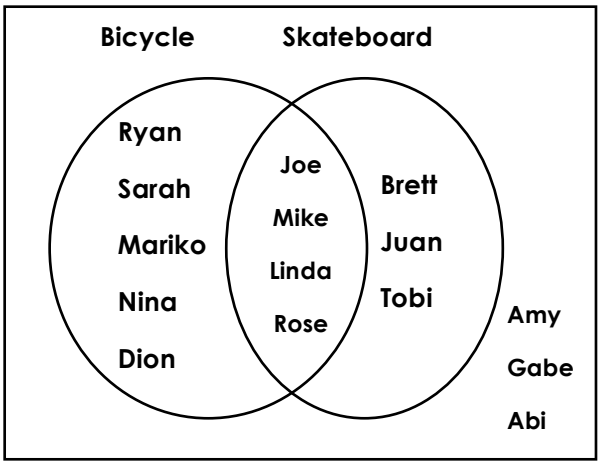
Homework 5.1 Venn Diagrams, Mutually Exclusive & Overlapping Events

Mr. Leary's Class: Use the Venn Diagram showing the number of kids owning bicycles (A) and skateboards (B) to find the following probabilities.

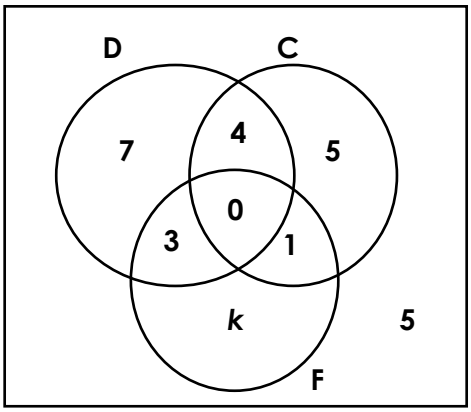


_____1. Find P(A ∩ B) and describe what this probability represents?

_____2. Find P(A ∪ B) and describe what this probability represents?

_____3. Find P(A ∪ B)' and describe what this probability represents?

The Venn Diagram below shows the results of a survey done by a veterinarian about the types of pets owned by 26 clients. The survey was only related to dogs (D), cats (C), and fish (F).



_____4. What is the value of *k*?

5. How did you determine the value?

If a randomly selected member is asked their preference, what is the <u>probability</u> that the member has:

_____ 6. Only dogs?

_____ 7. Dogs and cats?

_____ 8. None of these animals?

_____ 9. At least one of these pets?

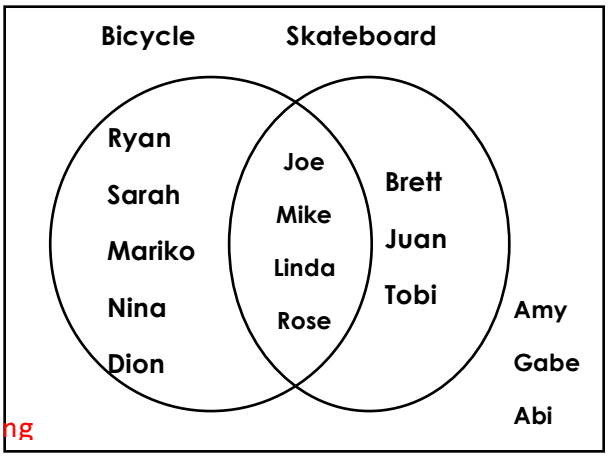
_____ 10. All of the pets?

_____ 11. Fish and dogs, but not cats?

_____12. Fish or dogs?

Homework 5.1 Venn Diagrams, Mutually Exclusive & Overlapping Events **Solutions**

Mr. Leary's Class: Use the Venn Diagram showing the number of kids owning bicycles (A) and skateboards (B) to find the following probabilities.



$\frac{4}{15}$ 1. Find P(A ∩ B) and describe what this probability represents?

Probability of owning both

$\frac{4}{5}$ 2. Find P(A ∪ B) and describe what this probability represents?

Probability of owning at least 1 of the

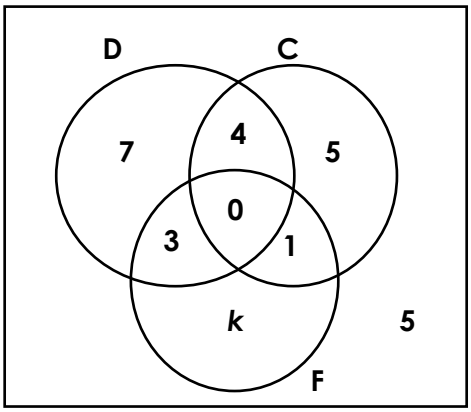
$\frac{1}{5}$ 3. Find P(A ∪ B)' and describe what this probability represents? Probability of owning neither thing

The Venn Diagram below shows the results of a survey done by a veterinarian about the types of pets owned by 26 clients. The survey was only related to dogs (D), cats (C), and fish (F).

1 4. What is the value of k?

5. How did you determine the value?

26 total : subtract 7, 4, 3, 1



If a randomly selected member is asked their preference, what is the probability that the member has:

$\frac{7}{26}$ 6. Only dogs?

$\frac{2}{13}$ 7. Dogs and cats?

$\frac{5}{26}$ 8. None of these animals?

$\frac{21}{26}$ 9. At least one of these pets?

$\frac{0}{26}$ 10. All of the pets?

$\frac{3}{26}$ 11. Fish and dogs, but not cats?

$\frac{8}{13}$ 12. Fish or dogs?

13. Determine if the following events are mutually exclusive or overlapping.
    a. **The experiment is answering multiple choice questions.**
        i. **The 1st event:** the correct answer is chosen
        ii. **The 2nd event:** the answer A is chosen.

    b. The experiment is selecting a chocolate bar.
        i. **The 1st event:** the bar has nuts
        ii. **The 2nd event:** the bar has caramel.

14. In Mr. Mabry's class, there are 12 boys and 16 girls. On Monday, 4 boys and 5 girls were wearing white shirts.

    a. If a student is chosen at random from Mr. Mabry's class, what is the probability of choosing a boy or a student wearing a white shirt?

    b. If a student is chosen at random from Mr. Mabry's class, what is the probability of choosing a girl or a student not wearing a white shirt?

15. Terry has a number cube with sides labeled 1 through 6. He rolls the number cube twice.

    a. What is the probability that the sum of two rolls is a prime number, given that at least one rolls is a 3?

    b. What is the probability that the sum of the rolls is a prime number or at least one of the rolls is a 3

13. Determine if the following events are mutually exclusive or overlapping.

c. **The experiment is answering multiple choice questions.**

i. **The 1st event:** the correct answer is chosen

ii. **The 2nd event:** the answer A is chosen.

Mutually Exclusive Events

d. The experiment is selecting a chocolate bar.

i. **The 1st event:** the bar has nuts

ii. **The 2nd event:** the bar has caramel.

Overlapping Event

14. In Mr. Mabry's class, there are 12 boys and 16 girls. On Monday, 4 boys and 5 girls were wearing white shirts.

a. If a student is chosen at random from Mr. Mabry's class, what is the probability of choosing a boy or a student wearing a white shirt?

$$\frac{17}{28}$$

b. If a student is chosen at random from Mr. Mabry's class, what is the probability of choosing a girl or a student not wearing a white shirt?

$$\frac{6}{7}$$

15. Terry has a number cube with sides labeled 1 through 6. He rolls the number cube twice.

c. What is the probability that the sum of two rolls is a prime number, given that at least one rolls is a 3?

$$\frac{4}{11}$$

d. What is the probability that the sum of the rolls is a prime number or at least one of the rolls is a 3

$$\frac{11}{18}$$