



4. According to a recent survey, 24% of U.S. adults plan to travel out-of-state for the upcoming Thanksgiving holiday, 36% plan to travel in-state, and the rest plan to stay home.

If one U.S. adult is randomly selected, find the probability that he or she

a. will stay home.

b. will not stay home.

c. Are the outcomes of traveling out-of-state and traveling in-state mutually exclusive? Explain.

5. At a large university, 80% of incoming freshmen nursing students are female. Suppose that four freshmen nursing students are randomly selected at this school. (Assume that because the university is large, we can treat the selections as independent.)

Find the probability that

a. all are female.

b. none are female.

c. at least one is male.

d. the first student selected is male and the last three are female.

6. In a coastal community, 25% of households have sailboats, 46% of households have motorboats, and a 10% have both. Find the probability that a randomly selected household has neither a sailboat nor a motorboat.

7. The following table summarizes successes and failures when subjects used different methods in trying to stop smoking. The determination of smoking or not smoking was made five months after the treatment was begun, and the data are based on results from the Centers for Disease Control and Prevention.

	Nicotine Gum	Nicotine Patch	Nicotine Inhaler	Total
Smoking	109	263	95	467
Not smoking	59	57	27	143
Total	168	320	122	610

a. If an individual is randomly selected from this group, what is the probability that he/she stopped smoking?

b. If an individual is randomly selected from this group, what is the probability that he/she stopped smoking, given that the nicotine patch was used?

c. Are the events of stopping smoking and using the nicotine patch independent? Justify your answer using probabilities.

d. Are the events of stopping smoking and using the nicotine patch mutually

exclusive? Justify your answer using probabilities.

e. If an individual is randomly selected from this group, what is the probability that the nicotine patch or the nicotine inhaler was used? Are these events mutually exclusive? Justify your answer using probabilities.

f. If an individual is randomly selected from this group, what is the probability that he/she stopped smoking or used the nicotine patch?

g. If two different individuals are randomly selected from the group, what is the probability that they both continued smoking?

8. Is the following a probability distribution? Why or why not?

X	P(X)
1	-.05
2	.65
3	.20
4	.20

9. Find the mean and standard deviation of the following probability distribution.

X	P(X)
10	.20
20	.30
30	.50

10. In clinical trials of a new allergy medication, 30% of patients in the study experienced insomnia as a side effect. Suppose a sample of 4 participants in the study is randomly selected. Let  $X$  = the number in the sample experiencing insomnia as a side effect.

a. Is  $X$  a discrete or continuous random variable?

b. What is the probability distribution for  $X$ ? Which values of  $X$  are most likely? Which are least likely to occur?

$X$					
$P(X)$					

c. What is the probability that exactly 2 experienced side effects? Use the binomial formula and check your answer with the table above.

d. What is the probability that 2 or fewer experienced side effects?

e. What is the expected number experiencing insomnia as a side effect in this sample?

f. What is the standard deviation for the number experiencing insomnia as a side effect in this sample?

11. An insurance policy costs \$100 and will pay policyholders \$10,000 if they suffer a major injury (resulting in hospitalization) or \$3000 if they suffer a minor injury (resulting in lost time from work). The company estimates that each year 1 in every 2000 policyholders may have a major injury and 1 in 500 a minor injury. What is the expected value for an individual who purchases a policy?

12. A consumer organization inspecting new cars found that many had appearance defects (dents, scratches, paint chips, etc.) While none had more than three of these defects, 7% had three, 11% had two, and 21% had one. Find the expected number of appearance defects in a new car.

13. A man buys a racehorse for \$20,000. He plans to enter it in a race and then sell it afterwards. He believes that there is a 20% chance that the horse will win the race and he will be able to sell it for \$50,000. If the horse loses, he believes that it will be worth only \$8,000. What is his expected profit?

14. Two thousand tickets are sold for a raffle. The grand prize is \$500, the second prize is \$100, and there are ten \$10 prizes. If tickets cost \$2 each, what is an individual's expected profit for the game if he or she buys one ticket?