

Name: KEY

Probability/Basic Set Theory Worksheet

1. Find the union $A \cup B$ and the intersection of $A \cap B$ of the two sets A and B , where:

a. $A = \{0, 1, 2\}$ $B = \{2, 3, 4\}$

b. $A = \{x \mid 0 < x < 2\}$, $B = \{x \mid 1 \leq x < 3\}$

2. Find the complement A^c of the set A with respect to the space S if:

a. $S = \{x \mid 0 < x < 1\}$, $A = \{x \mid \frac{5}{8} < x < 1\}$

b. $S = \{(x, y, z) \mid x^2 + y^2 + z^2 \leq 1\}$, $A = \{(x, y, z) \mid x^2 + y^2 + z^2 = 1\}$

3. A random experiment consists of drawing a card from an ordinary deck of 52 playing cards. Let A denote the collection of the 13 hearts and let B denote the collection of the 4 kings. Compute $P(A)$, $P(B)$, $P(A \cap B)$, and $P(A \cup B)$.

4. If the sample space is $S = A \cup B$ and if $P(A) = 0.8$ and $P(B) = 0.5$, find $P(A \cap B)$.

5. Out of the students in class, 60% are geniuses, 70% love chocolate, and 40% fall into both categories. Determine the probability that a randomly selected student is neither a genius nor a chocolate lover.

6. Consider randomly selecting a student at a certain university, and let A denote the event that the selected individual has a Visa credit card and B be the analogous event for a MasterCard. Suppose that $P(A) = 0.5$, $P(B) = 0.4$, and $P(A \cap B) = 0.25$.

a. Compute the probability that the selected individual has at least one of the two types of cards.

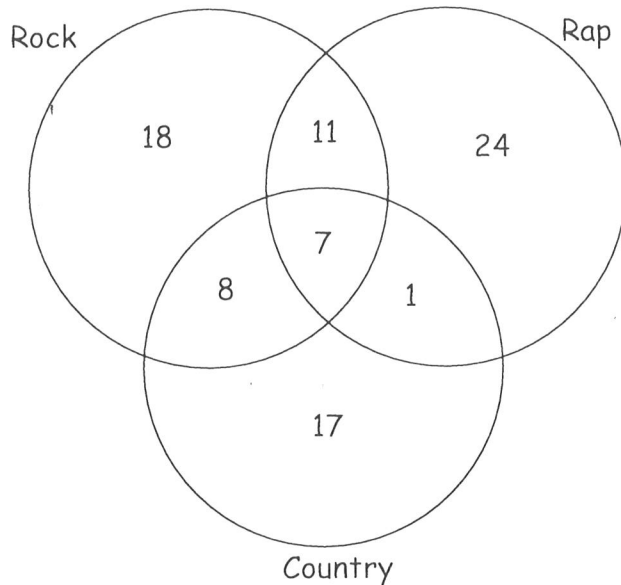
b. What is the probability that the selected individual has neither type of card?

c. Calculate the probability that the selected student has a Visa card but not a MasterCard.

7. A six-sided die is loaded in a way that each even face is twice as likely as each odd face. All even faces are equally likely, as are all odd faces. Find the probability that the outcome of one roll is less than 4.

Lesson 47 – Probabilities and Venn Diagrams

Use the Venn Diagram below to answer question #1 – 5.



1. How many total people are represented in the diagram? _____
2. How many people like country? _____
3. If one person is chosen at random, what is the probability that that person will like rap music?

$$P(\text{rap}) =$$

4. If one person is chosen at random, what is the probability that that person will like country or rock music?

$$P(\text{country or rock}) =$$

5. If one person is chosen at random, what is the probability that that person will like country and rock music?

$$P(\text{country and rock}) =$$

Lesson 47 – Probabilities and Venn Diagrams

Use the following information to fill in the Venn Diagram below.

100 people were asked if they liked Math, Science, or Social Studies. Everyone answered that they liked at least one.

56 like Math

43 like Science

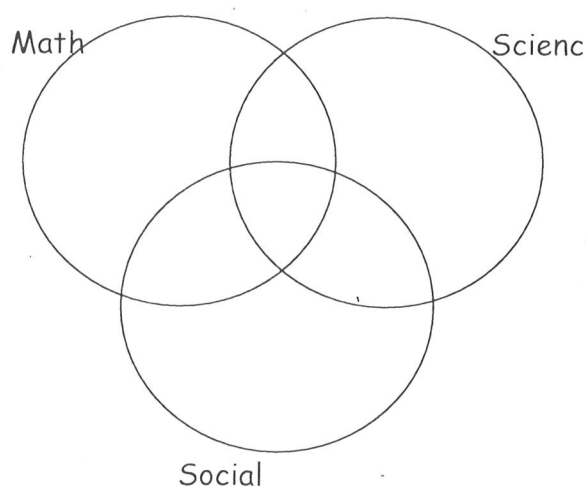
35 like Social Studies

18 like Math and Science

10 like Science and Social Studies

12 like Math and Social Studies

6 like all three subjects



6. How many people like Math only? _____
7. How many people like Science only? _____
8. If one person is chosen at random, what is the probability that that person will like Science and Math? _____.
9. If one person is chosen at random, what is the probability that that person will like only Math? _____.
10. If one person is chosen at random, what is the probability that that person will not like Science? _____.
11. If one person is chosen at random, what is the probability that that person will like Science or Math? _____.
12. If one person is chosen at random, what is the probability that that person will like Science but not math? _____.