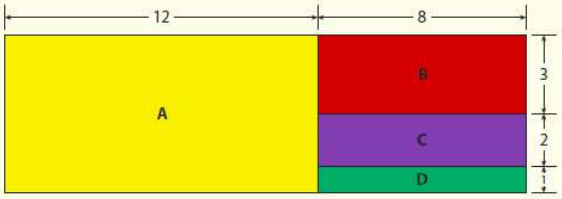
Ch. 14 Review Pg. 521 1-14

Chapter 14 Test Review

Fill in the blank.

1. Theoretical probability is determined using mathematical methods and the fairness of coins, spinners, number cubes, etc.
2. Experimental probability is determined by performing experiments and making observations about their outcomes.
3. Two events are independent if the occurrence of one does not affect the occurrence of the other.

4. The probability that an event M will occur given that some other event N also occurs is called the conditional probability of M given N.
5. A dart is thrown at the target shown below.



What is the probability it will land in region C?

Total Area $= 20 \cdot 6 = 120\ u^2$

$\text{Area}_C = 8 \cdot 2 = 16\ u^2$

$P(A_C) = \frac{16}{120} = \frac{2}{15}$

6. Veteran's Day is celebrated on its original date (November 11), rather than always on a Monday. In any arbitrary year, what is the probability that Veteran's Day will be on a weekend?

$\frac{2}{7} \approx .286 \approx 28.6\%$

7. A quality control engineer for a toy company tested 800 computer games and found 3 to be defective.
   a. Based on these findings, what is the probability that a computer game manufactured by this company will be defective?
   b. The company plans to make 500,000 computer games this year. Based on these findings, how many computer games can be expected to be defective?

$\frac{3}{800} = .00375$ or $.375\%$

$\frac{3}{800} * 500{,}000 = 1{,}875$ games def.

8. A group of students designed a board game with a spinner that is divided into four equal sections: 1, 2, 3, and "Lose a Turn." To help them determine the number of times a player would spin "Lose a Turn" in 10 spins, they conducted an experiment. In the experiment, one trial consisted of 10 spins. Look at the table. The third row, for example, shows that students spun "Lose a Turn" 2 times in 11 of their 50 trials. Based on the results of the experiment, what is the probability that a player will spin "Lose a Turn" 3 or more times in a trial?

Number of Times a "Lose a Turn" Was Spun in a Trial of 10 Spins	Number of Trials
0	5
1	12
2	11
3	15
4	4
5	2
6	0
7	1
8	0
9	0
10	0
Total number of trials	50

$P(\text{spin} \geq 3) = 1 - P(\text{spin } 0 \text{ or } 1 \text{ or } 2)$

$= 1 - \left(\frac{5}{50} + \frac{12}{50} + \frac{11}{50}\right)$

$= \frac{50}{50} - \frac{28}{50}$

$= \frac{22}{50}$

$= \frac{11}{25}$ or 44%

9. If you randomly guess at the answer to a multiple-choice test question for which there are five answer choices, what is the probability that you will guess correctly? What is the probability that you will guess incorrectly?

$P(\text{correct}) = \frac{1}{5}$

$P(\text{incorrect}) = 1 - \frac{1}{5} = \frac{4}{5}$

10. What is the complement of rolling a 5 on a number cube that is labeled 1–6?

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$P(\text{incorrect}) = 1 - \frac{1}{5} = \frac{4}{5}$

Rolling a 1, 2, 3, 4, or 6

11. A card is drawn from a standard deck of 52 cards. What is $P(\text{even-numbered card}|\text{spade})$?

$$\frac{P(\text{even \# } \cap \text{ spade})}{P(\text{spade})} = \frac{5 \ (2,4,6,8,10)}{13}$$

12. A coin is flipped 3 times.

a. Are these events independent or dependent?

b. Find the probability of getting tails each time.

$P(T) = \left(\frac{1}{2}\right)^3 = \frac{1}{8}$

13. A large jar is filled with bills of different denominations. If a person draws two $100 bills in succession without looking, he will receive the entire jar of bills. The jar contains the following number of bills.

Bill Value	Number of Bills
$100	2
$20	10
$10	20
$5	50
$1	100

Total # of bills = 182

What is the probability of drawing two $100 dollar bills in succession without replacement?

$P(2 \text{ \#100}) \text{ w/o replacement} = \frac{2}{182} \cdot \frac{1}{182}$

$= \frac{2}{33124}$

$= \frac{1}{16562}$ or a .00006 or a .006%

boo... not good! 😐

14. Two jeeps are used on a humanitarian mission that is expected to take 150 hours. The motor in each jeep has a 0.94 probability of lasting 150 hours. The mission can succeed if at least one of the jeeps completes the mission. What is the probability that the motor in at least one of the two jeeps lasts for the entire mission?

P(at least 1 motor lasts) = 1 − P(both motors fail)

= 1 − (.06 * .06)

= 1 − .0036

= .9964 or 99.64% yay! very good 😊

Motor #2 \ Motor #1	S	F
S	$(.94)^2$ .8836	(.94)(.06) .05604
F	.05604	.0036