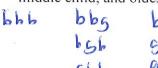
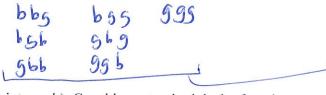
- 1) (3 points each) Consider a family with 3 children.
- a) Write the sample space showing the different b) What is the probability of having at least arrangements of genders for the youngest child, middle child, and oldest child.

one girl?





- 2) (3 points each) Consider a standard deck of cards.
- a) How many Face Cards are there?

$$\frac{13}{52} = \left(\frac{1}{4}\right)$$

$$\frac{12 + 13 - 3}{52} = \frac{22}{52}$$

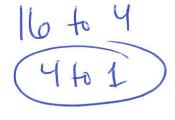
$$=$$
 $\frac{11}{26}$

3) (4 points) At Chili's, you can pick one of 5 appetizers, one of 10 main dishes, and one of 6 desserts. How many complete meals can be made from this menu?

- 4) (4 points each) Dario has a box of chocolates. There are 20 in total of which 9 are dark, 7 are salted caramel, and are milk. Picking a piece at random....

c) What is the probability that the piece is not milk?

d) What are the odds the piece is not milk?





5) (4 points each) In a room of 40 people, 15 saw the movie *Poor Things (PW)*, 26 people saw the movie *Dune Part 2*, and 10 people saw both. Picking a person at random, what is the probability that they:

a) Saw PW or Dune?

b) Saw *PW* given they saw *Dune*?

c) Saw Dune given they didn't see PW?

6) (3 points each) Three cards are picked, one at a time, from a standard deck of cards. Find the probability that you pick a Heart first, a Diamond second, and another Heart third if...

a) The cards are not replaced:

$$\frac{13}{52} \cdot \frac{13}{51} \cdot \frac{12}{50} = \frac{13}{13}$$

$$\frac{13}{52} \cdot \frac{13}{52} \cdot \frac{13}{52} = \frac{1}{64}$$

7) (4 points) How many distinct permutations can be formed using all of the letters in the word SUCCESSES?

- 8) (4 points each) A room is full of 12 artists, 7 financial advisors, 8 engineers, and 4 less scary clowns. A committee is to be formed that contains 12 people to rid the world of the Monday blues.
- a) How many ways can you pick exactly 3 people from each group?

b) What is the probability that you pick exactly 3 people from each group?

9) (3 points) Martha and Stewart are having a party where they invited 3 women and 3 men. Assuming everyone arrives at a different time, what is the probability that the women are the first three guests and the men are the last three guests?

$$\frac{P(3,3) \cdot P(3,3)}{P(6,6)} = \frac{3 \cdot 2 \cdot 1 \cdot 3 \cdot 2 \cdot 1}{6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1} = \frac{1}{20}$$

333

10) (3 points each) In February 2024, it was found that 65% of internet users choose Google
Chrome. Picking 5 internet users, found the probability, written as a percent rounded to four
decimal places, that

a) They all use Google Chrome:

b) Exactly 3 use Google Chrome:

$$C(5.5)(0.65)^{5}(0.359)^{6}$$
= [11.6029%)

c) At least 3 of them use Google Chrome:

$$C(53)(0.65)(0.35)^{2} + C(5.4)(0.65)(0.35)' + C(5.5)(0.65)(0.35)'$$

$$= |76.4831\%$$

- 11) A raffle is being held where 1,000 tickets were sold for \$20 each. One first place ticket brings in a prize of \$500. Two second place prizes are for \$200 each. Five third place prizes are for \$100 each. Rounding answers (in dollars) to two decimal places...
- a) (6 points) What is the expected net value of the game?

$$\frac{4^{5+}}{1000} \cdot 480 + \frac{2}{1000} \cdot 180 + \frac{5}{1000} \cdot 80 + \frac{992}{1000} (-20) = \begin{bmatrix} -18.60 \end{bmatrix}$$

b) (2 points) Is the game fair to play? Why or why not?

Nope, Er War negetie

- 12) (3 points each) Short Answer: When writing the answer to a question that give the following directions, how can you write your answer?
- a) "What is the probability that..."
- b) "What are the odds that.."

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- 13) Extra credit: Using the language of the problem, explain the 4 reasons why #10 was a binomial probability:

 1.
- 2.
- 3.
- 4.

Wells.

23/27