}{8}$
c) HHT, THH, HTH $\frac{3}{8}$
d) $\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{8}$ HHH

e) They add up to 1 as $\frac{3}{8} + \frac{3}{8} + \frac{1}{8} + \frac{1}{8} = 1$ as they make up the entire sample space

5.22
$56 / 1275 = 0.0439$ or 4.39%.

5.26
$\frac{722 + 101 - 45}{1275} = 0.6099$ or 60.99%.

5.40
a) students taking English as there may be students taking math & english, so this group is larger as it also includes math students
b) students taking English or math as or encompasses more people as the second group doesn't include students taking math

5.46
a) $1 - 0.41 - 0.23 = .36 \times 100 = 36\%$.
b) $1 - 0.23 = .77 \times 100 = 77\%$.
c) $0.41 + 0.23 = .64 \times 100 = 64\%$
d) Events c & a are complementary since they encompass the entire sample space & the entire possibilities add up to 100%.

5.52
They are associated as the gender of the person selected affects possibility of being left handed

5.64

Sequence A & B are equally likely since $P(GGGGGG) = \frac{1}{2}\cdot\frac{1}{2}\cdot\frac{1}{2}\cdot\frac{1}{2}\cdot\frac{1}{2}\cdot\frac{1}{2} = \frac{1}{64}$

& sequence B is also $\frac{1}{64}$ since $P(GGGBBB) = \frac{1}{2}\cdot\frac{1}{2}\cdot\frac{1}{2}\cdot\frac{1}{2}\cdot\frac{1}{2}\cdot\frac{1}{2} = \frac{1}{64}$

5.66

a) $95\% \times 95\% = 90.25\%$

b) $5\% \times 5\% = 0.25\%$

c) $100\% - (5\% \times 5\%) = 99.75\%$

seatbelt → Y 95%, N 5%

5.74

a) 0.5

b) Roughly 500 trials

c) Law of Large Numbers

d) Heads since at the trial 1, proportion was 1 for heads