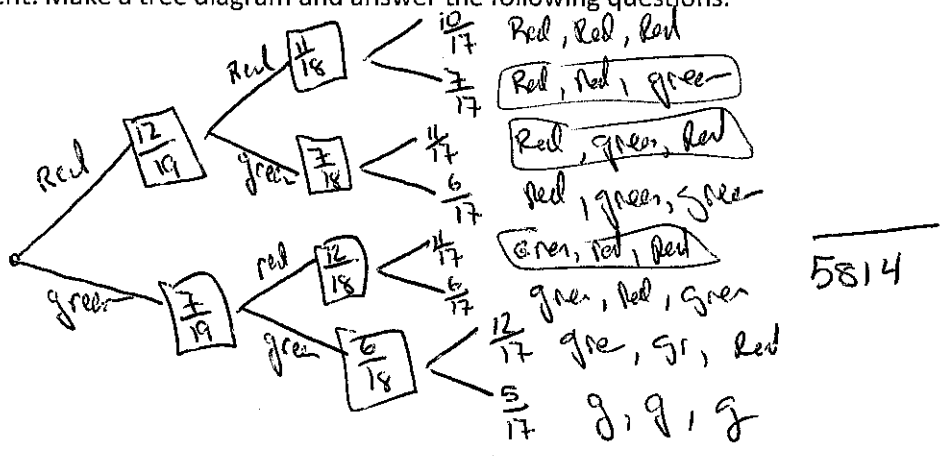


Monday 4/18/22

Advanced Algebra
Probability Review

1) You have 12 red marbles and 7 green marbles. You will be selecting three marbles without replacement. Make a tree diagram and answer the following questions.



a) What is the probability of getting all green?

$$\left(\frac{7 \times 6 \times 5}{19 \times 18 \times 17} \right) = \frac{210}{5814} = \boxed{.04}$$

b) What is the probability of getting all red?

$$\frac{(12 \times 11 \times 10)}{5814} = \boxed{.23}$$

c) P(Exactly 2 red)?

$$3 \left(\frac{12 \times 11 \times 7}{5814} \right) = \boxed{.48}$$

d) P(At least 1 green)

$$1 - .23 = \boxed{.77}$$

2) Two dice are thrown. Make the list of outcome below. You should have a list of 36 outcomes.

1-1 1-2 1-3 <u>1-4</u> 1-5 1-6	2-1 2-2 2-3 2-4 <u>2-5</u> 2-6	3-1 3-2 3-3 3-4 3-5 <u>3-6</u>	<u>4-1</u> 4-2 4-3 4-4 4-5 4-6	5-1 <u>5-2</u> <u>5-3</u> 5-4 5-5 5-6	6-1 6-2 <u>6-3</u> 6-4 6-5 6-6
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a) P(both numbers are less than 4)

$$\frac{9}{36}$$

b) P(sum of the dice is ≤ 5)

$$\frac{10}{36}$$

c) P(that the product of the dice < 8)

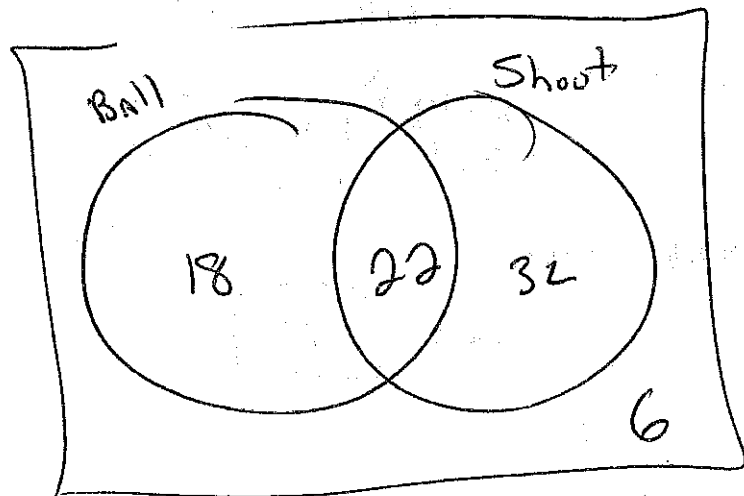
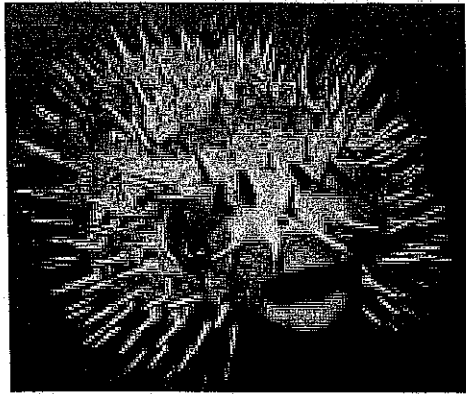
$$\frac{14}{36}$$

d) P(the absolute difference of the dice is 3)

$$\frac{6}{36}$$

Venn diagram and 6 Probabilities: Draw the Venn Diagram and list the 6 probabilities.

3) In a group of 78 pufferfish, 40 like to puff up like a ball. 54 like to shoot needles from their body. And 22 like to puff up like a ball and shoot needles from their body.



$$P(A) = \frac{40}{78}$$

$$P(B) = \frac{54}{78}$$

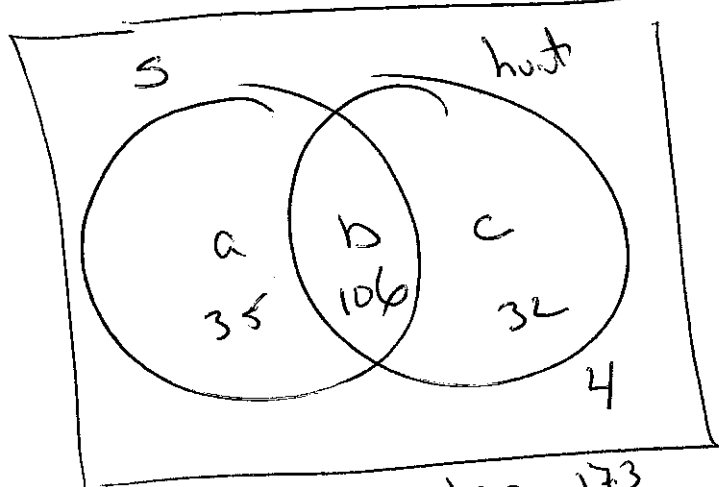
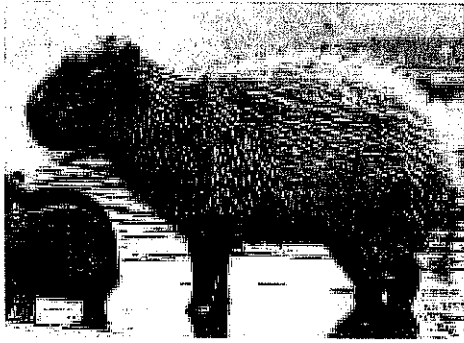
$$P(A \cap B) = \frac{22}{78}$$

$$P(A \cup B) = \frac{70}{78}$$

$$P(A|B) = \frac{22}{54}$$

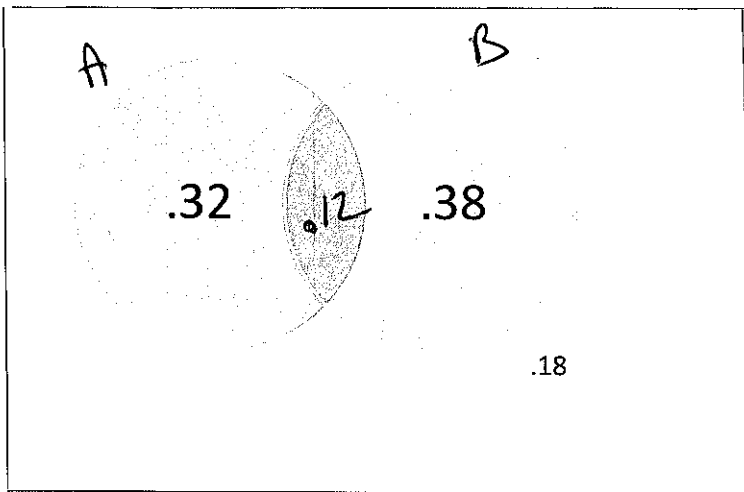
$$P(B|A) = \frac{22}{40}$$

4) In a group of 177 Capybara's, 141 like to be social with each other. 138 like to hunt for food. And 4 like to do neither.



$$\begin{aligned} a+b+c &= 177 & c &= 32 \\ a+b &= 141 & & \\ b+c &= 138 & b &= 106 \end{aligned}$$

5) Fill in the missing Probabilities and list the 6 probabilities.



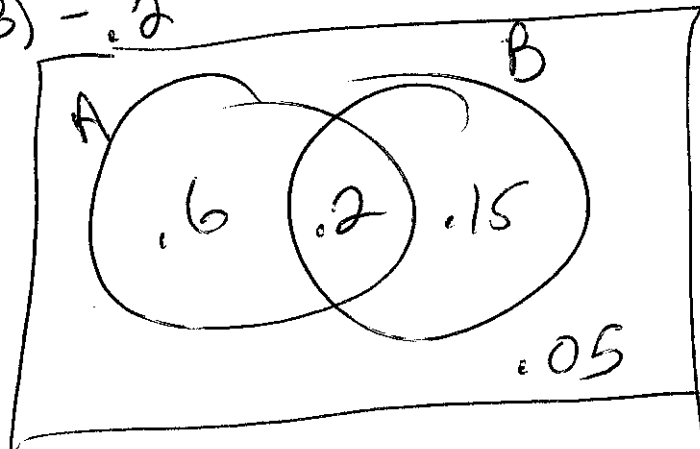
$$\begin{aligned} P(A) &= .44 \\ P(B) &= .50 \\ P(A \cap B) &= .12 \\ P(A \cup B) &= .82 \\ P(A|B) &= \frac{.12}{.50} = (.24) \\ P(B|A) &= \frac{.12}{.44} = (.27) \end{aligned}$$

I can work with Probability Rules. Find the missing probability and draw the proper Venn Diagram.

6) $P(A \cup B) = .95$ $P(A) = .8$ and $P(A \cap B) = .2$

$$.95 = .8 + P(B) - .2$$

$$.35 = P(B)$$



7) $P(A) = .58$ and $P(B) = .72$ and $P(A \cup B) = .98$

a) Find the missing probability $P(A \cap B)$ $.32$

$$.98 = .58 + .72 - x$$

b) Draw the proper Venn diagram

$$.32 = P(A \cap B)$$

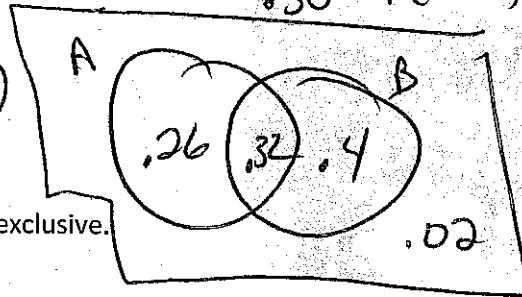
c) State if A and B are independent

NO

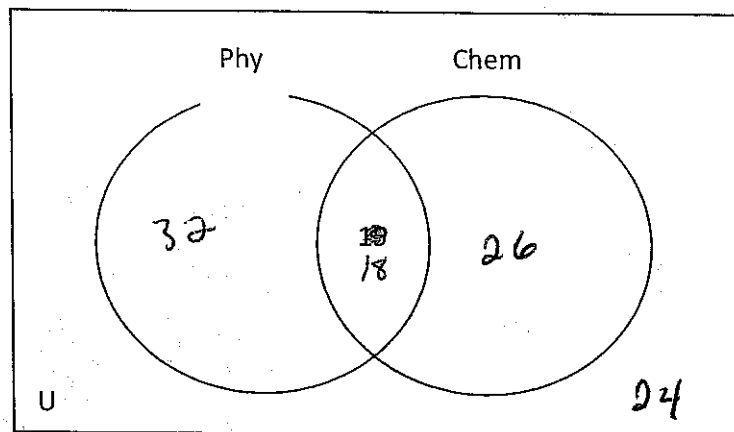
$$.58 \times .72 \neq .32$$

d) State with a reason if A and B are mutually exclusive.

NO



8) In an 11th grade advisory class of 100 students, 50 students study Physics during the day, 44 study Chemistry, and 18 study both of those subjects. The Venn diagram below models this situation but many of the numbers are missing. Complete the diagram and figure out how many of the 100 students take neither Physics nor Chemistry.

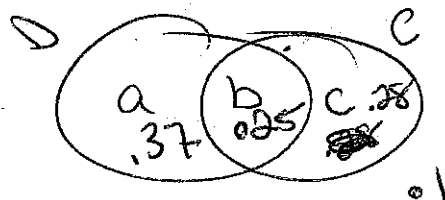


Answer to how many take neither:

24

9) The probability that a randomly selected student at Simon's school has a dog is .62. The probability that a randomly selected student in the school has a cat and a dog is .25. The probability that a randomly selected student has neither a cat nor a dog is .10. What is the probability that a randomly selected student at Simon's school has only a cat? **Drawing a Venn Diagram will be very helpful.**

A	B	C	D
0.34	0.40	0.28	0.66



$$a + b + c = .9$$

$$a + b = .62$$

$$b + c = .25$$

c = .28

10) The following table gives information about how students at Washburn High School get to school each morning. Assume that the table accounts for every student in the school. **Express answer as a fraction.**

	Bus	Car	Walk	Bike	Total
9th Grade	169	32	68	50	319
10th Grade	132	30	97	11	270
11th Grade	99	44	33	42	218
12th Grade	67	78	39	20	204
Total	467	184	237	123	1011

a. What is the probability that a randomly chosen student takes the bus to school?

_____ $\frac{467}{1011}$ $.46$

b. What is the probability that a randomly chosen bike rider is in 12th grade?

_____ $\frac{20}{123} = .16$

c. What is the probability that a randomly chosen 11th grader walks to school?

_____ $\frac{33}{218}$ $.15$

d) What is the probability that a randomly chosen student takes the bus given they are in the 9th grade? _____

$\frac{68}{319} = .21$

e) What is the probability that a randomly chosen student is in 12th grade given that they ride a bike to school? _____

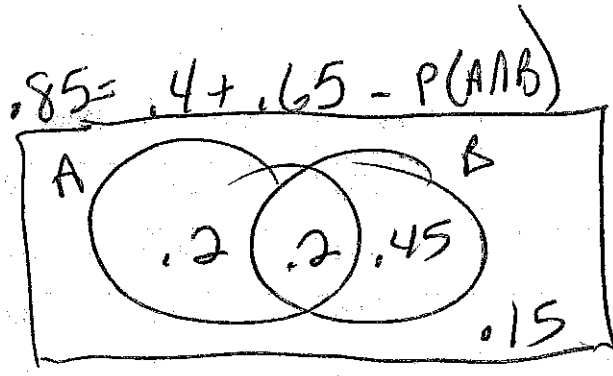
$\frac{20}{123} = .16$

11) Events A stinking and Event B is hissing. Events A and B have probabilities $P(A) = .4$, $P(B) = .65$ and $P(A \cup B) = .85$ Calculate $P(A \cap B)$.



10) Write your answer here:

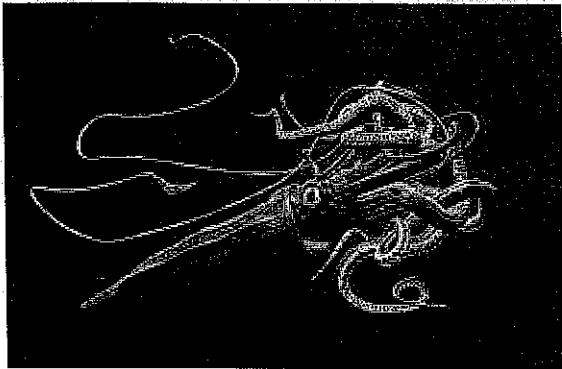
20



If there is an attack of 1200 skunks, according to this data, what is the expected number that are going to stank and hiss?

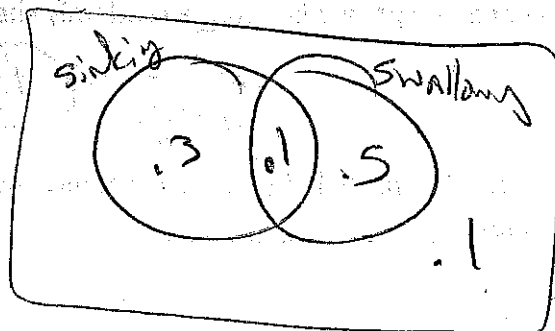
$1200 \times .2$ 240

12) Event A is sinking ships. Event B is swallowing swimmers whole. Events A and B have probabilities of $P(A) = .4$, $P(A \cup B) = .9$ and $P(A \cap B) = .1$ Calculate $P(B)$



$.9 = .4 + B - .1$

$.6 = P(B)$



If there are 2100 people swimming, what is the expected value of those that will get swallowed up whole?

$.6 \times 2100$

Is it a good idea to go swimming knowing this?

1260