Name: Key Class: ______ Date: ______ ID: A

Chapter 5 Review

Multiple Choice
Identify the choice that best completes the statement or answers the question.

B 1. Three events, A, B, and C, are all equally likely. If there are no other possible events, which of the following statements is true?

A. $P(A) = 0$
B. $P(B) = \frac{1}{3}$ ✓
C. $P(C) = 1$
D. $P(A) = 3$

D 2. Tia notices that yogurt is on sale at a local grocery store. The last eight times that yogurt was on sale, it was available only three times. Determine the odds against yogurt being available this time.

5:3

A. 3 : 5
B. 3 : 8
C. 5 : 8
D. 5 : 3 ✓

A 3. Julie draws a card at random from a standard deck of 52 playing cards. Determine the probability of the card being a diamond.

$\frac{13}{52}$

A. 0.250 ✓
B. 0.500
C. 0.625
D. 0.750

A 4. The weather forecaster says that there is a 50% probability of showers tomorrow. Determine the odds against showers.

$\frac{50}{100}$ 50:50

A. 1 : 1 ✓
B. 5 : 10
C. 2 : 1
D. 1 : 2

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B 5. A credit card company randomly generates temporary three-digit pass codes for cardholders. The pass code will consist of three different even digits. Determine the total number of pass codes using three different even digits. 0, 2, 4, 6, 8

$_nP_r = \frac{n!}{(n-r)!}$

A. $_5P_5$
(B.) $_5P_3$ ✓ $5 \times 4 \times 3 = {_5P_3} = \frac{5!}{2!}$
C. $_5P_4$
D. $_5P_1$

B 6. Four boys and three girls will be riding in a van. Only two people will be selected to sit at the front of the van. Determine the probability that there will be equal numbers of boys and girls sitting at the front.

specific / total: $\frac{_4C_1 \, _3C_1}{_7C_2} = \frac{\frac{4!}{1!3!} \times \frac{3!}{1!2!}}{\frac{7!}{2!5!}} = \frac{12}{21}$

A. 53.07%
(B.) 57.14% ✓
C. 59.36%
D. 62.23%

D 7. Yvonne tosses three coins. Determine the probability that at least one coin will land as heads.

(so not all tails) ↑ 1 chance of this

$\frac{7}{8}$

$2 \times 2 \times 2 = 8$ ways of landing

$8 - 1 = 7$ $\frac{7}{8} =$

A. 12.5%
B. 37.5%
C. 62.5%
(D.) 87.5% ✓

C 8. Jake and Agnes are playing a board game. If a player rolls a sum greater than 9 or a multiple of 6, the player gets a bonus of 50 points. Determine the probability of rolling a multiple of 6.

A. $\frac{1}{18}$
B. $\frac{1}{9}$
(C.) $\frac{1}{6}$ ✓
D. $\frac{1}{3}$

+	1	2	3	4	5	6
1					6	7
2				6		
3			6			
4		6				
5	6					
6						12

$\frac{6}{36} = \frac{1}{6}$

A 9. Two dice are rolled. Let A represent rolling a sum greater than 10. Let B represent rolling a sum that is a multiple of 2. Determine $n(A \cap B)$. intersection

(A.) 1 ✓
B. 3
C. 11
D. 18

+	1	2	3	4	5	6
1	2		4		6	
2		4		6		8
3	4		6		8	
4		6		8	9	10
5	6		8	9	10	11
6		8		10	11	12

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D 10. Select the events that are mutually exclusive.

- **A.** Drawing a red card or drawing a diamond from a standard deck of 52 playing cards. —are red
- **B.** Rolling a sum of 8 or rolling an even number with a pair of six-sided dice, numbered 1 to 6. —13 even
- **C.** Drawing a black card or drawing a Queen from a standard deck of 52 playing cards. —2 Q's are black
- **D.** Drawing a 3 or drawing an even card from a standard deck of 52 playing cards. —not even

B 11. Helen is about to draw a card at random from a standard deck of 52 playing cards. Determine the probability that she will draw a black card or a spade.

spades are black

$\frac{26}{52}$

- **A.** $\frac{1}{4}$
- **B.** $\frac{1}{2}$ ✓
- **C.** $\frac{29}{52}$
- **D.** $\frac{5}{6}$

A 12. Brian rolls a regular six-sided red die and a regular six-sided black die. If the red die lands on 5 and the sum of the two dice is greater than 9, Brian wins a point. Determine the probability that Brian will win a point.

red 5, black 5 6

$\frac{1}{6} \times \frac{2}{6} = \frac{2}{36} =$

- **A.** $\frac{1}{18}$ ✓
- **B.** $\frac{1}{3}$
- **C.** $\frac{2}{5}$
- **D.** $\frac{1}{2}$

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D 13. Misha draws a card from a well-shuffled standard deck of 52 playing cards. Then he puts the card back in the deck, shuffles again, and draws another card from the deck. Determine the probability that both cards are even numbers. 2,4,6,8,10 → 5×4 suits = 20

A. $\frac{1}{100}$
B. $\frac{3}{45}$
C. $\frac{6}{15}$
D. $\frac{25}{169}$ ✓

$$\frac{\cancel{20}^{5}}{\cancel{52}_{13}} \times \frac{\cancel{20}^{5}}{\cancel{52}_{13}} = 0.1479$$
$$= \frac{25}{169}$$

C 14. Select the events that are dependent.

A. Rolling a 2 and rolling a 5 with a pair of six-sided dice, numbered 1 to 6. ×
B. Drawing an odd card from a standard deck of 52 playing cards, putting it back, and then drawing another odd card. ×
✓ C. Drawing a spade from a standard deck of 52 playing cards and then drawing another spade, without replacing the first card. ✓
D. Rolling an even number and rolling an odd number with a pair of six-sided dice, numbered 1 to 6. ×

B 15. Anthony has three loonies, four toonies, and seven quarters in his pocket. He needs two toonies for a parking meter. He reaches into his pocket and pulls out two coins at random. Determine the probability that both coins are toonies. = 14 coins

A. 2.1%
✓ B. 6.6%
C. 9.2%
D. 12.7%

$$\frac{4}{14} \times \frac{3}{13} = \frac{12}{182} = 0.066$$

$$\left(\frac{{}_4C_2}{{}_{14}C_2} = \frac{\frac{4!}{2!2!}}{\frac{14!}{2!12!}} = \frac{6}{91} = 0.066\right)$$

B 16. A five-colour spinner is spun, and a die is rolled. Determine the probability that you spin yellow and roll a 6.

A. 2.42%
B. 3.33% ✓
C. 6.13%
D. 7.75%

$$\frac{1}{5} \times \frac{1}{6} = \frac{1}{30}$$

D 17. There are 20 cards, numbered 1 to 20, in a box. Two cards are drawn, one at a time, with replacement. Determine the probability of drawing an even number then drawing a number that is a multiple of 4.

even ×4

$\frac{10}{20} \times \frac{5}{20} = \frac{50}{400} = 0.125$

A. 8.8%
B. 9.3%
C. 10.7%
D. 12.5% ✓

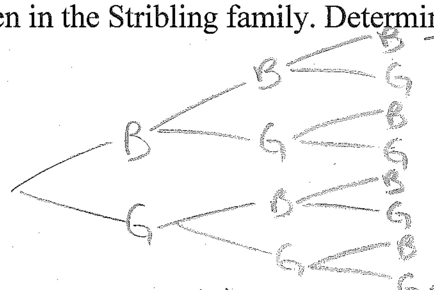
C 18. Select the independent events.

$P(A \cap B) = P(A) \cdot P(B)$ if they are independent

A. $P(A) = 0.67$, $P(B) = 0.12$, and $P(A \cap B) = 0.086$ × $P(A) \cdot P(B) = 0.0804$
B. $P(A) = 0.83$, $P(B) = 0.4$, and $P(A \cap B) = 0.378$ × 0.332
C. $P(A) = 0.4$, $P(B) = 0.91$, and $P(A \cap B) = 0.364$ ✓ 0.364
D. $P(A) = 0.2$, $P(B) = 0.32$, and $P(A \cap B) = 0.046$ × 0.0233

A 19. There are three children in the Stribling family. Determine the probability that all the children are girls.

A. 12.5% ✓
B. 25%
C. 37.5%
D. 50%



8 varieties of genders

all girls ← 1 chance for all girls

$\frac{1}{8} = 0.125$

or $2 \cdot 2 \cdot 2 = 8$ total
1 way for all girls
$P = \frac{1}{8}$

Short Answer

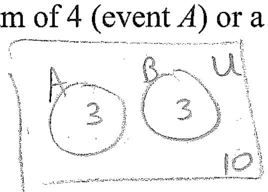
1. Jean and Kira have invented a game:
   - Two people play.
   - For each turn, both players roll a die.
     - Player 1 scores a point in the sum of the two numbers is even.
     - Player 2 scores a point in the sum of the two numbers is odd.
   - A game consists of 10 turns.

   Is their game fair? If it is not fair, which player has the advantage? (1)

2. Teresa notices that bagels are on sale at a local grocery store. The last four times that bagels were on sale, they were available only once. Determine the odds in favour of bagels being available this time. (1)

   1 : 3
   avail : not avail

3. Brett is playing a board game. He must roll two four-sided dice, numbered 1 to 4. He can move if he rolls a sum of 4 (event A) or a sum of 6 (event B). Draw a Venn diagram to represent the two events. (3)



+	1	2	3	4
1			4	
2		4		6
3	4		6	
4		6		

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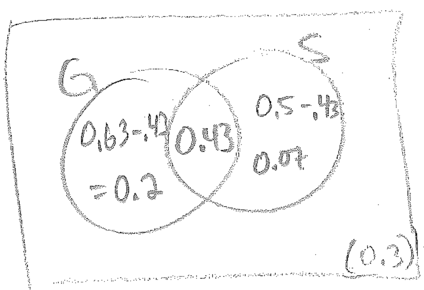
4. The probability that Eva will go to the gym on Saturday is 0.63. The probability that she will go shopping on Saturday is 0.5. The probability that she will do neither is 0.3. Determine the probability that Eva will ~~do at least one of these activities~~ only go to the gym (not shop) on Saturday. 0.2 (4) & Draw a Venn Diagram

5. A heart is drawn from a well-shuffled standard deck of 52 playing cards. Another card is drawn from the deck without replacing the first card. Are the two events dependent or independent? ✓ (1)

6. A computer manufacturer knows that, in a box of 100 computer chips, 2 will be defective. Eric will draw 2 chips at random, from a box of 100. Draw a tree diagram and determine, to six decimal places, the probability that Eric will draw 2 defective chips. 0.000202 ✓ (3)

4.



$0.63+0.5+0.3 = 1.43$

0.43 overlap

then subtract from G and S to get new values

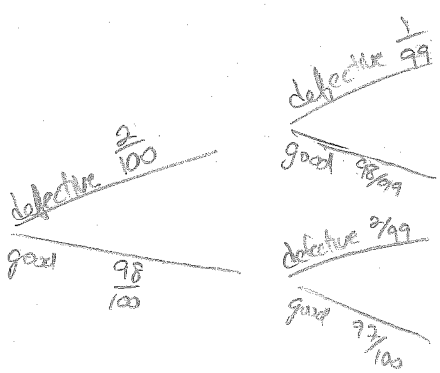
G only = 0.2

or

$1-0.5-0.3 = 0.2$

$0.3+0.2+0.43+0.07 = \underline{1.0}$ check

6.



$\rightarrow \frac{2}{100} \times \frac{1}{99} = 0.000202$ ✓