Quiz 5 Solutions

1. If the event that he hits the free throw \( P(H) = 0.793 \)
   and the event he misses the free throw \( P(M) = 0.207 \)

   A. \( S = \{0, 1, 2, 3\} \)

   B. \( P(S=1) = P(HMM) + P(MHM) + P(MHH) = 3 \times (0.793) \times (0.207)^2 \)

   C. \( P(S=0) = P(MMM) = (0.207)^3 = 0.0087 \)
   \( P(S=2) = 3 \times P(MHH) = 3 \times (0.793)^2 \times (0.207) \approx 0.3905 \)
   \( P(S=3) = P(HHH) = 0.793^3 = 0.4987 \)

   \[
   \begin{array}{c|cccc}
   S & 0 & 1 & 2 & 3 \\
   \hline
   P(S) & 0.0087 & 0.1019 & 0.3905 & 0.4987 \\
   \end{array}
   \]


2. G is event the referee is good \( P(G) = 1 - P(B) = 0.87 \)
   B is event the referee is bad \( P(B) = 0.13 \)
   \( P(\text{all 6 are good}) = (0.87)^6 = 0.4336 \) or 43.36%

   Note we are assuming that the events are independent

3. \( P(\text{OB}) = 0.36 \) \( P(\text{OW}) = 0.33 \) \( P(\text{N}) = 0.31 \)

   A. There is no overlap. One cannot be in both groups.

   B. See below

   C. \( P(\text{OB or OW}) = 0.36 + 0.33 = 0.69 \)

   C. Above

   \( \text{OB} \) is event person is obese, \( \text{OW} \) is event person is overweight, \( \text{N} \) is event person's weight is normal
4. A. When add up the probabilities you get one. So this shows that there are no students who are taking 2 languages.
B. \( P(\text{Sp or For G or M}) = .29 + .12 + .06 + .09 = .56 \)
C. \( P(\text{For G or M}) = .12 + .06 + .09 = .27 \)

5. A. normcdf \((50,57,61,9) = .2175\) or 21.75% of runners run the race between 50 and 57 mins.
B. normcdf \((75,100,61,9) = .0599\) or 5.99% run race in greater than 75 minutes.
C. \[
\frac{65 - 61}{9} \approx .4444\] time is .4444 standard deviations above the mean.
D. \[
\frac{50 - 61}{9} \approx -1.222, \quad \frac{57 - 61}{9} \approx -.4444\]
\[\text{normcdf}\ (-1.222, -.4444, 0, 1) \approx .2175\]

6. A. \( P(T \leq 8) \) means the person runs the race in 8 minutes or less
\( P(T \leq 8) = \text{normcdf}\ (-100, 8, 7.11, 0.74) \approx .8855 \)

B. \( P(T \geq 7) \) is probability that person could not run a mile in less than 7 minutes
\( P(T \geq 7) = \text{normcdf}\ (7,100,7.11,0.74) \approx .5591 \)