

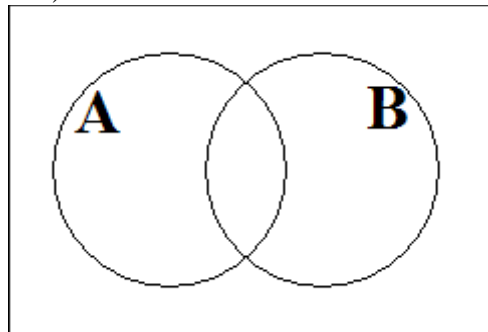
Exam 3

Answer each of the following problems to the best of your ability. Show all work.

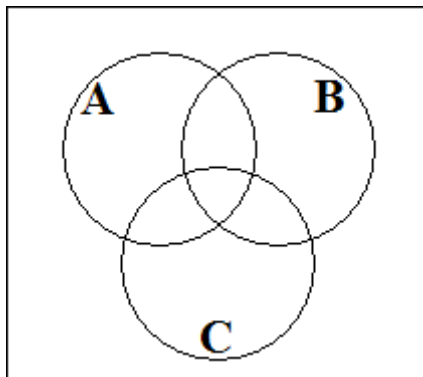
1. Answer true or false: (2 point each)
 - a. _____ $\{1,3,4,5\} \cap \{2,3,5,7\} = \{3,5\}$
 - b. _____ $\{2,4,5\} \subseteq \{2,4,5\}$
 - c. _____ $9 \notin \{x \mid x \text{ is a positive even integer less than } 10\}$
 - d. _____ $\{1,2,5,6\} = \{5,1,2,6\}$
 - e. _____ $0 \in \phi$

2. Use set-builder notation to rewrite the set $\{3,6,9,12,\dots\}$. (5 points)

3. Shade in the specified region of the following Venn diagrams:
 - a. $A' \cap B$ (5 points)



- b. $A' \cap (B \cap C)$ (5 points)



4. A person conducts a survey at a local mall and obtained the following results:
- 58 people use microwave ovens;
 - 63 use electric ranges;
 - 58 use gas ranges;
 - 19 use microwave ovens and electric ranges;
 - 17 use microwave ovens and gas ranges;
 - 4 use both gas and electric ranges;
 - 1 uses all three;
 - 2 use none of the three;

a. How many people were interviewed? (5 points)

b. How many use only microwave ovens? (5 points)

c. How many do not use a microwave oven? (5 points)

5. A card is drawn from a well-shuffled deck of 52 cards. What is the probability of each of the following:

a. A black card? (2 points)

b. A heart or a 7? (3 points)

c. An ace or a ten? (5 points)

6. Two fair dice are rolled and the sum is 9. What is the probability that the first die was a 5? (5 points)

7. Two cards are drawn (without replacement) from an ordinary deck.
 - a. What is the probability that the second is a heart, given that the first was a heart? (5 points)

 - b. What is the probability that the cards were an ace and a ten? (10 points)

8. Two fair dice are rolled. What is the probability that either the first die is a 2 or the sum of the results is a 6 or 7? (5 points)

9. Among users of ATMs, 92% use ATMs to withdraw cash, and 32% use them to check their account balance. Suppose that 96% use ATMs to either withdraw cash or check their balance (or both). Given a person who uses an ATM to check her account balance, what is the probability that she also uses an ATM to get cash? (10 points)

10. A building contractor buys 70% of his cement from supplier A and 30% from supplier B. A total of 90% of the bags from A arrive undamaged, while 95% of the bags from B arrive undamaged. What is the probability that a damaged bag arrives from supplier A? (5 points)

