



Intermediate Math Circles

November 8, 2017

Probability II

Problem Set

- In a coin toss, what is the probability that heads is flipped exactly two times out of three tosses?
 - What if the coin is weighted so that the probability that heads occurs is 0.6?
- Three digits are chosen at random (with replacement) from $0, 1, \dots, 9$. Find the probability of each of the following events.
 - A: “all three digits are the same”
 - B: “all three digits are different”
 - C: “the digits all exceed 4”
 - D: “digits are either all even or all odd”
- A gumball machine contains 4 colours of gumballs. If you purchase a gumball, there is a 30% chance it will be blue, a 40% chance it will be green, a 10% chance it will be red, and a 20% chance it will be yellow. All of the red gumballs are removed. What are the chances of getting a blue, green and yellow gum ball now?
- In Canada, the probability that someone plays baseball or hockey is 0.79. The probability that someone plays just hockey is 0.6 and the probability that someone plays baseball and hockey is 0.15. What is the probability that someone plays only baseball?
- Let A and B be events defined on the same sample space, with $P(A) = 0.3$, $P(B) = 0.4$ and $P(A|B) = 0.5$. If you are given that B does **not** occur, what is the probability of event A occurring?
- Billy and Crystal each have a bag of 9 balls. The balls in each bag are numbered 1 to 9. Billy and Crystal each remove one ball from their own bag. Let b be the sum of the numbers on the balls remaining in Billy’s bag. Let c be the sum of the numbers on the balls remaining in Crystal’s bag.
Determine the probability that b and c differ by a multiple of 4.