

Name Key
Date / /

$\frac{100}{100}$

Illowsky – Chapt. 3 & 4
Larson – Chapt. 3 & 4

Please show all work neatly and orderly for credit.

- 1) In a survey of college students, 840 said that they have cheated on an exam and 1765 said that they have not. If one college student is selected at random, find the probability that the student has cheated on an exam.

$$P(C) = \frac{840}{2605} = \boxed{.322}$$

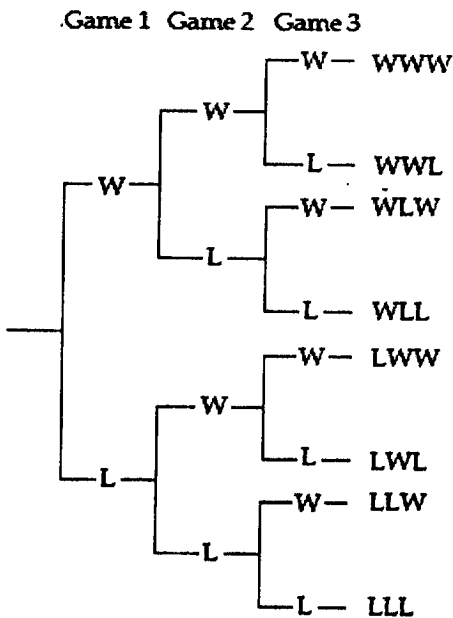
- 2) The distribution of blood types for 100 Americans is listed in the table. If one donor is selected at random, find the probability of selecting a person with blood type A+ or A-.

Blood Type	O+	O-	A+	A-	B+	B-	AB+	AB-
Number	37	6	34	6	10	2	4	1

$$P(A^+ \text{ or } A^-)$$

$$= \frac{34}{100} + \frac{6}{100} = \boxed{.400}$$

- 3) A sports team has a three game road trip. Use the tree diagram to answer the question.



$\{ WWL, WLW, LWW \}$

List the outcome(s) of the event "They win exactly two games."

Use the fundamental counting principle to solve the problem.

- 4) How many different codes of 4 digits are possible if the first digit must be 3, 4, or 5 and if the code may not end in 0?

$$\frac{3}{10} \times \frac{10}{10} \times \frac{9}{10}$$

$$\boxed{2700}$$

Provide an appropriate response.

5) A group of students were asked if they carry a credit card. The responses are listed in the table.

Class	Credit Card Carrier	Not a Credit Card Carrier	Total
Freshman	40	20	60
Sophomore	25	15	40
Total	65	35	100

If a student is selected at random, find the probability that he or she owns a credit card given that the student is a freshman. Round your answer to three decimal places.

$$P(C|F) = \frac{40}{60} = \boxed{.667}$$

6) Find the probability of answering the two multiple choice questions correctly if random guesses are made. Assume the questions each have five choices for the answer. Only one of the choices is correct.

$$\frac{1}{5} \cdot \frac{1}{5} = \frac{1}{25} = \boxed{.04}$$

7) A card is drawn from a standard deck of 52 playing cards. Find the probability that the card is an ace or a black card.

$$P(A \text{ or Black}) = \frac{4}{52} + \frac{26}{52} - \frac{2}{52} = \frac{28}{52} = \frac{7}{13} = \boxed{.538}$$

8) The table lists the smoking habits of a group of college students.

Sex	Non-smoker	Regular Smoker	Heavy Smoker	Total
Man	135	42	5	182
Woman	187	21	10	218
Total	322	63	15	400

If a student is chosen at random, find the probability of getting someone who is a man or a woman. Round your answer to three decimal places.

$$P(M \text{ or } W) = \frac{182}{400} + \frac{218}{400} = \boxed{1}$$

9) State whether the variable is discrete or continuous.
The cost of a Statistics textbook

Discrete

10) The random variable x represents the number of cars per household in a town of 1000 households. Find the probability of randomly selecting a household that has less than two cars.

Cars	Households
0	125
1	428
2	256
3	108
4	83

$$P(x < 2) = \frac{125 + 428}{1000} = \frac{553}{1000} = \boxed{.553}$$

11) An insurance actuary asked a sample of senior citizens the cause of their automobile accidents over a two-year period. The random variable x represents the number of accidents caused by their failure to yield the right of way. Use the frequency distribution to construct a probability distribution.

Accidents	0	1	2	3	4	5
Senior Citizens	4	3	12	3	2	1

x	$P(x)$
0	.16
1	.12
2	.48
3	.12
4	.08
5	.04

12) Determine whether the distribution represents a probability distribution. If not, identify any requirements that are not satisfied.

x	$P(x)$
3	-0.3
6	0.5
9	0.1
12	0.3
15	0.4

No, $P(3) = -.3 \notin [0, 1]$

13) At a raffle, 10,000 tickets are sold at \$5 each for three prizes valued at \$4,800, \$1,200, and \$400. What is the expected value of one ticket?

Gain

x	$P(x)$
4795	$\frac{1}{10,000}$
1195	$\frac{1}{10,000}$
395	$\frac{1}{10,000}$
-5	$\frac{9997}{10000}$

$$\Rightarrow \boxed{\$ -4.36}$$

- 14) Decide whether the experiment is a binomial experiment. If it is not, explain why. Surveying 250 prisoners to see how many crimes in which they were convicted. The random variable represents the number of crimes in which each prisoner was convicted.

NO. More Than 2 outcomes

- 15) Find the mean of the binomial distribution for which $n = 40$ and $p = 0.2$.

$$\mu = np = 40(.2) = 8$$

- 16) In a recent survey, 80% of the community favored building a police substation in their neighborhood. If 15 citizens are chosen, what is the mean number favoring the substation?

$$\mu = np = (15)(.80) = \boxed{12}$$

- 17) The probability that an individual is left-handed is 0.16. In a class of 10 students, what is the mean and standard deviation of the number of left-handers in the class?

$$p = .16, q = .84, n = 10$$

$$\mu = n \cdot p = \boxed{1.6}$$

$$SD = \sqrt{npq} = \sqrt{(10)(.16)(.84)} = \boxed{1.159}$$

- 18) Fifty percent of the people that get mail-order catalogs order something. Find the probability that exactly two of 10 people getting these catalogs will order something.

$$p = .5, q = .5, x = 2, n = 10$$

$$P(2) = {}_{10}C_2 (.5)^2 (.5)^8 = \boxed{.044}$$

- 19) A company ships computer components in boxes that contain 90 items. Assume that the probability of a defective computer component is 0.21. Find the probability that the first defect is found in the seventh component tested. Round your answer to four decimal places.

$$(.79)^6 (.21) = \boxed{.0510}$$

- 20) A sales firm receives an average of four calls per hour on its toll-free number. For any given hour, find the probability that it will receive exactly nine calls. Use the Poisson distribution.

$$\mu = 4$$

$$P(x=9) = \frac{4^9 e^{-4}}{9!} = \boxed{.013}$$