Homework #2

Solutions
Math 1011
28 July, 2014

Chapter 13 (p 234)

[1] (a) False. Probability 1,000% is impossible because probabilities must be between 0% and 100%.

(b) True. On average, out of every 10 trials the event in question will happen 9 times and its opposite will happen once.

[3] Option (ii) is better. With option (ii) you win a dollar every time you would have won one in option (i), plus in other situations too. (For example, if you draw ♢ ♡ ♤ ♧.)

[9] (a) The chance of getting one ⚅ is 1/6 for each roll. The rolls are independent so we use the multiplication rule to get

$$\frac{1}{6}\cdot\frac{1}{6}\cdot\ldots\cdot\frac{1}{6} = \boxed{\left(\frac{1}{6}\right)^{10} \approx 1.65\times10^{-8}}$$

(b) This is the opposite of part (a), so the answer is

$$\boxed{1-\left(\frac{1}{6}\right)^{10} \approx 0.9999999\,8346 = 99.999998346\%}$$

(c) Not the same as part (b). The chance of rolling 5 or less for each die is 5/6, so use mult rule:

$$\frac{5}{6}\cdot\ldots\cdot\frac{5}{6} = \boxed{\left(\frac{5}{6}\right)^{10} \approx 16.1506\%}$$

Chapter 14 (p 252)

[1] (a) Only one way to get this out of 36.

$$\boxed{1/36}$$

(b) Six ways to get this out of 36.

$$\boxed{\frac{6}{36} = 1/6}$$

[3] (a) False. These events are not mutually exclusive so you cannot use the addition rule.
(actual chance would be $1 - \left(\frac{5}{6}\right)^3$)

(b) False. Clearly you might get tails each time.

[7] In a single draw the chance of getting [2] is 2/5. We will compute the chance of the opposite. To not get [2] 4 times the chance would be

$$\frac{3}{5} \cdot \frac{3}{5} \cdot \frac{3}{5} \cdot \frac{3}{5} = \frac{81}{625}.$$

Thus the chance of getting [2] at least once is

$$\boxed{1 - \frac{81}{625} = \frac{544}{625} = 87.04\%}$$

Chapter 15 (p261)

(HW #2)

2 (iii) $\left(\frac{5}{6}\right)^{10}$

The chance of it not landing on a ⚅ in a single roll is $\frac{5}{6}$. Use the multiplication rule.

6 False. The lists are the same length. Pick 6 out of 8 for a committee is the same as picking 2 out of 8 to not be in the committee.

(Also, you can compute

$$\frac{8!}{6!\,(8-6)!} = \frac{8!}{6!\,2!}$$

$$\frac{8!}{2!\,(8-2)!} = \frac{8!}{2!\,6!}$$

equal.)