Instructions: Show all work. Use exact answers or appropriate rounding conventions. If you use your calculator, you can show work by saying which calculator commands you used.

1. An academic department has just completed voting by secret ballot for a department head. The ballot box contains 4 slip for candidate A and three slips for candidate B. How many possible outcomes are there for pulling slips from the box? Give three examples of different elements from the sample space.

$$7C4 = 7C3 = 35$$

ex AABABAB

BAAABBA ← answers will vary

ABBAAAB

2. Consider all the outcomes of three children, and the sample space that orders the boys and girls. If the event A is the set of events with two girls, what is the complement of A?

BBB, BBG, BGB, GBB, GGG

3. Suppose the probability of an adult having a credit card is 79%, and the probability of an adult owning a car is 45%. If the two events are independent, find the probability that an adult has both a car and a credit card. Find the probability that an adult has either a car or a credit card.

$$P(A \cap B) = .79 * .45 = .3555$$

$$P(A \cup B) = P(A) + P(B) - P(A \cap B) = .79 + .45 - .3555 = .8845$$

4. Suppose that someone is having a dinner party and wants to serve two bottles of wine from three different varieties. Suppose that they have 10 bottles of cabernet sauvignon, 8 bottle of cabernet franc, and 9 bottles of syrah. How many different combinations of wine can be served?

$$\binom{10}{2}\binom{8}{2}\binom{9}{2} = 45,360$$

5. The table below shows information on the type of coffee selected by someone purchasing a single cup of coffee at an airport kiosk.

	Small	Medium	Large
Regular	14%	20%	26%
Decaf	20%	10%	10%

a. What is the probability that a random individual purchased a small cup?

$$34\%$$

b. If we know that the person purchased a small cup, what is the probability that they purchased decaf?

$$\frac{20\%}{34\%} = 58.8\%$$

c. If we know that they person purchased decaf, what is the probability that they purchased a small cup?

$$\frac{20\%}{40\%} = 50\%$$