

1. Suppose you are buying a new car and have decided to special order it from the factory to get the exact equipment you want. You've chosen all of the options except the *power train*. Now, you must pick an engine, a transmission, and a suspension. Your choices within each category are:

<u>engines</u>	<u>transmissions</u>	<u>suspensions</u>
4 cylinder	4 speed	regular
6 cylinder	5 speed	sports tuned
8 cylinder	Automatic	

- a) Sketch a tree diagram to list all the possible power trains.
- b) Use an appropriate formula to determine the number of possible power trains.
2. MegaTelco has four executives (Adams, Baker, Charles, Dunn) who are each qualified to serve on a negotiation committee. Two of these executives will be selected for the committee, with the first selected executive being the lead representative and the second as the backup representative.
- a) Sketch a tree diagram to list all the possible selections for this two-person committee.
- b) Use an appropriate formula to determine the number of possible pairings for this two-person selection.
3. Suppose the MegaTelco problem (above) is modified such that the two selected executives each serve as peers, rather than one being assigned a lead role and the other a backup role.
- a) List all the possible selections for this two-person committee.
- b) Use an appropriate formula to determine the number of possible pairings for this two-person committee.

4. In Arizona's LOTTO game, a machine has 42 balls numbered 1-42. You win a *share* of the Jackpot if you correctly predict which six tumble out.
- What is the probability you'll win the Jackpot if you play 1 set of numbers?
 - What is the probability you'll win the Jackpot if you had to pick the correct 6 *in their exact order of appearance*?
 - Suppose you lose on Saturday, but play the same set of numbers again on Wednesday. What's the probability of winning then?
5. A recent classified ad produced 100 applicants for a particular job. Each applicant's resume has been examined by a personnel clerk, who determined that 40 applicants have relevant *work experience*, 30 applicants have a relevant *degree*, 20 applicants have *both* relevant work experience and a relevant degree.

- a) Fill in the blanks in the following contingency table and construct an appropriate Venn diagram in the box.

	Work Exp	No Work Exp	Total
Degree			
No Degree			
Total			

- b) An application is selected at random. Find the probability it is someone who:

has work experience has no work experience

has a degree has no degree

- c) An application is selected at random. Find the probability it is someone who:

has work experience and a degree has work experience but no degree

has no work experience but does have a degree has neither work experience nor a degree

- d) You select an application at random, and notice that:

they have work experience. What's the probability they also have a degree? _____

they don't have work experience. What's the probability they have a degree? _____

- e) Based on your answers above, are the events "degree" and "work experience" independent? Explain.

- f) Suppose an applicant is deemed qualified if they have either work experience or a degree (or both). If an applicant is selected at random, what is the probability they are qualified?

9. The Collins Company has two factories, A & B. Historically, 10% of factory A's output has been defective, as has been 3% of factory B's output. Factory A produces four (4) times as many units as factory B.

- a) Organize the givens: $P(\quad) = .10$ $P(\quad) = .03$ $P(A) = \underline{\hspace{2cm}}$ $P(B) = \underline{\hspace{2cm}}$
- b) Are “defective status” and “factory in which produced” statistically independent? Cite appropriate numerical proof.

c) Sketch and solve the probability tree.

- d) An item is randomly selected. What is the probability it was made in factory A and was defective?
- e) An item is randomly selected. What is the probability it was made in factory A and was not defective?
- f) An item is randomly selected. What is the probability it was made in factory B and was defective?
- g) An item is randomly selected. What is the probability it was made in factory B and was not defective?
- h) Complete this contingency table.

Factory	Defective	Not defective	Total
A			
B			
Total			

- i) What is the probability a randomly selected item is either defective or made in factory B?
- j) A unit was selected at random and was found to be defective. What is the probability it came from factory A?

10. A pro football team wins with probability 0.70 when it is not snowing. However, on a snowy field, the probability of winning is reduced to 0.40. The probability for snow for next game day is 0.20. A newspaper headline indicates the team won the game. What is the probability they played on a snowy field?