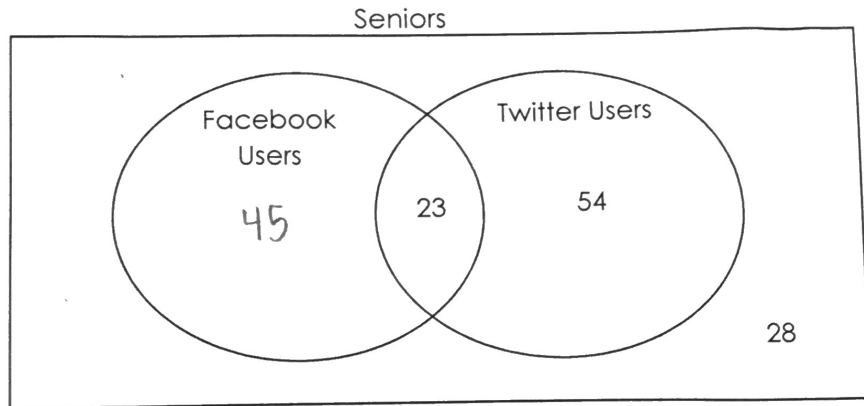


Remember to show all work! Round answers to the nearest 2 decimal places or simplest fraction form.

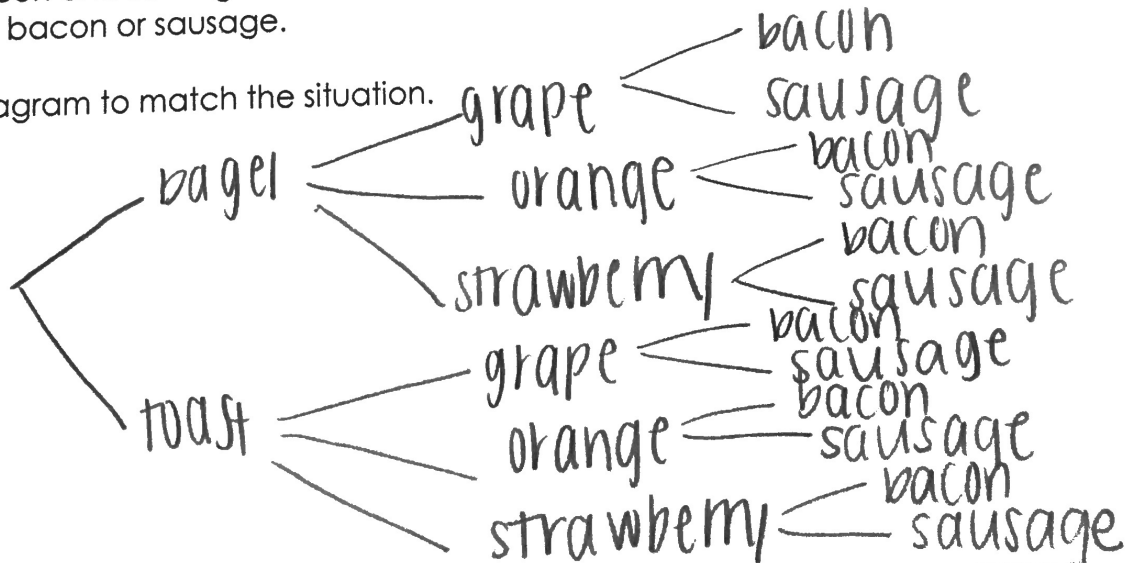
Use the following situation to answer #1-5 Jake gave a survey to 150 seniors at his school. In the survey, he asked the seniors if they used Facebook, Twitter, both, or neither. Here is a Venn diagram that models the results.



1. What is the probability that a senior uses Facebook AND Twitter? $\frac{23}{150} = 0.15$
2. What is the probability that a senior is not a Facebook user? $\frac{54+23}{150} = \frac{77}{150} = \frac{41}{75} = 0.55$
3. What is the probability that seniors are Facebook users but not Twitter users? $\frac{45}{150} = \frac{3}{10} = 0.3$
4. What is the probability that seniors are neither Facebook users nor Twitter users? $\frac{28}{150} = \frac{14}{75} = 0.19$
5. What is the probability that a student is a Twitter user given that he/she is a Facebook user? $\frac{23}{45+23} = \frac{23}{68} = 0.34$

Use the following situation to answer #6-13 Every morning, Neil eats either a bagel or toast for breakfast. Neil has three choices of jam to choose from: grape, orange, or strawberry. He also chooses between bacon and sausage as a side. Neil randomly chooses a bagel or toast, the flavor of jam, and his side of bacon or sausage.

6. Draw a Tree diagram to match the situation.



7. How many possible combinations can Neil choose?

$$(2)(3)(2) = 12$$

8. If Neil chooses a bagel with strawberry jam or orange jam and bacon for breakfast, what's the probability that his mom chooses the exact same breakfast?

$$\left(\frac{1}{2}\right)\left(\frac{2}{3}\right)\left(\frac{1}{2}\right) = \frac{2}{12} = \frac{1}{6}$$

9. What is the probability that Neil chooses bacon for breakfast?

$$\left(\frac{2}{2}\right)\left(\frac{3}{3}\right)\left(\frac{1}{2}\right) = \frac{6}{12} = \frac{1}{2}$$

10. What is the probability that Neil chooses toast with grape jam?

$$\left(\frac{1}{2}\right)\left(\frac{1}{3}\right)\left(\frac{2}{2}\right) = \frac{2}{12} = \frac{1}{6}$$

11. What is the probability that Neil chooses a bagel with strawberry jam and sausage?

$$\left(\frac{1}{2}\right)\left(\frac{1}{3}\right)\left(\frac{1}{2}\right) = \frac{1}{12}$$

~~*12. Given that Neil chooses sausage, what is the probability that he will choose a bagel?~~

~~*13. Given that Neil chooses orange jam, what is the probability that he will choose toast with bacon?~~

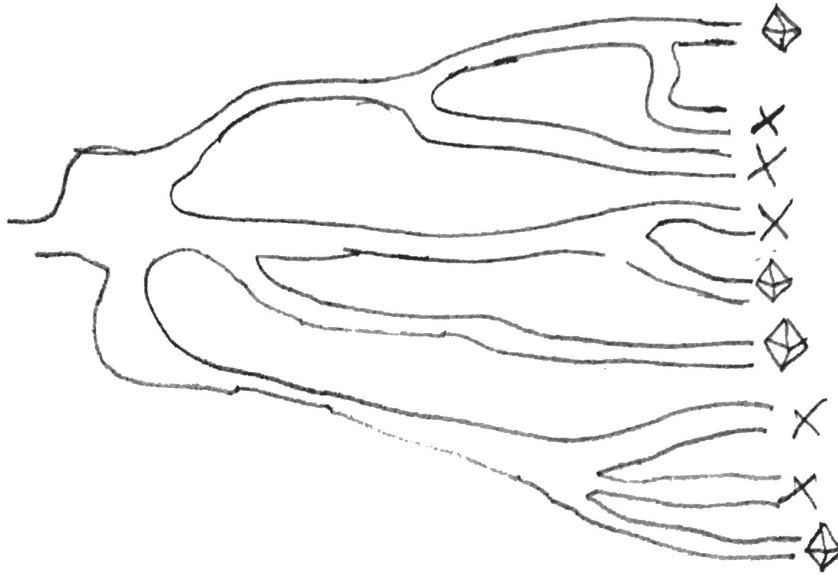
12. The area model below represents whether or not people would attend a Taylor Swift concert. If 252 people are surveyed concerning their concert attendance, how many people would attend it?

Y	N	2
N	Y	4
Y	N	3

$$P(\text{yes}) = \frac{17}{36}$$

$$\frac{17}{36} (252) = 119 \text{ people}$$

Use the following situation to answer #13-15 At Forsythe Farms, the corn maze has the paths shown. Only some paths have a prize at the end of the path.



13. If only forward motion is allowed (no backtracking), draw an area model for the corn maze.

upper	Y	N	N
middle	N	Y	Y
lower	N	N	Y

14. What is the probability of not winning a prize? $\frac{20}{30}$

15. If 500 people go through the maze on a particular weekend, how many prizes should Forsythe Farms expect to give away that weekend?

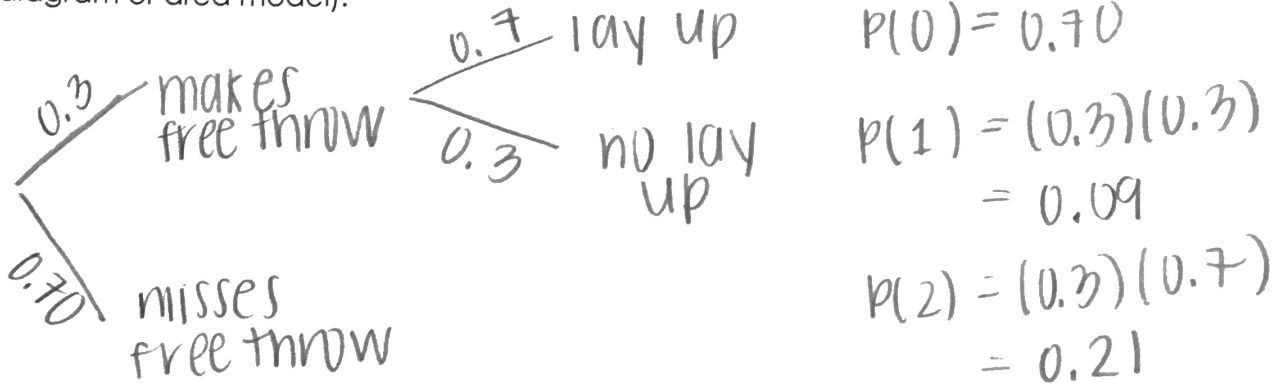
$$\frac{10}{30} (500) = 222.22$$

Around 222 prizes

Use the following situation to answer #16-18. After Yvonne starts her allowance deal with her dad, she tells her cousin CJ. CJ's dad agrees that he wants to offer a similar allowance to his son. Since CJ is only 8 years old, he takes his first shot from behind the free throw line, and the second shot is a lay-up. If his son misses the first shot, he gets only \$6. If he makes the first shot, he gets \$12 and a chance to shoot again for \$5 more.

CJ makes 30% from the free throw line and makes 70% of his lay-ups.

16. Find the probability of making 0 baskets, 1 basket, and 2 baskets. Draw an appropriate model (tree diagram or area model).



17. How many times in a year (52 weeks) would you expect CJ to get \$6? \$12? \$17?

\$6	$(0.7)(52) = 36.4 = 36 \text{ weeks}$
\$12	$(0.09)(52) = 4.68 = 5 \text{ weeks}$
\$17	$(0.21)(52) = 10.92 = 11 \text{ weeks}$

18. How much allowance should CJ expect to receive in a year?

$$36(\$6) + 5(\$12) + 11(\$17) = 216 + 60 + 187 = \$463/\text{year}$$

19. Joe has a bag of 20 marbles. You pay \$5 to play his game of chance. In the bag, there are 3 red marbles, 5 blue marbles, 8 green marbles, and the rest are yellow marbles. You are to draw one marble from the bag. You will win \$12 if you draw a yellow marble, you will win \$8 if you draw a red marble, and \$4 if you draw a green marble. If you draw a blue marble, you get \$0.

a) Calculate the following probabilities:

- $P(\text{yellow}) = 4/20 = 1/5 = 0.2$
- $P(\text{green}) = 8/20 = 2/5 = 0.4$
- $P(\text{blue}) = 5/20 = 1/4 = 0.25$
- $P(\text{red}) = 3/20 = 0.15$

b) How much do you expect to win or lose if you play this game 100 times?

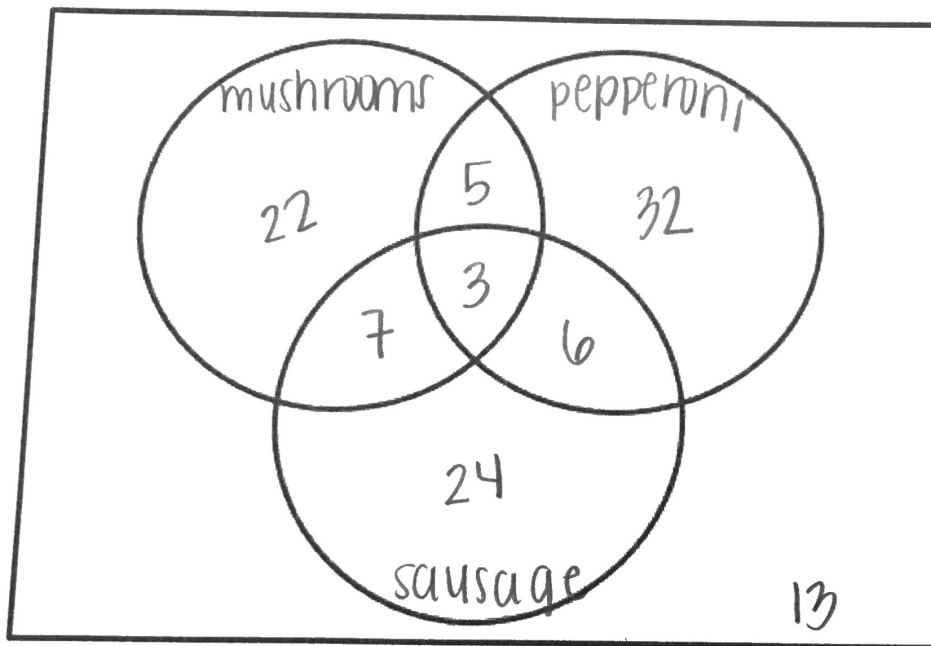
$$-5(1) + (12)(0.2) + (8)(0.15) + (4)(0.4) + (0)(0.25)$$

$$= -5 + 2.4 + 1.2 + 1.6 + 0 = \$0.20/\text{turn} \times 100 = 20$$

You can expect to win \$20 if you play 100 times.

20. A pizza place surveyed 112 customers to determine their favorite pizza topping or combination of toppings (mushrooms, sausage, and pepperoni). Only 3 people liked all three toppings. Six people liked both pepperoni and sausage. Seven people liked only mushrooms and sausage. Five people liked only mushrooms and pepperoni on their pizza. A total of 37 people liked mushrooms on their pizza, 40 liked sausage, and 46 also liked pepperoni.

a) Draw and label a Venn diagram to represent this situation.



b) What's the probability that a person chosen at random likes sausage?

$$40/112$$

c) Find $P(\text{pepperoni and mushrooms})$. $5/112$

d) What's the probability that a person chosen at random does NOT like mushrooms?

$$75/112$$

e) Find the probability that a person chosen at random likes mushrooms or sausage.

$$\frac{22+5+3+7+24}{112} = \frac{61}{112}$$

Find $P(\text{sausage, given that it already has pepperoni})$.

$$\frac{9}{46}$$

2. Create a table showing the following teacher schedules for math teachers:

Jones - 1st, 2nd, 3rd, 6th, 7th

Fowler - 3rd, 4th, 5th, 6th, 8th

Williams - 1st, 2nd, 6th, 7th

Miller - 3rd, 4th, 7th, 8th

Morning classes will be 1st - 5th Afternoon classes 6th - 8th

Teacher	1 st Period	2 nd Period	3 rd Period	4 th Period	5 th Period	6 th Period	7 th Period	8 th Period
Jones	✓	✓	✓			✓	✓	
Fowler			✓	✓	✓	✓		✓
Williams	✓	✓				✓	✓	
Miller			✓	✓			✓	✓

a) What is the probability of getting a morning class? $10/18 = 5/9$

b) Before deciding on a morning or afternoon class, Lisa remembered she wants to take her math class during 2nd period. What is the probability she will be scheduled a math class during this time?

$$2/18 = 1/9$$

c) All of the morning math classes are filled & Lisa has a decision to take either Mrs. Fowler or Mr. Williams in the afternoon, what is the probability of Lisa taking a Mrs. Fowler or Mr. Williams in the afternoon?

8 afternoon classes

$$4/8 = 1/2$$

d) Lisa's school counselor informs her all of Mrs. Fowler's classes are filled. The school adds another teacher Mrs. Jackson. She will teach (1st, 3rd, 5th, and 6th). What is now the probability of getting Mrs. Jackson for math in the morning?

	1st	2nd	3rd	4th	5th	6th	7th	8th
Jones	✓	✓	✓			✓	✓	
Williams	✓	✓				✓	✓	
Miller			✓	✓			✓	✓
Jackson	✓		✓		✓	✓	✓	

3/17