

Name: _____ Date _____ Period _____

Unit 5: Probability Review for CDA

True or false that the following can represent the probability that something will happen:

0 → 1

1. A. 121% F B. 69% T C. -.23 F D. 34/21 F
 $121/100 = 1.21$ $69/100 = .69$ 1.61

Use probability notation to complete:

2. $P(A \text{ and } B) = P(A \cap B)$

3. $P(A \text{ or } B) = P(A \cup B)$

4. The complement of the intersection of sets A and B. $P(A \cap B)'$

5. The union of set A and the complement of set B. $P(A \cup B')$

6. A drawer contains 5 blue socks, 6 red socks, and 8 green socks. What is the probability that you will randomly pick 3 green socks (without replacement)?

5B 6R 8G : 19 socks → change values!
 $\frac{8}{19} \cdot \frac{7}{18} \cdot \frac{6}{17} = \frac{336}{5814} = \frac{56}{969}$

7. Balls in a lotto machine are numbered 1 to 25. What is the probability that you will randomly draw a ball that is a multiple of 3 or 7?

$m_3: 3, 6, 9, 12, 15, 18, 21, 24$
 $m_7: 7, 14, 21$

$P(m_3) + P(m_7) - P(m_3 \cap m_7)$
 $\frac{8}{25} + \frac{3}{25} - \frac{1}{25} = \frac{10}{25} = \frac{2}{5}$

8. Which of the following events are independent given $P(A)$, $P(B)$, and $P(A \cap B)$? (Can be more than one answer.)

A. $P(A) = 0.2$; $P(B) = 0.3$; $P(A \cap B) = 0.6$ • 0.6 Dep.

B. $P(A) = 0.3$; $P(B) = 0.29$; $P(A \cap B) = 0.74$ • 0.87 Dep.

C. $P(A) = 0.2$; $P(B) = 0.5$; $P(A \cap B) = 0.01$ • 1 Dep.

D. $P(A) = 0.8$; $P(B) = 0.45$; $P(A \cap B) = 0.36$ • 0.36 ✓ Independent

9. Families of two pets. 37% of them have a dog and 44% of them have a cat. If 23% have both a dog and a cat, what's the probability that a family has a cat given they have a dog?

$$P(C|D) = \frac{P(C \cap D)}{P(D)} = \frac{0.23}{0.37} = \frac{23}{37} \text{ or } 0.62 \text{ or } 62\%$$

10. 500 people were surveyed at Six Flags. 405 of them like Goliath, 375 people like the Batman ride, and 95 like both. What is the probability of someone liking Batman given that they like Goliath?

$$P(B|G) = \frac{P(B \cap G)}{P(G)} = \frac{95}{405} = \frac{19}{81}$$

11. 80 people are on a bus. 36 of them have blonde hair and 24 of them have brown hair. 25 of the blondes have blue eyes and 19 have brown hair and blue eyes. Find the $P(\text{blue eyes}|\text{brown hair})$.

$$P(BE|BH) = \frac{P(BE \cap BH)}{P(BH)} = \frac{19}{24}$$

12. When looking at the association between the events "liking shoes" and "liking steak", if the events are independent, then the probability:

$P(\text{liking steak}|\text{liking shoes})$ is equal to $P(\text{liking steak})$.

13. Mr. Jones surveyed 300 men and 250 women about their vehicles. Of those surveyed, 78 men and 95 women said they own an SUV. If a person is chosen at random from those surveyed, what is the probability of choosing a woman or a person that owns an SUV?

$$\begin{array}{r} 78 \\ 95 \\ \hline 173 \end{array}$$

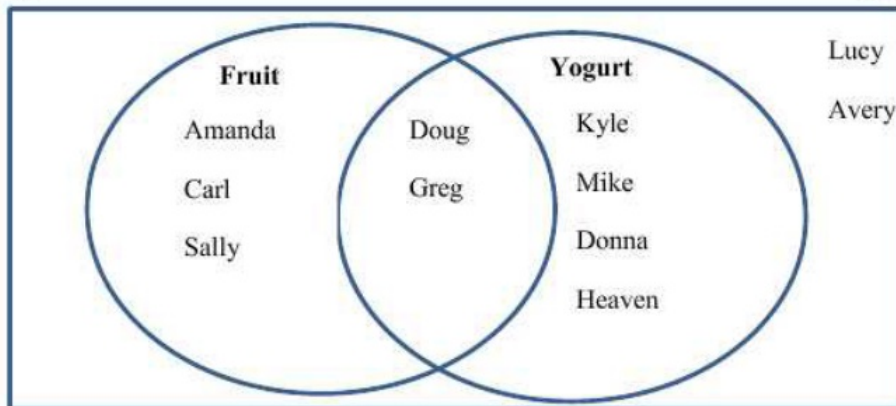
$$P(W) + P(SUV) - P(W \cap SUV) = \frac{250}{550} + \frac{173}{550} - \frac{95}{550} = \frac{328}{550} = \frac{164}{275}$$

14. At McDonalds the most popular drink ordered is coke. Let M represent all of the meals served from a McDonalds and C represent all of the coke ordered. Write the correct notation for:

a. the set of meals that do include a coke. $P(M \cap C)$

b. The set of meals that do not include a coke. $P(M \cap C')$

This Venn diagram shows the name of students in Ms. Smith's class that like fruit or yogurt.



Use the information in the Venn diagram above for questions 15 - 16.

Let set A be the names of students who like ~~vanilla~~ ~~chocolate~~ **YOGURT** and let set B be the names of students who like **FRUIT**

15. Find the $P(A \cap B)$. $\frac{2}{11}$

16. Find $P(A \cup B)$. $\frac{9}{11}$

17. In a particular state, the first character on a license plate is always a letter and the last letter is always a digit between 0 and 7. If C represents the set of all license plates beginning with a consonant, and T represents the set of all license plates that end with a multiple of 3, which license plate belongs to the set $C \cap T'$? **begin w/ consonant & Do NOT end w/ mult. of 3 : (B)**

Which license plate represents $C' \cap T'$? **(C)**

Does not begin w/ consonant & ends w/ mult of 3

Which license plate represents $C' \cap T$? **(A)**

Does not begin w/ consonant & does NOT end w/ mult of 3

A. **E23 PC8**

B. **MG4 3F5**

C. **AR8 8X9**

D. **P7M Z56**

18. Using the frequency table below, determine the probability of randomly selecting a person who:

		Gender		
		Male	Female	Total
Party Type	Bowling	6	2	8
	Skating	3	11	14
	Dancing	1	3	4
	Total	10	16	26

- a. Skates or is a male. $P(S) + P(M) - P(S \cap M) = \frac{14}{26} + \frac{10}{26} - \frac{3}{26} = \frac{21}{26}$
- b. Dances or is a Female. $P(D) + P(F) - P(D \cap F) = \frac{4}{26} + \frac{16}{26} - \frac{3}{26} = \frac{17}{26}$
- c. Bowls given they are a male. $P(B|M) = \frac{P(B \cap M)}{P(M)} = \frac{6}{10} = \frac{3}{5}$
- d. Skates given they are a female. _____

$$P(S|F) = \frac{P(S \cap F)}{P(F)} = \frac{11}{16}$$

19. If a card is drawn from a deck of four cards labeled A, B, C, and D and the spinner below is spun once, what is the probability of drawing a consonant and spinning a right hand or right foot?



vowel	consonant	consonant	consonant
A	B	C	D

consonant

$$\frac{3}{4} * \frac{8}{16} = \frac{24}{64} = \frac{3}{8}$$

20. 100 people were surveyed about their pets. The results of this survey are shown in the table below.

	Dog	Cat	Total
Male	42	10	52
Female	9	39	48
Total	51	49	100

Determine what the probability is of a person chosen at random from the 100 surveyed:

- A. Is a male and has a Dog. $\frac{42}{100} = \frac{21}{50}$
- B. Is a female and has a Cat. $\frac{39}{100}$

21. The two most popular kinds of meat for pizza is pepperoni and sausage. Let R be the event for having pepperoni on pizza and S be the event for sausage.: $P(R) = 0.4$, $P(S) = 0.3$, $P(R \text{ or } S) = 0.5$. Estimate $P(R \text{ and } S)$ in context of this problem.

both

$$P(R) + P(S) - P(R \cap S) = P(R \cup S)$$

$$0.4 + 0.3 - x = 0.5$$

$$0.7 - x = 0.5$$

$$-x = -0.2$$

$$x = 0.2$$

22. The probabilities an adult male has a beard and/or a mustache are given below. What is the probability that a randomly selected male doesn't have a beard or a mustache?

	Has a beard	No beard
Has a Mustache	0.20	0.25
No Mustache	0.15	0.40

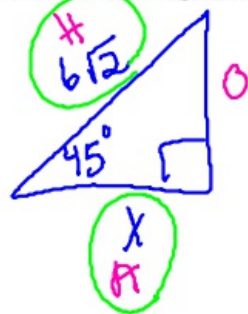
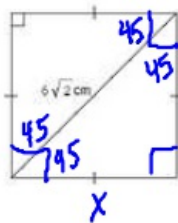
0.35 0.65 1.0

Has a beard but no mustache? _____

$$P(\text{NBU NM}) = P(\text{NB}) + P(\text{NM}) - P(\text{NB} \cap \text{NM})$$

$$0.65 + 0.55 - 0.40 = 0.8$$

23. Find the missing side length for a square with a diagonal that measures $6\sqrt{2}$ cm using trig ratios.



SOH CAH TOA

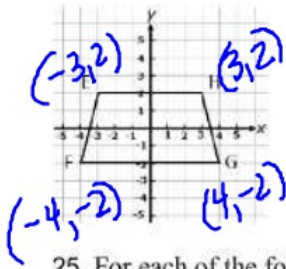
$$\cos 45^\circ = \frac{x}{6\sqrt{2}}$$

"x up high" - multiply
"x down low" - divide

$$x = 6\sqrt{2} \cdot \cos 45$$

$$6 = x$$

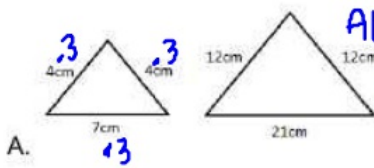
24. For EFGH below, name the vertices after the quadrilateral has been reflected over the x-axis.



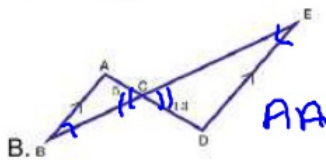
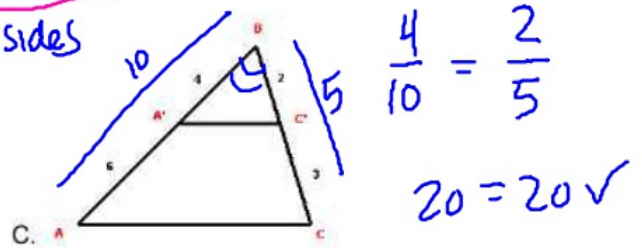
$E(-3, 2) \rightarrow E'(-3, -2)$
 $F(-4, -2) \rightarrow F'(-4, 2)$
 $G(4, -2) \rightarrow G'(4, 2)$
 $H(3, 2) \rightarrow H'(3, -2)$

change y

25. For each of the following, state if the triangles are similar and why.

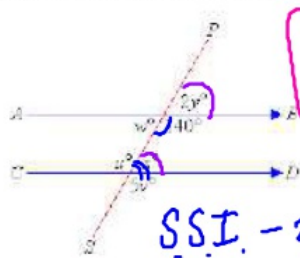


All corresponding sides proportional
SSS



SAS; 2 corresponding sides proportional; included angle is congruent

26. Find the value of u , v , w , x , and y in the figure below:



$w = 40^\circ, u = 140^\circ$

Corresponding angles \cong

$\frac{2y}{2} = \frac{40}{2} \quad \therefore \quad \frac{5v}{5} = \frac{140}{5}$
 $y = 20 \quad v = 28^\circ$

SS.I. - add to 180
 $\frac{180}{-140} = \frac{40}{40}$
 $x = 40^\circ$

27. Are the triangles below congruent? How do you know?

