

Accelerated Geom/Alg 2
Probability Review

Name: _____
Date: _____ Period: _____

MGSE9-12.S.CP.1 Describe categories of events as subsets of a sample space using unions, intersections, or complements of other events (*or*, *and*, *not*).

MGSE9-12.S.CP.7 Apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answers in context.

Multiple-Choice: Choose the best answer.

- Mrs. Rendon chose a day of the week as cleaning day, and it ended up on a weekday. Which of the following events is the complement of this event?
 - Monday
 - Wednesday
 - Any month
 - D. The day is a weekend

- The following balls are placed in an urn: 8 red, 3 yellow, 1 blue, and 6 green. One ball is randomly drawn from the urn. What is the probability that the ball is either red or green?
 - $1/3$
 - $2/9$
 - $4/9$
 - D. $7/9$

Short-Answer: Write answers clearly and concisely. Show all work. Round all answers to the hundredths place.

3. The lattice diagram below represents the sample space for the two dice thrown.

Dice Lattice

(1,1)	(1,2)	(1,3)	(1,4)	(1,5)	(1,6)
(2,1)	(2,2)	(2,3)	(2,4)	(2,5)	(2,6)
(3,1)	(3,2)	(3,3)	(3,4)	(3,5)	(3,6)
(4,1)	(4,2)	(4,3)	(4,4)	(4,5)	(4,6)
(5,1)	(5,2)	(5,3)	(5,4)	(5,5)	(5,6)
(6,1)	(6,2)	(6,3)	(6,4)	(6,5)	(6,6)

a. Explain why there are 36 possible outcomes.

$$6 \times 6 = 36$$

b. Using your lattice, find the probability that the sum of two die rolled will be 11.

$$\frac{2}{36} = \frac{1}{18}$$

c. Using your lattice, determine the probability that the sum of the numbers rolled is either an odd number or the first die is even.

$$\frac{27}{36} = \frac{3}{4}$$

4. A card is chosen from a standard deck of 52 cards. The drawer is looking for clubs and face cards. There are 13 club cards and of those club cards, 3 are face cards. There are 40 cards that do not have a face card and of those cards.

a. Construct the two-way frequency table below.

	Club	Not a Club	Total
Face card	3	9	12
Not a face card	10	30	40
Total	13	39	52

b. Find $P(\text{Club})$ $\frac{13}{52} = \frac{1}{4}$

c. Find $P(\text{Club} \cap \text{Face Card})$ $\frac{3}{52}$

d. Find $P(\text{Not a Club} \cup \text{Not a Face Card})$

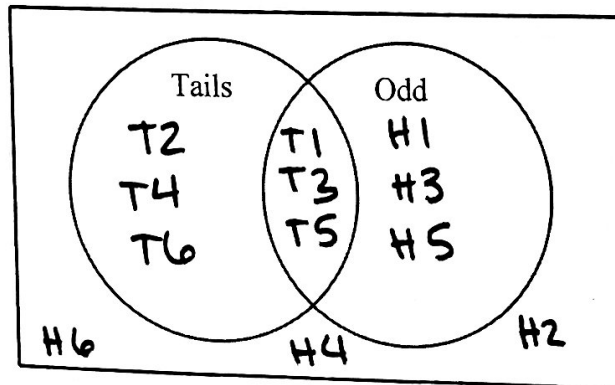
$$\frac{49}{52}$$

5. You flip a coin and roll a die at the same time. Be sure to use set notation when needed.

a. List the sample space (all possible outcomes). Use set notation.

$\{H1, H2, H3, H4, H5, H6, T1, T2, T3, T4, T5, T6\}$

b. Create a Venn diagram with the sample space above using the outcomes of tails and odd.



Let set A be the outcomes of tails and set B be the outcomes of odd.

c. Find $A \cap B$. $\{T1, T3, T5\}$

d. What does the set $A \cup B$ represent?

all outcomes of tails OR odd.

e. What does the set $(A \cup B)'$ represent?

all outcomes not tails or odd.

MGSE9-12.S.CP.2 Understand that if two events A and B are independent, the probability of A and B occurring together is the product of their probabilities, and that if the probability of two events A and B occurring together is the product of their probabilities, the two events are independent.

MGSE9-12.S.CP.3 Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$. Interpret independence of A and B in terms of conditional probability; that is the conditional probability of A given B is the same as the probability of A and the conditional probability of B given A is the same as the probability of B .

MGSE9-12.S.CP.4 Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. *For example, use collected data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.*

MGSE9-12.S.CP.5 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. *For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.*

MGSE9-12.S.CP.6 Find the conditional probability of A given B as the fraction of B 's outcomes that also belong to A , and interpret the answer in context

Multiple-Choice: Choose the best answer.

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

A. $P(A) = 0.65$; $P(B) = 0.06$; $P(A \text{ and } B) = 0.71$

B. $P(A) = 0.6$; $P(B) = 0.18$; $P(A \text{ and } B) = 0.78$

C. $P(A) = 0.09$; $P(B) = 0.15$; $P(A \text{ and } B) = 0.014$

D. $P(A) = 0.2$; $P(B) = 0.24$; $P(A \text{ and } B) = 0.48$

0.0135 rounded

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

	Brown	Blonde	Red
Male	548	876	82
Female	612	716	66

What is the percent that a randomly selected person has brown hair, **given** that the person selected is female?

A. 42%

B. 53%

C. 44%

D. 22%

$$\frac{612}{1394}$$

8. Assume the following events are independent:

- The probability that a high school senior will go to college is 0.82
- The probability that a high school senior will go to college and live on campus is 0.45

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

A. 0.37

B. 0.37

C. 0.55

D. 0.64

9. Which of the following events would be considered independent?

A. The time it took you to drive to school and the amount of traffic.

B. Your science grade and your art grade.

C. The amount of money spent on clothes and the amount of money in your wallet.

D. Your GPA in high school and the college acceptance.

10. There are 20 socks in a drawer. There are 5 pink, 12 white, and 3 black. You are going to pull out two socks to wear for the day. What is the probability that the second sock is black if the first sock is pink?

A. $\frac{2}{5}$

B. $\frac{3}{80}$

C. $\frac{3}{10}$

D. $\frac{3}{4}$

E. $\frac{3}{76}$

Short-Answer: Write answers clearly and concisely. Show all work. Round all answers to the hundredths place.

11. The following events are independent. Find the missing values. Show all work.

a. Given $P(S) = 0.28$ and $P(B) = 0.30$, find $P(S \cap B) = \underline{0.084}$

b. Given $P(M) = 0.5$ and $P(M \cap L) = 0.08$, find $P(L) = \underline{0.16}$

12. Use the data in the table below, which shows the employment status of individuals in a particular town by age group.

Age Group	Full Time	Part-Time	Unemployed	Total
0-17	24	164	371	559
18-25	185	203	148	536
26-34	348	67	27	442
35-49	581	179	104	864
50+	443	162	173	778
Total	1581	775	823	3179

a. A person from the town is randomly selected, what percent of individuals are full-time?

$$\frac{1581}{3179}$$

49.73%

b. What is the percent of people employed part-time, given that he or she is between 0 and 34 years of age?

$$\frac{434}{1537}$$

28.24%

13. The table below shows the political party registration by gender of all 500 registered voters in Franklin Township.

	Party W	Party X	Party Y	Total
Female	60	120	120	300
Male	28	124	48	200
Total	88	244	168	500

a. Given that a randomly selected person is registered for Party X, what is the probability that she is a female?

$$\frac{120}{244} \quad .49$$

b. Given that a randomly selected person is registered for party X, what is the probability that he is male?

$$\frac{124}{244} \quad .51$$

c. Using parts (a) and (b), is a male or female more likely to be registered for Party X? Explain your reasoning.

male, the probability is higher

d. Among the registered voters of Franklin Township, are the events "is a female" and "is registered for Party Y" **independent**? Justify your answer based on probabilities calculated from the table above.

$$\frac{300}{500} * \frac{168}{500} \neq \frac{120}{500}$$

Not Independent.