Homework 2 - Math 121   **Name:** _____

1. Suppose 80% of people like peanut butter, 89% like jelly, and 78% like both. Given that a randomly sampled person likes peanut butter, what's the probability that he also likes jelly?

2. The Behavioral Risk Factor Surveillance System (BRFSS) is an annual telephone survey designed to identify risk factors in the adult population and report emerginghealth trends. The following table displays the distribution of health status of respondents to this survey (excellent, very good, good, fair, poor) and whether or not they have health insurance.

	Excellent	Very good	Good	Fair	Poor	Total
Not insured	0.0230	0.0364	0.0427	0.0192	0.0050	0.1262
Insured	0.2099	0.3123	0.2410	0.0817	0.0289	0.8738
Total	0.2329	0.3486	0.2838	0.1009	0.0338	1.0000

(a) What is the probability that a randomly chosen individual has excellent health given that he has health coverage?

(b) The answer to part (a) is a conditional probability that can be expressed as $P(A \,|\, B)$. What are A and B?

(c) What is the probability that a randomly chosen individual has excellent health given that he doesn't have health coverage?

(d) Do having excellent health and having health coverage appear to be independent?

3. An airline charges the following baggage fees: $25 for the first bag and $35 for the second. Suppose 54% of passengers have no checked luggage, 34% have one piece of checked luggage and 12% have two pieces. We suppose a negligible portion of people check more than two bags. Compute the expected average revenue per passenger in baggage fees.

4. After an introductory statistics course, 80% of students can successfully construct histograms. Of those who can construct histograms, 86% passed, while only 65% of those students who could not construct histograms passed.

   (a) Construct a tree diagram for this scenario.

   (b) What percent of students passed the class?

   (c) If a student passed, then what is the probability that he can construct a histogram?

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5. The game of European roulette involves spinning a wheel with 37 slots: 18 red, 18 black, and 1 green (unlike American roulette which has 2 green slots). A ball is spun onto the wheel and will eventually land in a slot, where each slot has an equal chance of capturing the ball. Gamblers can place bets on red or black. If the ball lands on their color, they double their money. What is the expected value (i.e., theoretical average payoff) of a $100 bet?

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6. A recent poll of 600 likely voters in Arizona asked: If the U.S. Presidential race was held today, which of the following candidates, listed in random order, would you be most likely to vote for? The results, broken down by age (18-54 or 55+) are shown in the two-way table below. Use the table to find the conditional probability $P(\text{Supports Trump} \mid \text{Age } 55+)$.

	18-54	55+
Donald Trump	137	116
Joe Biden	174	140
Unsure/Undecided	19	14