

Math 142
Test #2
Spring 2021

Name: _____

Multiple Choice: Choose the answer that best fits as the solution to the question.

1. If you were to be asked to write to proof using an *indirect proof* (as the method) for the statement below, what would be trying to prove?

Given Statement: "If 2^{n-1} is a prime number, then $n < 2$."

- A) If 2^{n-1} is not a prime number, then $n \geq 2$.
- B) If $n \geq 2$, then 2^{n-1} is a not prime number.
- C) If $n > 2$, then 2^{n-1} is a not prime number.
- D) If $n < 2$, then 2^{n-1} is a not prime number.
- E) None of these

2. Suppose n is an integer and is not divisible by 9. How many remainders are possible for integer, n , when divided by 9?

- A) 7
- B) 8
- C) 9
- D) 6
- E) None of these

3. Compute: $(45 \bmod 10) - (18 \bmod 7) =$

- A) 2
- B) 5
- C) 4
- D) 1
- E) None of these

For questions 4-8, us the following information:

$U = \{-1,0,1,2,3,4,5,6,7,8,9,10\}$, $A = \{3,4,5,6,8\}$, $B = \{2,5,7,10\}$ $C = \{5,6,7,8\}$ $D = \{7,8,9,10\}$,

4. $(A \cap B \cap D)$

- A) {8}
- B) U
- C) { }
- D) {-1, 0, 1, 2, 3, 4, 5, 6, 7, 9, 10}
- E) None of these

5. $D - A =$

- A) {7, 8, 9, 10}
- B) {7, 9, 10}
- C) {2, 5}
- D) {8, 9}
- E) None of these

6. $(B \cup C)' \cap D$

- A) {2, 5, 6, 7, 8}
- B) {9}
- C) {1, 3, 4, 9, 10}
- D) {2, 4, 6, 8}
- E) None of these

7. $(A \cup B \cup C \cup D)'$

- A) {1} B) {-1, 0, 1} C) {2, 3, 4, 5, 6, 7, 8, 9, 10} D) {1, 2} E) None of these

8. $n(A \cup B \cup C)' =$

- A) {-1, 0, 1, 9}
- B) 7
- C) 4
- D) {2, 3, 4, 5, 6, 7, 10}
- E) None of these

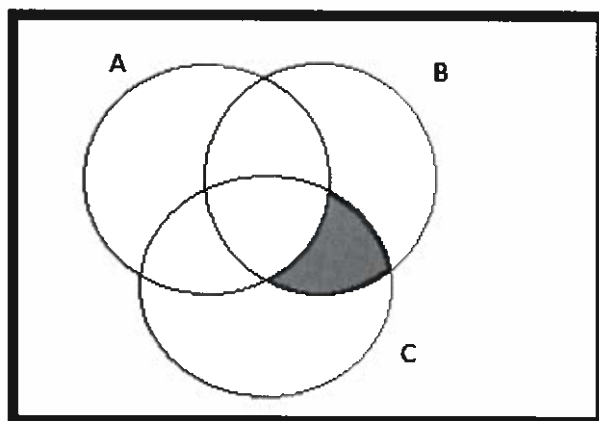
9. How many subsets exist for the empty set?

- A) 0 subsets
- B) 1 subset
- C) 2 subsets
- D) An infinite number of subsets
- E) None of these

10. Given Z is the set of integers. $U = \{Z\}$; $B = \{x : x \in Z \text{ and } x < -1\}$, find B' .

- A) $\{-1, 0, 1, 2, 3, 4, \dots\}$
- B) $\{0, 1, 2, 3, 4, \dots, 99\}$
- C) $\{0, 1, 2, 3, 4, 5, \dots\}$
- D) Z'
- E) None of these

11. Given Set A is the set of people who listen to music online, Set B is people who listen to music on CD's, and Set C is people who listen to music via the radio. What would the shaded region represent?



- A) People who listen to music online and on CD's, but not on the radio.
- B) People who listen to music on the radio and CD's, but not online.
- C) People who listen to music online or on CD's, but not the radio.
- D) People who listen to music online, CD's, and the radio.
- E) None of these.

Answer questions 12-14 given the following information:

A survey of 200 students at Radford University was taken to determine how students followed the latest news. The following information was obtained:

- 100 students followed the news via online.
- 70 students followed the news via a newspaper.
- 35 students followed the news via television.
- 20 students followed the news via both television and the newspaper.
- 15 students followed the news via both television and online.
- 18 students followed the news via both online and the newspaper.
- 10 students followed the news via all three news mediums.

12. How many students used two of the mediums to follow the news?

- A) 23
- B) 87
- C) 42
- D) 129
- E) None of these

13. How many students did not use television to follow the news?

- A) 165
- B) 38
- C) 127
- D) 165
- E) None of these

14. How many students used only online to follow the news?

- A) 119
- B) 42
- C) 77
- D) 10
- E) None of these

15. Which of the following statements are true given that Z is the set of integers, N is the set of natural numbers, Q is the set of rational numbers, and R is the set of real numbers.

- i. $R \subseteq Z^+$
- ii. $Z \subseteq Q$
- iii. $Z^- \subseteq R$
- iv. $R \subseteq Q$

- A) All of the statements are true.
- B) None of the statements are true.
- C) Only i, ii, iii are true.
- D) Only ii and iii are true.
- E) Only ii, iii, and iv are true.