Day 1 Homework

Pg. 342: #3-23 odd, 33-37 odd, 43-49 odds.

Write the given set in set-builder notation.

3. {3,4,5,6,7}

List the elements of the given set in roster notation.

5. $\{x \mid x$ is a digit in the number 352,646$\}$ 　　　　　　7. $\{x \mid 2 - x = 4;\ x,$ is an integer$\}$

State whether the given statements are true or false.

9. a. {a,b,c} = {c,a,b}　　　b. $A \in A$ 　　　　　　　　　11. a. $0 \in \varnothing$ 　　　　b. $0 = \varnothing$

13. {Chevrolet, Pontiac, Buick} $\subset$ {x | x is a division of General Motors}

Let A= {1,2,3,4,5}. Determine whether the given statements are true or false.

15. a. $2 \in A$ 　　b. $A \subseteq \{2,4,6\}$

17. Let A = {1,2,3}. Which of the following sets are equal to A? Circle all that apply.

　　a) {2,1,3}　　　b) {3,2,1}　　　c) {0,1,2,3}

19. List all subsets of the following sets:　　　a. {1,2}　　b. {1,2,3}　　　c. {1,2,3,4}

Find the smallest possible set (that is, the set with the least number of elements) that contains the given sets as subsets.

21. {1,2}, {1,3,4}, {4,6,8,10}

23. {Jill, John, Jack}, {Susan, Sharon}

Let U= {1,2,3,4,5,6,7,8,9,10}, A= {1,3,5,7,9}, B= {2,4,6,8,10} and C= {1,2,4,5,8,9}. Find each of the given sets.

33. a. A^c 　　　　　　　　　　b. $B \cup C$ 　　　　　　　　　　　c. $C \cup C^C$

35. a. $(A \cap B) \cup C$ 　　　　　　b. $(A \cup B \cup C)^c$ 　　　　　　　c. $(A \cap B \cap C)^C$

Determine whether the given pairs of sets are disjoint. Explain why or why not.

37. a. {1,2,3,4}, {4,5,6,7} 　　　　　　　b. {a,c,e,g}, {b,d,f}

Let U denote the set of all employees in a hospital. Let:

$N = \{x \in U \mid x \text{ is a nurse}\}$, $D = \{x \in U \mid x \text{ is a doctor}\}$, $A = \{x \in U \mid x \text{ is a administrator}\}$

$M = \{x \in U \mid x \text{ is a male}\}$, $F = \{x \in U \mid x \text{ is a female}\}$

Describe each set in words:

43. a. D^c b. N^c 45. a. $D \cap M^C$ b. $D \cap A$

Let U denote the set of all senators in Congress. Let:

$D = \{x \in U \mid x \text{ is a Democrat}\}$, $R = \{x \in U \mid x \text{ is a Republican}\}$, $F = \{x \in U \mid x \text{ is a female}\}$,

$L = \{x \in U \mid x \text{ is a lawyer}\}$. **Write set that represents the given statements:**

47.   a. the set of all Democrats who are female

       b. the set of all Republicans who are male and are not lawyers

Let U denote the set of all students in the business college of a certain university. Let:

$A = \{x \in U \mid x \text{ had taken a course in accounting}\}$, $B = \{x \in U \mid x \text{ had taken a course in economics}\}$,

$C = \{x \in U \mid x \text{ had taken a course in marketing}\}$. **Write the notation for the set for the statement.**

49.   a. The set of students who have not had a course in economics.

       b. The set of students who have had courses in Accounting and Economics

       c. The set of students who have had courses in Accounting and Economics but not Marketing.

Pg. 350: #4, 7-13 odd, 19-23 odd

4. Let U = {1,2,3,4,5,6,7,a,b,c,d,e}. If A = {1,2,a,e} and B = {1,2,3,4,a,b,c} find

   a. $n(A^c)$ b. $n(A \cap B^C)$ c. $n(A \cup B^c)$ d. $n(A^c \cap B^c)$

7. If $n(A) = 15$, $n(A \cap B) = 5$, and $n(A \cup B) = 30$ what is $n(B)$?

Let A and B be subsets of a universal set U and suppose N(U)= 200, n(A)= 100, n(B)= 80, and $n(A \cap B) = 40$. **Compute:**

9. a. $n(A \cup B)$ b. $n(A^c)$ c. $n(A \cap B^c)$

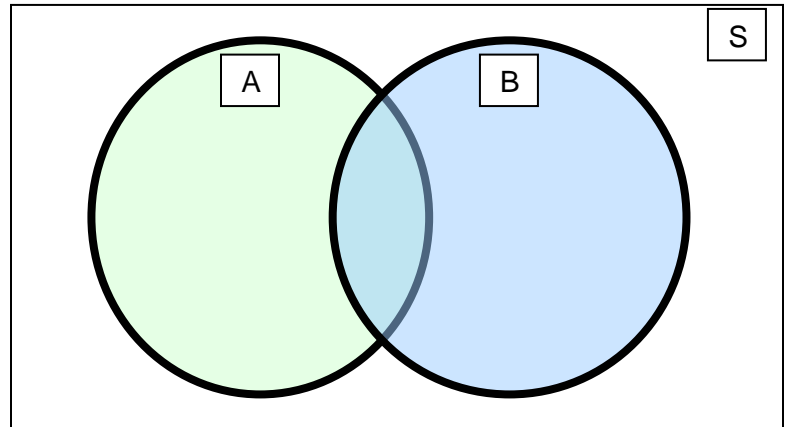13. If n(A) = 4, n(B) = 5, and n($A \cup B$) =9, find $n(A \cap B)$

Day 2 Homework

Part 1: Organize the data into the Venn Diagram given the following information and answer the questions in set notation.

S = {0, 1, 2, 3, 4, 6, 7, 8, 9, 12, 16, 24, 30, 32, 55, 64}

A = {factors of 64}

B = {factors of 24}

1. What is $A \cup B$?

2. What is $A \cap B$?

3. What is A^C?

4. What is B^C?

Part II: Answer Questions about the diagram.
        Remember to show your work for credit.

1) How many students play sports year-round?

2) How many students play sports in the spring and fall?

3) How many students play sports in the winter and fall?

4) How many students play sports in the winter and spring?

5) How many students play only one sport?

6) How many students play at least two sports?

7) How many students did not play any sports?
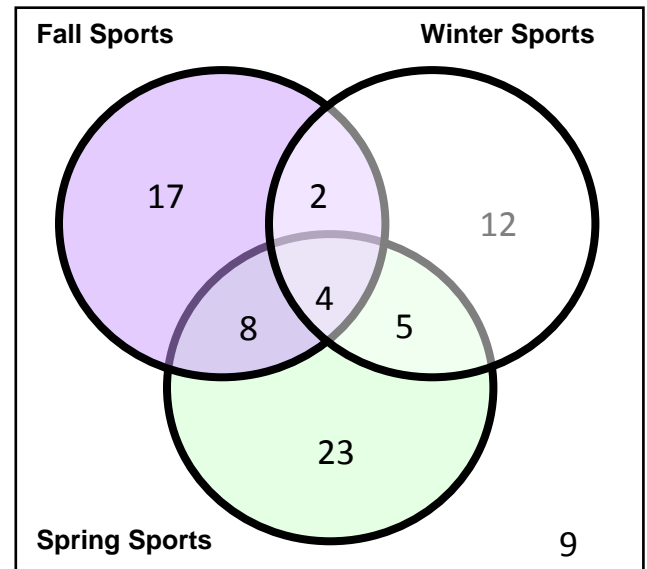
Part III: Draw and shade a Venn Diagram to represent each of the following sets.

1) $(A \cap B^c)$ 2) $C \cap (A \cup B)^c$ 3) $(A \cup B \cup C^c)$

Draw a Venn Diagram to represent the following situations and answer the questions. Remember to show work for your answers to the questions.

19. In a survey of 120 consumers conducted in a shopping mall, 80 consumers indicated that they buy brand A of a certain product, 68 buy brand B, and 42 buy both brands. How many consumers participating in the survey buy:

    A. At least one of these brands?   *B.* Exactly one of these brands?

    C. Only brand A?   *D.* None of these brands?

47. A high school is analyzing enrollment of 3 high demand senior courses. Of its 230 seniors, 135 enrolled in ICM and 125 in Statistics. 15 enrolled in only Environmental Science. Also 100 enrolled in ICM and Environmental Science, 90 signed up for both ICM and Statistics, and 110 enrolled in Statistics and Environmental Science. Eighty students enrolled in all three. Draw Venn diagram to represent these data. Then, find how many seniors…

    A. enrolled in only Statistics.   B. just signed up for ICM.

    C. enrolled in ICM and Environmental Science, but not Statistics.

    D. did not enroll in any of these three courses.   E. enrolled in exactly one of these courses

23. In a survey of 200 households regarding the ownership of desktop and laptop computers, the following information was obtained: 120 households own only desktop computers, 10 households own only laptop computers, 40 household own neither desktop nor laptop computers.

    A. How many households own both desktop and laptop computers?

    B. How many households own a desktop or a laptop computer?

Day 3 Homework

Pg. 357: 15-23 odd   Remember to show work & answer for credit. Work Ex: $_9P_6$ or 9*8*7

15. Two soups, five entrees, and three desserts are listed on the "Special" menu at the Neptune Restaurant. How many different selections consisting of one soup, one entrée, and one dessert can a customer choose from this menu?

17. To gain access to his account, a customer using an automatic teller machine (ATM) must enter a four digit code. If repetition of the same four digits is not allowed, how many possible combinations are there?

19. Over the years the state of California has used different combinations of letters of the alphabet and digits on its automobile license plates.
   A. At one time, license plates were issued that consisted of 2 letters followed by 3 digits. How many different license plates can be issued under this arrangement?

   B. Later on, license plates were issued that consisted of 3 digits followed by 3 letters. How many different license plates can be issued under this arrangement?

21. An exam consists of ten true or false questions. Assuming that every question is answered, in how many different ways can a student complete the exam? In how many ways may the exam be completed if a penalty is imposed for each incorrect answer, so that a student may leave some questions unanswered?

23. In a state lottery, there are 15 finalists eligible for the Big Money Draw. In how many ways can the first, second, and third prizes be awarded if no ticket holder may win more than one prize?

Pg. 370-371: 23-49 odd
For #23-29, classify each problem according to whether it involves a permutation or a combination and solve.
23. In how many ways can the letters of the word GLACIER be arranged?

25. As part of a quality control program, 3 cell phones are selected at random for testing from each of 100 cell phones produced by the manufacturer. In how many ways can this test batch be chosen?

27. In how many ways can nine different books be arranged on a shelf?

31. How many four letter permutations can be formed from the first four letters of the alphabet?

33. In how many ways can four students be seated in a row of four seats?

35. How many different batting orders can be formed for a nine member baseball team?

37. In how many ways can a member of a hiring committee select 3 of 12 job applicants for further consideration?

39. Find the number of distinguishable permutations that can be formed from the letter of the word ANTARCTICA.

41. In how many ways can a supermarket chain select 3 out of 12 possible sites for the construction of new supermarkets?

43. In how many ways can a quality control engineer select a sample of 3 transistors for testing from a batch of 100 transistors?

45. In how many ways can a television programming director schedule six different commercials in the six time slots allocated to commercials during a 1 hour program?

47. Weaver and Kline, a stock brokerage firm, has received six inquiries regarding new accounts. In how many ways can these inquiries be directed to its 12 account executives if each executive handles no more than one inquiry?

49. At a college library exhibition of faculty publications, three mathematics books, four social science books, and three biology books will be displayed on a shelf. (Assume that none of the books are alike.)

a. In how many ways can the ten books be arranged on the shelf?

b. In how many ways can the ten books be arranged on the shelf if books on the same subject matter are placed together?

Day 5 – Homework

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p.386-387 #7-35 odd

Let S = {1,2,3,4,5,6}, E = {2,4,6}, F = {1,3,5}, and G = {5,6}

7.   Find the event E U F U G.

9.   Find the event (E U F U G)^c

11.   Are the events E and F mutually exclusive?

13.   Are the events E and F complementary?

Let S be any sample space and E, F, and G be any three events associated with the

experiment.   Describe the given events using the symbols $\cup, \cap, {}^c$

15.   The event that E and/or F occurs.

17.   The event that G does not occur.

19.   The event that none of the events E, F and G occurs.

21.   Consider the sample space S created from an experiment consisting of casting a pair of
        dice and observing the number that falls uppermost on each die.

        a.   Determine the event that the number that falls uppermost on the first die is
                greater than the number that falls uppermost on the second die.

        b.   Determine the event that the number that falls uppermost on the second die is
                double that of the number that falls on the first die.

23.   Let S={a,b,c} be a sample space of an experiment with outcomes a, b and c. List all of the
        events of this experiment.

25.   An experiment consists of selecting a card from a standard deck of playing cards and
        noting whether it is black(B) or red(R).

        a.   Describe an appropriate sample space for this experiment.

        b.   What are the events of this experiment?

27.   An experiment consists of tossing a coin and casting a die and observing the outcomes.
        A. Describe an appropriate sample space for this experiment.
        B. Describe the event "a head is tossed and an even number is cast."

29. A die is cast and the number that falls uppermost is observed. Let E denote the event that the number shown is a 2 and let F denote the event that the number shown is an even number.

    A. Are the events E and F mutually exclusive? Explain why or why not.

    B. Are the events E and F complementary? Explain why or why not.

31. A sample of three transistors taken from a local electronics store was examined to determine whether the transistors were defective (d) or nondefective (n). What is an appropriate sample space for this experiment?

33. In a television game show, the winner is asked to select three prizes from five different prizes, A, B, C, D, and E.

    a. Describe a sample space of possible outcomes (order is not important).

    b. How many points are there in the sample space corresponding to a selection that includes A?

    c. How many points are there in the sample space corresponding to a selection that includes A and B?

    d. How many points are there in the sample space corresponding to a selection that includes either A or B?

Pg. 394 : 1-25 odd, 31, 33, 35
List the sample space associated with each of the given experiments.
1. A nickel and a dime are tossed, and the result of heads or tails is recorded for each coin.

3. An opinion poll is conducted among a group of registered voters. Their political affiliation, Democrat (D), Republican (r), or Independent (I), and their sex, male (m) or female (f), are recorded.

7. Blood tests are given as a part of the admission procedure at the Monterey Garden Community Hospital. The blood type of each patient (A, B, AB, or O) and the presence or absence of the Rh factor in each patient's blood (Rh+ or Rh-) are recorded.

Day 6 – Homework

9. The grade distribution for a certain class is shown in the following table. Find the probability distribution associated with these data

Grade:	A	B	C	D	F
Frequency of occurrence:	4	10	18	6	2
Probability distribution:	____	____	____	____	____

11. The number of cars entering a tunnel leading to an airport in a major city over a period of 200 peak hours was observed and the following data were obtained:

Number of Cars, x	Frequency of Occurrence	Empirical Probability
$0 < x \le 200$	15	
$200 < x \le 400$	20	
$400 < x \le 600$	35	
$600 < x \le 800$	70	
$800 < x \le 1000$	45	
$X > 1000$	15	

 a. Describe an appropriate sample space for this experiment.

 b. Find the empirical probability distribution for this experiment (fill in table).

13. In a poll conducted among 2000 college freshmen to ascertain the political views of college students, the accompanying data were obtained:

Political Views	A	B	C	D	E
Respondents	52	398	1140	386	24
Empirical Prob.					

Determine the empirical probability distribution associated with these data (fill in table).

17. According to Mediamark Research, 84 million out of 179 million adults in the United States correct their vision by using prescription eyeglasses, bifocals, or contact lenses. (Some respondents use more than one type.) What is the probability that an adult selected at random from the adult population uses corrective lenses?

19. According to data obtained from the National Weather Service, 376 of the 439 people killed by lightning in the United States between 1985 and 1992 were men. (Job and recreational habits of men make them more vulnerable to lightning.) Assuming that this trend holds in the future, what is the probability that a person killed by lightning:

A. Is a male?   B. Is a female?

21. According to a survey of 176 retailers, 46% of them use electronic tags as protection against shoplifting and employee theft. If one of these retailers is selected at random, what is the probability that he or she uses electronic tags as antitheft devices?

23. If 1 card is drawn at random from a standard 52 card deck, what is the probability that the card drawn is:
A. a diamond?   B. a black card?   C. an ace?

25. What is the probability of arriving at a traffic light when it is red if the red signal is flashed for 30 seconds, the yellow signal for 5 seconds, and the green signal for 45 seconds?

26.   Let E and F be two events that are mutually exclusive and suppose P(E) = 0.2 and P(F) = 0.5. Compute

$a. P(E \cap F)$

$b. P(E \cup F)$

$c. P(E^c)$

$d. P(E^c \cap F^c)$

27.   Let S = {s_1, s_2, s_3, s_4} be the sample space associated with an experiment having the probability distribution shown in the table below. If A = {s_1, s_2} and B = {s_1, s_3}, find

$a. P(A)$

$b. P(B)$

$c. P(A^c)$

$d. P(B^c)$

$e. P(A \cap B)$

$f. P(A \cup B)$

Outcome	Probability
s_1	1/8
s_2	3/8
s_3	1/4
s_4	1/4

Day 7 - Homework

Pg. 403: #1-13 odd, 25-35 odd

A pair of dice is cast, and the number that appears uppermost on each die is observed. Refer to this experiment and find the probability of the given event.

1. The sum of the numbers is an even number.   3. A pair of 1s is thrown

5. One die shows a 6, and the other is a number less than 3

An experiment consists of selecting a card at random from a 52 card deck. Refer to this experiment and find the probability of the given event.

7. A king of diamonds is drawn   9. A face card is drawn.

11. An ace is not drawn

13. Five hundred people have purchased raffle tickets. What is the probability that a person holding one ticket will win the first prize? What is the probability that he or she will not win the first prize?

29. In a survey of 2140 teachers in a certain metropolitan area, conducted by a nonprofit organization regarding teacher attitudes, the following data were obtained:

900 said that lack of parental support is a problem
890 said that abused or neglected children are problems.
680 said that malnutrition or students in poor health is a problem
120 said that lack of parental support and abused or neglected children are problems.
110 said that lack of parental support and malnutrition or students in poor health is a problem.
140 said that abused or neglected children and malnutrition or students in poor health is a problem.
40 said that lack of parental support, abused or neglected children and malnutrition or students in poor health are problems.

What is the probability that a teacher selected at random from this group said that lack of parenting support is the only problem hampering a student's schooling?
(Hint: Draw a Venn diagram)

31.   Consumer Surveys   A leading manufacturer of kitchen appliances advertised its product in two
        magazines: Good Housekeeping and the Ladies Homes Journal. A survey of 500 customers
        revealed that 140 learned of its products from Good Housekeeping, 130 learned of its products
        from the Ladies Home Journal and 80 learned of its products from both magazines. What is the
        probability that a person selected at random from this group saw the manufacturer's
        advertisement in
        a.   Both magazines?

        b.   At least one of the two magazines?

        c.   Exactly one magazine?

35.   Gun Control Laws   A poll was conducted among 250 residents of a certain city regarding
        tougher gun-control laws. The results of the poll are shown in the table:

	Own only a handgun	Own only a rifle	Own a handgun and a rifle	Own neither	Total
Favor tougher laws	0	12	0	138	150
Oppose tougher laws	58	5	25	0	88
No opinion	0	0	0	12	12
Total	58	17	25	150	250

If one of the participants in this poll is selected at random, what is the probability that he or she

a.   Favors tougher gun-control laws?   c. Owns a handgun but not a rifle?

b.   Owns a handgun?   d. Favors tougher gun-control laws and
                                                      does not own a handgun?

19. Two light bulbs are selected at random from a lot of 24, of which 4 are defective. What is the
probability that

    a) both of the light bulbs are defective?

    b) At least 1 of the light bulbs is defective?

21. A shelf in the Metro Department Store contains 80 colored ink cartridges for a popular ink-jet
     printer. Six of the cartridges are defective. If a customer selects 2 of these cartridges at
     random from the shelf, what is the probability that

    a) both are defective?

    b) at least one is defective?

Day 9 – Homework Mixed Review

p.411 #1, 3, 13-21 odd

An unbiased coin is tossed five times. Find the probability of the given event.

1. The coin lands heads all five times.

3. The coin lands heads at least once.

Assume that the probability a boy being born is the same as the probability of a girl being born. Find the probability that a family with three children will have the given composition.

13. Two boys and one girl

15. No girls

16. **Your pencil pouch contains 3 pens and 6 pencils. You draw a writing utensil at random and then put it back before drawing another one at random. Find each probability:**
a) P(2 pencils)   b) P(pen, pencil)

17. **A box contains 5 Snickers Candy bars, 7 Peppermint Patties, and 4 Butterfinger Candy bars. Without looking, your friend selects a candy bar, then you select one. Find the probability:**
a) Your friend selects a Snickers and you select   b) You both get a Butterfinger
    a Peppermint Patty

25. Five black balls and four white balls are placed in an urn. Two balls are then drawn in succession. What is the probability that the second ball drawn is a white ball if:
a. The second ball is drawn without replacing the first?

b. The first ball is replaced before the second is drawn?

27. At a certain school, 1/7 of the students play on a school sports team.
Of the students who play on a school sports team, 1/3 of them play soccer.

a. What is the probability that a student selected at random from the school plays soccer?

b. What is the probability that a student selected at random from this school plays soccer if it is known that the student plays on a school sports team?

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Day 10 Homework

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p. 424-426 # 1, 17, 18, 23, 31

1. Let A and B be events in a sample space S such that P(A) = 0.6, P(B) = 0.5, and P(A ∩B) = 0.2.
    Find:
    a) P(A|B)   b) P(B|A)

17. A pair of dice is cast. What is the probability that the sum of the numbers falling
    uppermost is less than 9, if it is known that one of the numbers is a 6?

18. A pair of dice is cast. What is the probability that the number landing uppermost on the
    first die is a 4, if it is known that the sum of the numbers falling uppermost is 7?

23. The probability that a battery will last 10 hr or more is 0.80, and the probability that it will
    last 15 or more is 0.15. Given that a battery has lasted 10 hr, find the probability that it
    will last 15 hr or more.

31. In a three-child family, what is the probability that all three children are girls given that
    one of the children is a girl?

Pg. 425-426 #11-15 odd, 25, 27, 33

11. The accompanying tree diagram represents an experiment consisting of two trials.
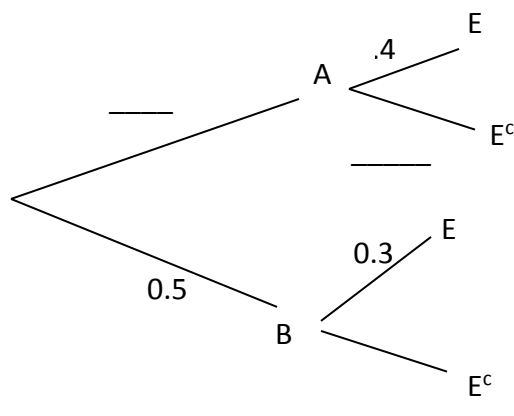
Complete the diagram. Then use it to find:

$a.\ P(A)$ $b.\ P(E|A)$

$c.\ P(A \cap E)$ $d.\ P(E)$

$e.\ Does\ P(A \cap E) = P(A) \cdot P(E)?$

$f.\ Are\ A\ and\ E\ independent\ events?$

13. An experiment consists of two trials. The outcomes of the first trial are *A* and *B* with probabilities of occurring of 0.4 and 0.6. There are also two outcomes, *C* and *D*, in the second trial with probabilities of 0.3 and 0.7. **Draw a tree diagram** representing this experiment. Use the diagram to find:

Tree Diagram:

a. $P(A)$ b. $P(C|A)$

c. $P(A \cap C)$ d. $P(C)$

15. A pair of fair dice is cast. Let *E* denote the event that the number falling uppermost in the first die is 5 and let *F* denote the event that the sum of the numbers falling uppermost is 10. Find the following:

a. $P(F)$ b. $P(E \cap F)$

c. $P(F|E)$ d. $P(E)$

e. Are E and F independent events? Explain why or why not.

33. Figures obtained from a city's police department seem to indicate that, of all motor vehicles reported as stolen, 64% were stolen by professionals, whereas 36% were stolen by amateurs. Of those vehicles presumed stolen by professionals, 24% were recovered with 48 hrs, 16% were recovered after 48 hrs, & 60% were never recovered. Of those vehicles presumed stolen by amateurs, 38% were recovered within 48 hrs, 58% were recovered after 48 hrs, and 4% were never recovered.

a. **Draw a tree diagram** representing these data.

b. What is the probability that a vehicle stolen by a professional will be recovered in 48 hrs?

c. What is the probability that a vehicle stolen in this city will never be recovered?