

Probability: Compound Events

1. Suppose you have a jar of candies: 4 red, 5 purple and 7 green. Find the following probabilities of the following events:

a.) Selecting a red candy.

b.) Selecting a purple candy.

c.) Selecting a green or red candy.

d.) Selecting any color except a green candy.

f.) If you select one candy, put it back, and select again, what is the probability of pulling two purple candies?

g.) If you select two candies, what is the probability that the first is red and the second is green?

h.) If you select two candies, what is the probability that one is red and one is green? (*hint: be careful! Order does not matter!*)

2. A coin and a die are tossed. Calculate the probability of getting tails and a 5.

3. In Tania's homeroom class, 9% of the students were born in March and 40% of the students have a blood type of O+. What is the probability of a student chosen at random from Tania's homeroom class being born in March and having a blood type of O+?

4. If a baseball player gets a hit in 31% of his at-bats, what is the probability that the baseball player will get a hit in 5 at-bats in a row?

5. Two cards are chosen from a deck of cards. The first card is replaced before choosing the second card. What is the probability that they both will be clubs?

6. If the probability of receiving at least 1 piece of mail on any particular day is 22%, what is the probability of not receiving any mail for 3 days in a row?

7. Assume you have 8 red beads and 12 blue beads in a bag and you will be drawing 3 beads from the bag one at a time without replacement. Make a tree diagram that represents this situation if you pulled three beads and label each branch with the probabilities of the outcomes.

a) What is the probability of pulling three red beads?

b) *Challenge!* What is the probability of pulling one red and two blue beads in any order? .

8. Jenny bought a half-dozen doughnuts, and she plans to randomly select 1 doughnut each morning and eat it for breakfast until all the doughnuts are gone. If there are 3 glazed, 1 jelly, and 2 plain doughnuts, what is the probability that the last doughnut Jenny eats is a jelly doughnut?

9. Steve will draw 2 cards one after the other from a standard deck of cards without replacement. What is the probability that his 2 cards will consist of a heart and a diamond?

10. A class consists of 12 girls and 8 boys. A group of three is picked for a committee. If the students are picked at random, what is the probability that they all will be boys?

11. A fair coin is flipped four times.

a) Find the probability that it will land up heads each time.

b) Find the probability that it land the same way each time. *(be careful! This is different than part a!)*

12. A bag of marbles contains 12 red marbles, 8 blue marbles, and 5 green marbles. If three marbles are pulled out, find each of the following probabilities.

a) Pulling out three green marbles without replacement

b) Pulling out three red marbles with replacement

c) Pulling out a red, a green, and a blue, in order, without replacement

6. The physics department of a college has 7 male professors, 11 female professors, 16 male teaching assistants, and 8 female teaching assistants. If a person is selected at random from the group, find the probability that the selected person is a teaching assistant or a female.

A) $\frac{4}{7}$

B) $\frac{9}{14}$

C) $\frac{5}{6}$

D) $\frac{19}{42}$

7. In a class of 50 students, 32 are Democrats, 16 are business majors, and 6 of the business majors are Democrats. If one student is randomly selected from the class, find the probability of choosing a Democrat or a business major.

A) $\frac{1}{5}$

B) $\frac{24}{25}$

C) $\frac{21}{25}$

D) $\frac{27}{25}$

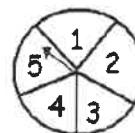
8. Use the spinner shown, find the probability that the arrow will land on an odd number. Assume that it is equally probable to land on any of the numbered spaces. If the pointer lands on the border, spin again.

A) $\frac{2}{5}$

B) $\frac{3}{5}$

C) 1

D) 0



9. A die is rolled. The sample space of equally likely outcomes is (1, 2, 3, 4, 5, 6). Find the probability of getting a 6.

A) $\frac{1}{6}$

B) 1

C) 6

D) 0

12. A student conducted a survey at school and found the following:
- Of the respondents, 60% have 1 sibling and 20% have 2 or more siblings
 - Of the respondents with 0 siblings, 90% have their own room
 - Of the respondents with 1 sibling, 20% do not have their own room
 - Of the respondents with 2 or more siblings, 50% have their own room
- a. Create a tree diagram for the scenario, displaying all possibilities and percentages
- b. What is the probability that a randomly selected student from this school has 1 sibling and has their own room?
- c. What is the probability that a randomly selected student has their own room?
- d. Find $P(\text{own room} \mid 2 \text{ or more siblings})$
- e. If a student has 1 sibling, find the probability that they share a room.

13. In a certain school the students in Common Core Math 2 completed a survey about cats and dogs. They found that 47% of the children in a school have a dog. Of those with no dog, 30% have a cat. 16% of those with a dog also have a cat.

- a. Create a tree diagram for the scenario, displaying all possibilities and percentages

- b. What is the probability that a randomly selected student from this school has a dog and a cat?

- c. What is the probability that a randomly selected student has either no dog or no cat?

- d. If the student has a cat, find the probability that they have a dog.

- e. Find $P(\text{no cat} \mid \text{no dog})$

5) (9 points Total) Complete the Venn Diagram of the following scenario. An Honors Math 2 student surveyed 85 students about whether or not they liked to watch hockey and soccer. Of them, he found that 43 liked to watch hockey, 26 liked to watch soccer, and 18 liked watching both. Let H = likes watching hockey, S = likes watching soccer

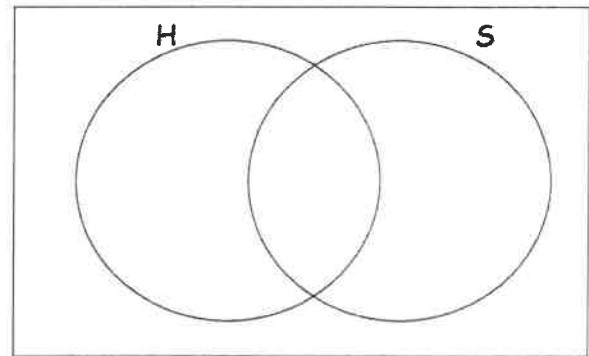
a. Find $H \cup S$

b. Find $H \cap S$

c. Find $P(S^c)$ $P(NS)$

d. Find $(H \cup S)^c$

e. Describe the meaning of $(H \cup S)^c$ in the context of the problem.



Billy arrived at the stadium for a game and saw 130 vehicles already in the parking lot. There were 16 trucks, 12 motorcycles, and 5 buses. The rest were cars. If a vehicle is selected randomly from the parking lot, what are the following probabilities? Write answers as simplified fractions. (2 pts each)

a) $P(\text{bus}) =$ _____

b) $P(\text{not a motorcycle}) =$ _____

c) $P(\text{truck or bus}) =$ _____

In a large bin, there are 26 baseballs, 10 basketballs, 12 soccer balls, and 4 footballs. (3 pts each)

- a) Tom is going to randomly select two balls, in succession from the bin without replacing them. What is the probability that Tom chooses a soccer ball and then a basketball?

Answer: _____

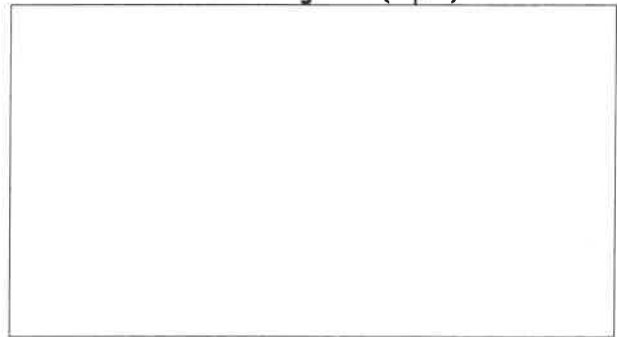
- b) Tom decides he only needs one ball at a time from the bin. What is the probability that he will choose to play with a baseball, return it, and then choose a soccer ball?

Answer: _____

6. A survey of 200 high school students who frequent the movie theater were asked the following regarding their movie preferences:

Draw Venn Diagram (5 pts)

86 watch *Drama*
72 watch *Action*
95 watch *Romance*
29 watch *Drama and Romance*
42 watch *Romance and Action*
18 watch *Action and Drama*
17 watch all three types of movies



Draw a Venn diagram, then determine how many of the students surveyed watch: (1 pt each)

a) Exactly one type of movie?

b) At least one type of movie?

c) Exactly two types of movies?

d) None of these types of movies?