

Module 4 Unit 8 Test Review

Directions: Show all work. Round answers to the nearest thousandth unless otherwise indicated.

- 1) Consider the following table taken from *The Practice of Statistics*, p. 216, about years of education completed by age.

	25 to 34	35 to 54	55 & over	Total
Did not complete high school	5325	9152	16035	30512
Completed high school	14061	24070	18320	56451
1 to 3 years of college	11659	19926	9662	41247
4 or more years of college	10342	19878	8005	38225
Total	41387	73026	52022	166435

If a person is chosen at random from this population, what is the probability that the person:

- is between 25 and 34 years of age?
 - is between 25 and 34 years of age **and** 55 & over years of age?
 - is between 25 and 34 years of age **or** 55 & over years of age?
 - is between 25 and 34 years of age **and** has completed 1 to 3 years of college?
 - is 35 to 54 years of age **or** has 4 or more years of college?
 - If the person is 55 & over years of age, what is the probability that they completed 1 to 3 years of college?
- 2) A rocket being launched has three engines that are independent of each other. The probability of an engine firing is .97. What is the probability of at least one engine not firing?

- 3) Student Life at a college did a survey asking students if they were part-time or full-time students. Another question was if the student voted or not in the most recent student elections. The results follow:

There are 90 students

25 are not full-time and did not vote

50 are full-time

35 did no vote

- a) Use the information to fill in the two-way table to the right.

	Full-time	Not Full-time	Total
Voted			
Did not vote			
Total			

If a student is selected at random, what is the probability that

- the student voted in the most recent election?
- the student voted in the most recent election or is not a full-time student?
- A full-time student voted in the most recent election?
- Are "voted" and "full-time student" independent? Justify.

For questions 4-8, create a Venn Diagram OR hypothetical 1,000 table to answer each question. You may choose which to use, but you must use either one or both for the exam.

4) The probability that a football player weighs more than 230 pounds is 0.69, that he is at least 75 inches tall is 0.55, and that he weighs more than 230 pounds and is at least 75 inches tall is 0.43. Find the probability that he is at least 75 inches tall if he weighs more than 230 pounds.

5) Of voters in a recent election, 57% were male, 64% were Democrat, and 35% were both male and Democrat.

- a) What is the probability that a voter chosen at random is female?
- b) What is the probability that a voter chosen at random is either male or Democrat?
- c) Is being male or Democrat independent of each other?
- d) If 2200 voters were chosen at random, approximately how many would be female non-Democrats?

6) If the $P(A) = .5$, $P(B) = .6$, and $P(A \text{ or } B) = .85$, then what is

- a) $P(A \& B)$?
- b) $P(A|B)$?
- c) $P(B|A)$?
- d) $P(A^c|B)$
- e) $P(A \cup B^c)$

7) According to the American Pet Products Manufacturers Association (APPMA) 2003-2004 National Pet Owners Survey, 39% of U.S. households own at least one dog and 34% of U.S. households own at least one cat. Assume 21% of U.S. households own a cat but not a dog.

- a) What is the probability that a randomly selected U.S. household owns neither a cat nor a dog?
- b) What is the probability that a randomly selected U.S. household owns both a cat and a dog?
- c) What is the probability that a randomly selected U.S. household owns a cat if the household has a dog?
- d) Are "having at least one dog" and "having at least one cat" disjoint? Explain.
- e) Are "having at least one dog" and "having at least one cat" independent? Justify.

8) If $P(A) = 0.65$ and $P(B) = 0.24$ and $P(A \cap B) = 0.156$, find the following:

- a) $P(A \cup B) =$
- b) $P(B|A) =$
- c) $P(B^c \cap A^c)$
- d) Are A and B disjoint events? Why or why not?
- e) Are A and B independent? Why or why not?

9) If $P(K) = 0.71$, $P(R) = 0.23$ and K and R are independent, what is the probability of K and R?

10) Use the spinner to the right for the questions that follow. Assume each of the 6 sections are of equal size.

- a) $P(\text{even})$
- b) $P(1)$
- c) $P(\text{odd})$
- d) $P(\text{not } 4)$
- e) $P(2 \text{ or } 3)$
- f) What is the probability of landing on 4 three times in a row?
- g) If you spin twice, what is the probability that the sum of the two spins will be 5?
- h) You just landed on 1 twice in a row. On the next spin, what is the probability of landing on 1?



11) You roll a die twice. What is the probability that the sum of the two rolls is 6?

Answers

- 1a. 0.249 b. 0 c. 0.561 d. 0.071 e. 0.549 f. 0.186
2. 0.087
3. a. See Teacher b. 0.611 c. 0.722 d. 0.8 e. No $P(\text{Voted}) = .611, P(\text{Voted}|\text{Full-Time}) = .8$
4. 0.623
- 5a. 0.43 b. 0.86 c. No $P(\text{Male}) = .57, P(\text{Male}|\text{Democrat}) = .547$ d. 418
- 6a. 0.15 b. 0.25 c. 0.3 d. 0.75 e. 0.55
- 7a. 0.4 b. 0.13 c. 0.333 d. No. There are people that are in both groups
- e. No. $P(\text{Cat}) = .34, P(\text{Cat}|\text{Dog}) = .333$
- 8a. 0.734 b. 0.65 c. 0.266 d. No. $P(A \cap B) \neq 0$ e. No $P(B) = .24, P(B|A) = .65$
9. 0.163
- 10a. 0.5 b. 0.333 c. 0.333 d. 0.667 e. 0.333 f. 0.012
- g. 0.278 h. 0.333
11. 0.139