

NC MATH 2 NCFE FINAL EXAM REVIEW

Unit 6 – Probability

Theoretical Probability

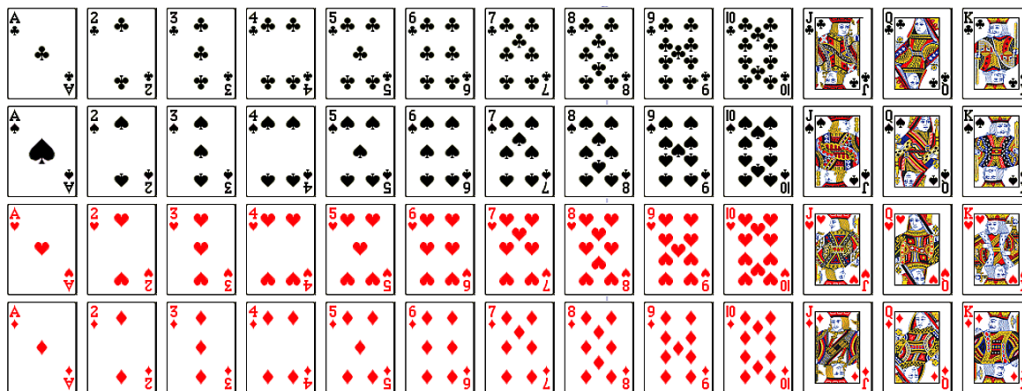
A tube of sweets contains 20 red candies, 8 blue candies, 8 green candies and 4 orange candies.

If a sweet is taken at random from the tube, what is the probability that it is:

1. $P(\text{red})$?
2. $P(\text{orange})$?
3. $P(\text{blue or green})$?
4. $P(\text{not green})$?

In a bag of 40 pieces of candy, 45% are Hershey's Kisses, 20% are Twix and the remaining pieces are Skittles.

5. Madison picks a piece of candy, find the probability she selects either a Hershey Kiss or Twix.
6. Madison picks a piece of candy, eats it, and then picks another piece. Find the probability her 1st candy is a Hershey Kiss and her second is a Skittle.
7. Madison picks a piece of candy and then replaces it. Find the probability of her first selecting Skittles and then selecting Twix.
8. In a bag of Reese's Pieces, there are 12 yellow, 14 orange and 18 brown pieces. I only want to eat the brown ones, however if I pick the wrong color, I put it back in the bag. What's the probability that on my 1st three tries, I get a brown piece of candy?



Use the deck of cards to answer the questions below.

9. What is the total number of cards in a standard deck?
10. How many sets are in a deck of cards?
11. How many cards are in each set?
12. What is the probability that you choose a 2 of hearts from a standard deck of cards?
13. What is the probability that you choose a 2 from a standard deck of cards?
14. What is the probability that you choose a heart from a standard deck of cards?
15. What is the probability that you choose a Jack from a standard deck of cards?
16. What is the probability that you choose a 4 or a King from a standard deck of cards?
17. What is the probability that you choose a 6 or an Ace from a standard deck of cards?
18. What is the probability of choosing a Queen out of all the face cards (Jacks, Queens, and Kings)?
19. What is the probability of **NOT** choosing a spade or a King from a deck of cards?
20. What is the probability that you do **NOT** choose an Ace from the deck of cards?

Experimental Probability

I choose 10 cards from a standard deck of cards and replace the card I pick after recording what I chose each time. The table below shows my recordings.

Pick	Card I picked
1 st pick	3 of hearts
2 nd pick	2 of diamonds
3 rd pick	King of diamonds
4 th pick	4 of spades
5 th pick	4 of clubs
6 th pick	Jack of diamonds
7 th pick	Ace of spades

157. What is the experimental probability of picking a red card?
 158. What is the experimental probability of picking a 2 of hearts?
 159. What is the experimental probability of picking a heart or spade?
 160. What is the experimental probability of not choosing a heart or spade?
 170. What is the experimental probability of picking a black card?
 171. What is the experimental probability of picking an Ace of spades?
 172. What is the experimental probability of picking a face card?
173. What is the difference between theoretical probability and experimental probability?

Independent & Dependent Events

Label the following as independent or dependent.

174. Rolling a 6 sided die 3 times
175. Spinning a spinner twice.
176. Drawing 4 cards from a standard deck without replacement.
177. Drawing 3 cards from a standard deck with replacement.
178. Flipping a coin twice and getting heads, then tails.
179. Selecting the order in which one picture will be taken of each of four friends by drawing their names out of a hat.
180. Selecting the order in which each member of a history class will present a speech.
181. Choosing the starting player line-up for a basketball game.

Independent Events

Independent Events:

- Event A is *independent* of event B if the conditional probability $P(A | B)$ is the same as the marginal probability $P(A)$.
- To check for independence, apply this test:
If $P(A | B) = P(A)$ then event A is *independent* of B .
- Another approach... Consider the definition of a conditional probability
- If A and B are independent, $P(A|B) = P(A)$. So ...

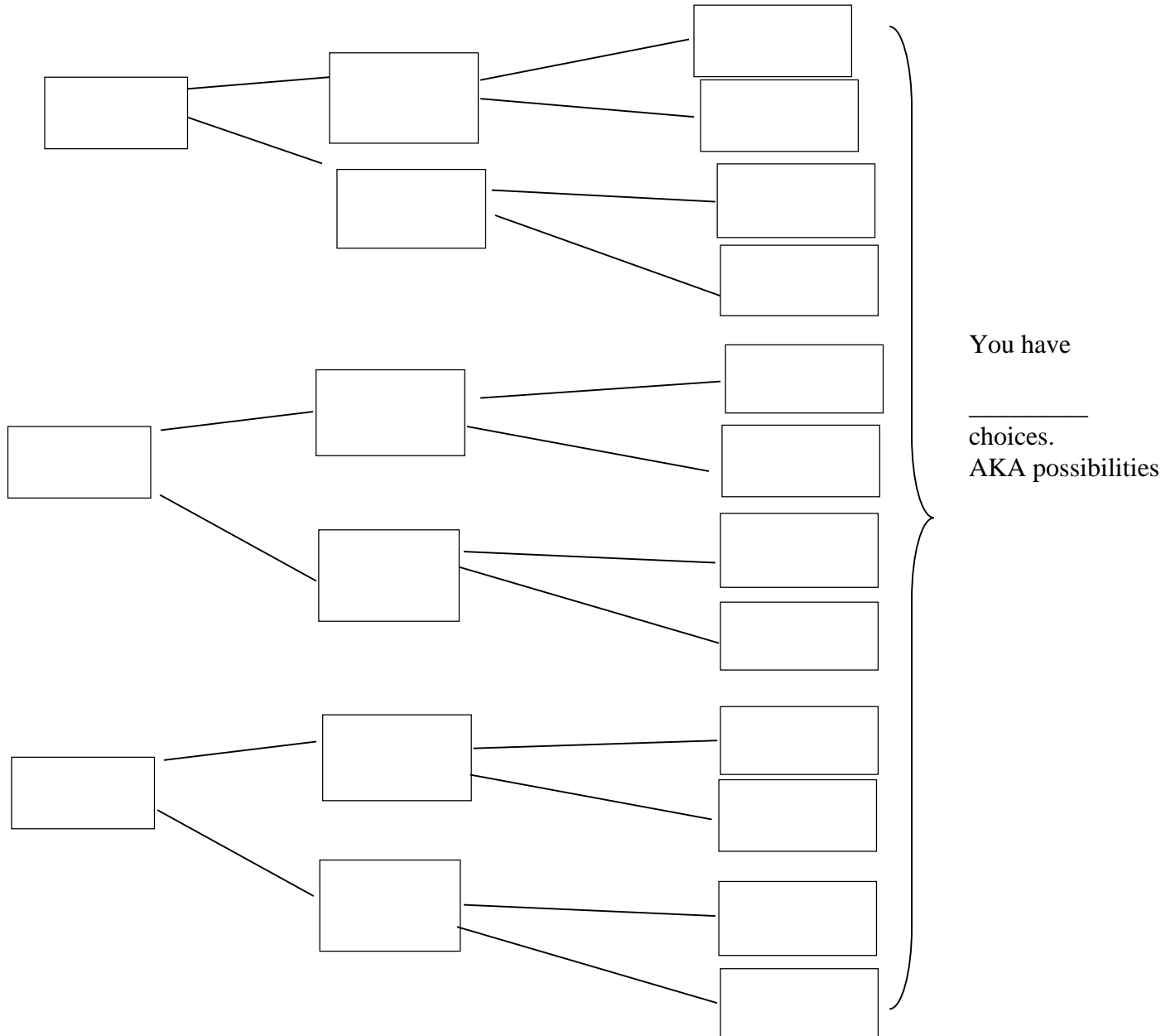
$$P(A | B) = P(A) = \frac{P(A \cap B)}{P(B)} \Rightarrow P(A \cap B) = P(A)P(B)$$

Tree Diagrams

182. You are going out for dinner. You have the following choices:

Drink: water, tea, or soda **Appetizer:** calamari or fried pickles **Entrée:** shrimp alfredo or chicken parmesan

Complete the tree diagram to show your choices:



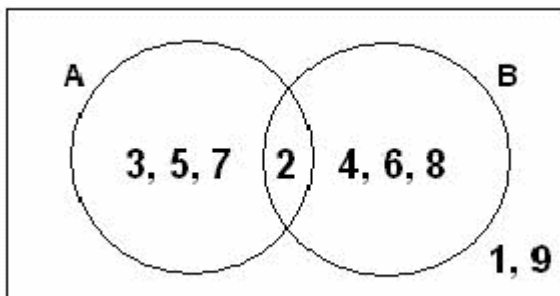
183. At the after school Math Club meeting, there were three drinks you could choose from:

Coke, Mt. Dew, and water. There were three snacks you could choose from: crackers, fruit, and cookies. Each student may only have one drink and one snack.

- Create a tree diagram showing all possible choices available.
- What is the probability that a club member chooses Coke and crackers?

Venn Diagrams

184. Use the following Venn diagram to answer the questions.



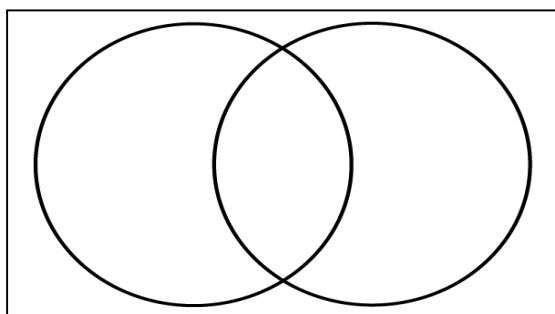
- List the sample space.
- $A =$
- $B =$
- $A \cap B =$
- $A \cup B =$
- $\bar{A} =$
- $\overline{A \cup B} =$

185. 1787 ASU Freshmen were surveyed to determine their favorite cardiovascular equipment at the Student Recreation Center. The following results were obtained:

936 liked the treadmill machine

846 liked the elliptical machine

321 like only the elliptical machine



- How many freshmen liked both the treadmill and the elliptical?
- How many students didn't like either of the machines?
- How many students like only the treadmill?

Conditional Probability

A number is selected randomly from a container containing all the integers from 20 to 70. Find:

186. $P(\text{even number} \mid \text{greater than } 30)$

187. $P(\text{greater than } 20 \mid \text{even number})$

188. $P(\text{prime number} \mid 20 \leq x \leq 50)$

Use the table to the right,

189. Find $P(\text{novels} \mid \text{middle school})$

190. Find $P(\text{middle school student})$

191. Find $P(\text{high school} \mid \text{comic books})$

Students' Reading Preferences

	Comic Books	Novels
Middle School	128	32
High School	86	98

192. The probability that Sue will go to Mexico in the winter and to France in the summer is 0.40. The probability that she will go to Mexico in the winter is 0.60. Find the probability that she will go to France this summer, given that she just returned from her winter vacation in Mexico.
193. A penny and a nickel are tossed. Find the probability that the penny shows heads, given that the nickel shows heads.
194. A penny is tossed. Find the probability that it shows heads. Compare this answer to your answer to #4 and explain the results.
195. A number is selected, at random, from the set $\{1,2,3,4,5,6,7,8\}$. Find:
- a) $P(\text{odd})$
 - b) $P(\text{prime} | \text{odd})$

Are the following independent or dependent?

196. $P(A) = 1/3$ $P(B) = 2/5$ $P(B|A) = 4/10$
197. $P(A) = 1/3$ $P(B) = 2/5$ $P(A \cap B) = 1/6$