UNIT 7

Probability: $P = \frac{ASK}{Total}$

Symbols: $\cup$ = OR (add)
$\cap$ = And (multiply)

$P(A \text{ and } B) = P(A) \cdot P(B)$

$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$
* subtract out duplicates

$P(A|B) = \frac{P(A \text{ and } B)}{P(B)}$

UNIT 7 – EOCT Review Name: _____

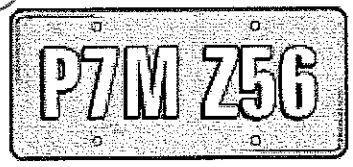
1. **In a particular state, the first character on a license plate is always a letter. The last character is always a digit from 0 to 9.**

   If V represents the set of all license plates beginning with a vowel, and O represents the set of all license plates that end with an odd number, which license plate belongs to the set $V \cap O'$?

A. 

B. 

C. 

D. 

2. **Which of the following events are independent given $P(A)$, $P(B)$, and $P(A \text{ and } B)$?**

X **A.** $P(A) = 0.25$; $P(B) = 0.25$; $P(A \text{ and } B) = 0.5$ $0.25(0.25) = 0.0625$

X **B.** $P(A) = 0.08$; $P(B) = 0.4$; $P(A \text{ and } B) = 0.12$ $0.08(0.4) = 0.032$

X **C.** $P(A) = 0.16$; $P(B) = 0.24$; $P(A \text{ and } B) = 0.32$ $0.16(0.24) = 0.0384$

D. $P(A) = 0.3$; $P(B) = 0.15$; $P(A \text{ and } B) = 0.045$ $0.3(0.15) = 0.045$ ✓

3. **Assume that the following events are independent:**

   - **The probability that a high school senior will go to college is 0.72.**
   - **The probability that a high school senior will go to college and live on campus is 0.46.**

   What is the probability that a high school senior will live on campus, given that the person will go to college?

A. 0.26

B. 0.33

C. 0.57

D. 0.64

college = .72

college / live on campus = .46

P(live on campus out of all college)

$\frac{.46}{.72} = .638$

4. **A random survey was conducted about gender and hair color. This table records the data.**

Hair Color

	Brown	Blonde	Red
Male	548	876	82
Female	612	716	66

only use males

What is the probability that a randomly selected person has blonde hair, given that the person selected is male?

A. 0.51

B. 0.55

C. 0.58

D. 0.63

$\frac{\text{Blond}}{\text{males}} = \frac{876}{1506} = .58$

5. **Mrs. Klein surveyed 240 men and 285 women about their vehicles. Of those surveyed, 155 men and 70 women said they own a red vehicle. If a person is chosen at random from those surveyed, what is the probability of choosing a woman or a person that does NOT own a red vehicle?**

A. $\frac{14}{57}$

B. $\frac{71}{105}$

C. $\frac{74}{105}$

D. $\frac{88}{105}$

men = 240; 155 have a red car

women = 285; 70 have a red car

525 total; 225 total with a red car

women: $\frac{285}{525}$ + don't have red car: $\frac{300}{525}$ − women without red car: $\frac{215}{525}$ = $\frac{74}{105}$

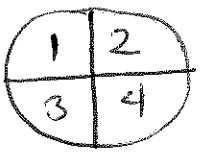
6. **Bianca spins two spinners that have four equal sections numbered 1 through 4. If she spins a 4 on at least one spin, what is the probability that the sum of her two spins is an odd number?**

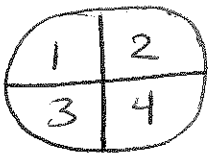
A. $\frac{1}{4}$

B. $\frac{7}{16}$

C. $\frac{4}{7}$

D. $\frac{11}{16}$





prob given / ask total

11 21 31 41
12 22 32 42
13 23 33 43
14 24 34 44

$\frac{4}{7}$

7. **Each letter of the alphabet is written on a card using a red ink pen and placed in a container. Each letter of the alphabet is also written on a card using a black ink pen and placed in the same container. A single card is drawn at random from the container. What is the probability that the card has a letter written in black ink, the letter A, or the letter Z?**

A. $\frac{1}{2}$

B. $\frac{7}{13}$

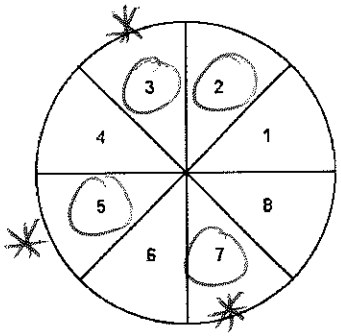
C. $\frac{15}{26}$

D. $\frac{8}{13}$

$= \frac{26}{52} + \frac{1}{52} + \frac{1}{52}$ ← remember the back A and Z were counted already so only count the reds.

$= \frac{28}{52} = \frac{7}{13}$

8. You spin a spinner with 8 equally likely landing spaces numbered 1 to 8. Event *A* is landing on a prime number. Event *B* is landing on an odd number. What is the intersection of *A* and *B*?



Ⓐ ∅
Ⓑ {3, 5, 7}
Ⓒ {1, 2, 3, 5, 7}
Ⓓ {1, 2, 3, 4, 5, 6, 7, 8}

9. For two independent events *A* and *B*, $P(A) = 0.5$ and $P(B) = 0.4$. What is $P(A \text{ and } B)$?

Ⓐ 0.1
Ⓑ 0.2
Ⓒ 0.8
Ⓓ 0.9

$.5(.4) = .20$

10. In a bag of 20 candies, 12 are red and 15 have peanuts in them. If the events of picking a red candy and picking a candy with peanuts are independent, how many of the red candies have peanuts?

Ⓐ 3
Ⓑ 6
Ⓒ 9
Ⓓ 12

$\frac{12}{20} \cdot \frac{15}{20} = \frac{9}{20}$

11. Suppose events *A* and *B* are independent, $P(A) = 0.75$, and $P(B) = 0.5$. What is $P(A \mid B)$, the probability of *A* given *B*?

use formula on formula sheet

Ⓐ 0.25
Ⓑ 0.375
Ⓒ 0.5
Ⓓ 0.75

$\frac{.75(.5)}{.5} = .75$

12. Darren randomly chooses a card from a standard deck of 52 playing cards. What is the probability that Darren chooses a club or a queen?

Ⓐ $\frac{4}{52}$
Ⓑ $\frac{13}{52}$
Ⓒ $\frac{16}{52}$
Ⓓ $\frac{17}{52}$

$\frac{13}{52} + \frac{4}{52} - \frac{1}{52} = \frac{16}{52}$

CONSTRUCTED RESPONSE

1. A fair number cube is rolled two times. Are the events that the first roll is an even number and the second roll is a 6 independent? Justify your answer.

yes... the first roll does not influence the second roll.

2. 16 cards numbered 1 through 16 are placed face down and Stephanie chooses one at random. What is the probability that the number on Stephanie's card is less than 5 or greater than 10? Show your work.

$\frac{4}{16} + \frac{6}{16} = \frac{10}{16} = \frac{5}{8} = .625$

3. Two-way frequency tables summarize data in two categories. These tables can be used to show if the two events are independent and to approximate conditional probabilities.

A random survey was taken to gather information about grade level and car ownership status of students at a school. This table shows the results of the survey.

Car Ownership by Grade

	Owns a Car	Does Not Own a Car	Total
Junior	6	10	16
Senior	12	8	20
Total	18	18	36

Estimate the probability that a randomly selected student will be a junior, given that the student owns a car.

$\frac{6 \text{ junior}}{18 \text{ own car}} = \frac{1}{3}$ or .33