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M463
Exam 1

Justify your answers!

Numerical expressions may be left unsimplified.

- 10 1. [10 pt.s] Of those IU students who are Music Majors, 20% are Lady Gaga fans; of those who are not Music Majors, 40% are fans of Lady Gaga. All together 35% of IU students are Lady G. fans.
- (a) What is the overall percentage of IU students who are Music majors?
- (b) Suppose a randomly selected IU student happens to be a Lady G. fan. What is the probability s/he is a Music Major?
- 10 2. [10 pt.s] Suppose that $P(E) = .6$, event F is independent of E , and $P(E \cup F) = .8$. Find $P(F)$.
- Hint: Let $x = P(F)$, and solve for x algebraically after applying the inclusion-exclusion formula and the independence formula.
- 10 3. [10 pt.s] A standard deck of cards has 52 cards, in 13 ranks (2, 3, 4, ..., 10, J, Q, K, A) and four suits (\diamond , \heartsuit , \clubsuit , \spadesuit). If a hand of five cards is dealt at random, find the probability that it the hand is a full house, meaning it contains three cards of one rank and two cards of another rank.
- 10 4. [10 pt.s] Suppose a pollster randomly calls 1000 people and asks whether they support Obama's healthcare plan. Suppose that in fact 50% of the general population supports the plan. Let X be the number of "Yes" responses. You may assume that X has a binomial distribution.
- (a) Find a 95% confidence interval for X .
- (b) How large a sample size n would be needed so that the sample fraction X/n would be within 0.01 of the true value 0.50 (with confidence level 95%)?
- 10 5. [10 pt.s] Let X be a R.V. with a Poisson(μ) distribution. Find
- $$P(X = 2 | X = 1 \text{ or } X = 2).$$