

Math 142

Test #2 Review Problems

Spring 2024

Name: _____

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

For questions 1 and 2, us the following information:

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

1. $(A \cap B \cap C \cap D)' = \{8\}' = \{1, 2, 3, 4, 5, 6, 7, 9, 10\}$

A) {8}

B) U

C) { }

D) {1, 2, 3, 4, 5, 6, 7, 9, 10}

E) None of these

2. $n(B - C) = \{2, 5, 6, 8\} - \{5, 6, 7, 8\} = \{2\}$

A) {2, 6}

B) {2}

C) 2

D) 1

E) None of these

3. If a set has 1 element, how many subsets exist for the given set?

A) 1

B) 2

C) 3

D) 4

E) None of these

SUBSETS = 2^n — # OF ELEMENTS
 $= 2^1 = 2$

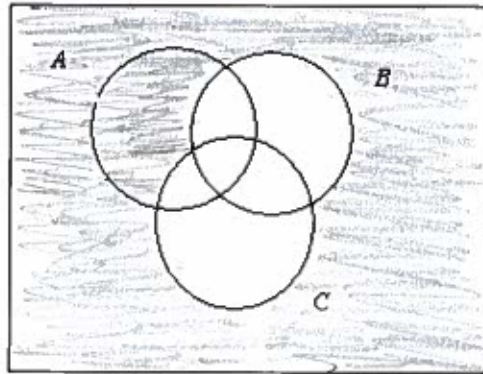
4. Given N is the set of natural numbers. $U = \{N\}$; $A = \{x : x \text{ and } x > 100\}$, find A' .

- A) $\{0, 1, 2, 3, 4, \dots, 100\}$
- B) $\{0, 1, 2, 3, 4, \dots, 99\}$
- C) $\{0, 1, 2, 3, 4, \dots, 101\}$
- D) $\{0, 1, 2, 3, 4, \dots, 98\}$
- E) $\{101, 102, 103, 104, \dots\}$

$$A = \{101, 102, 103, \dots\}'$$

$$A' = \{0, 1, 2, 3, 4, \dots, 100\}$$

5. What shaded region is given below?



- A) $(B \cup C)'$
- B) $(A \cap C) \cup B$
- C) $(A \cap B \cap C)'$
- D) $(A \cup B \cup C)'$
- E) $(A \cap C) \cup (B \cap A)$

Answer questions 6-7 given the following information:

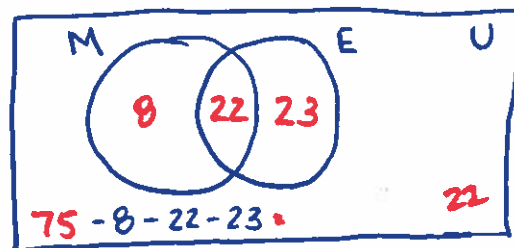
A survey of 75 students was taken and the following information was obtained:

- 30 took a Math course their first semester, freshman year.
- 45 took an English course their first semester, freshman year
- 22 students took both a math course and English course first semester of their freshman year.

6. How many students did **not take math** during their first semester, freshman year?

- A) 23
- B) 30
- C) 22
- D) 55
- E) None of these

$$23 + 22 = 45$$



7. How many students took neither of the courses during their first semester, freshman year?

- A) 23
- B) 30
- C) 22
- D) 55
- E) None of these

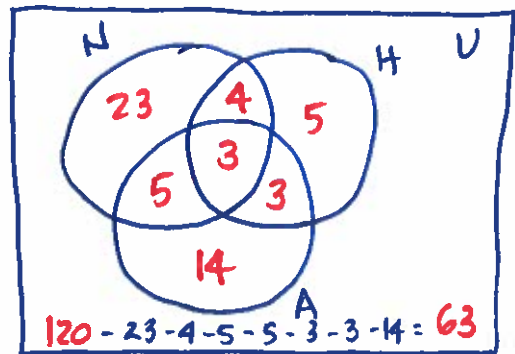
8. Given the $A = \{3, 5, 7, 9, 10\}$. Which would be defined as a subset of A?

- A) $\{\}$
- B) $\{3\}$
- C) $\{10, 9, 7\}$
- D) $\{0, 3, 5, 7, 8, 10\}$
- E) All are subsets except choice D.

Answer questions 9-11 given the following information:

A survey of 120 students was taken and the following information was obtained:

- 35 use Netflix
- 15 use Hulu
- 25 use Amazon Prime
- 7 use both Netflix and Hulu
- 6 use both Hulu and Amazon Prime
- 8 use both Netflix and Amazon Prime
- 3 use all three



9. How many students use only one streaming service?

- a. 23
- b. 5
- c. 14
- d. 42
- e. None of these

$$23 + 5 + 14 = 42$$

10. How many students use Hulu or Netflix, but not Amazon Prime?

- a. 32
- b. 23
- c. 5
- d. 4
- e. None of these

$$23 + 4 + 5 = 32$$

11. How many students use none of the listed streaming services?

- a. 120
- b. 63
- c. 57
- d. 43
- e. None of these

12. Which of the following statement(s) are true?

- i. All integers are real numbers.
- ii. All rational numbers are real numbers.
- iii. All natural numbers are rational numbers.
- iv. All integers are real numbers. ($\frac{1}{2}$)
- v. All rational numbers are integers. ($\frac{1}{3}$)

- a. All are true.
 - b. None are true.
 - c. Only ii is true.
 - d. All are true except iii.
 - e. All are true except ii.
- } i, iii, v

13. Which of the following statements are true?

- i. Positive integers are a subset of the real numbers.
- ii. Natural numbers are a subset of the integers.
- iii. Rational numbers are a subset of natural numbers. ($\frac{1}{3}$)
- iv. Integers are a subset of the natural numbers. (-2)

- a. All are true.
- b. All are false.
- c. Only i, ii is true.
- d. Only i, ii, and iii are true.
- e. Only iv is true.