

Homework 1

SDS 321

Turn in on Canvas Friday September 6 by 5pm

- (3 points) The registrar reported that among 1500 students, 800 did not register for a math or English course, while 250 registered for both of these two courses. How many registered for exactly one of these courses?
- (1+2+2 points) Let $P(A) = 0.15$, $P(B) = 0.35$, and $P(A \cup B) = 0.45$. Find the following:
 - $P(A \cap B)$
 - $P(A^c \cap B^c)^c$ *Hint: you can use De-Morgan's law here. $(A \cap B)^c = A^c \cup B^c$.*
 - $P(A^c \cup B)$
- (2 points) An urn holds 10 identical balls except that 4 are white, 1 is black, and the rest are red. An experiment consists of selecting a ball from the urn and observing its color.
 - What is a sample space for this experiment?
 - Indicate the outcomes in the event "the ball is not red."
- (11 points) For the urn in the above exercise, an experiment consists of selecting two balls in succession without replacement and observing the color of each of the balls.
 - What is the sample space of this experiment?
 - Indicate the outcomes of the event "no ball is red."
 - Compute the probability of observing first a white and then a black ball.
 - Now compute the probability of the event "no ball is red."
 - Compute the same probability if I now draw two balls *with* replacement.
- (2+2 points) A student flips a fair coin, if they get heads, they roll a six-sided dice. If they get tails they roll a twelve-sided dice¹.
 - What is the probability that they roll a 4?
 - What is the probability that they roll a 4 if the coin is not fair, and the probability of getting heads is 0.6 ($P(H) = 0.6$)?

¹A six-sided dice rolls numbers 1-6 with equal probability, and a twelve-sided dice rolls numbers 1-12 with equal probability.