

Part I – Multiple Choice

15 Marks

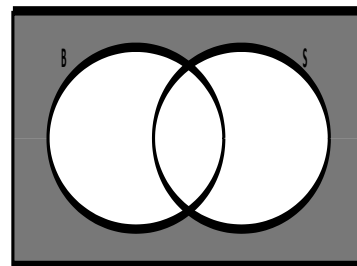
Choose the best answer for each question. Place your answer in the space provided at the end of this section.

- Which describes the set $M = \{2, 4, 6, 8\}$ in set-builder notation?
 - $M = x, \{x \mid 2 \leq x \leq 8, x \in \mathbb{N}\}$
 - $M = 2x, \{x \mid x \in I\}$
 - $M = 2x, \{x \mid x \in \mathbb{N}\}$
 - $M = 2x, \{x \mid 1 \leq x \leq 4, x \in \mathbb{N}\}$
- Which is an example of the empty set?
 - The set of days with 24 hours.
 - The set of months with less than 32 days.
 - The set of weeks with 8 days.
 - The set of years with less than 13 months.
- Which set is finite?
 - $\{x \mid x \text{ is an even prime number}\}$
 - $\{x \mid x \text{ is a fraction between 15 and 16}\}$
 - $\{x \mid x \text{ is an odd prime number}\}$
 - $\{x \mid x \text{ is a prime number}\}$
- Which two sets are disjoint?
 - The set of boys and the set of people who like sports.
 - The set of cats and the set of animals that slither.
 - The set of dogs and the set of animals that can run.
 - The set of girls and the set of people who like dancing.
- Which statement is true?
 - $\{1, 3, 4, 6\} \subset \{3, 4, 6\}$
 - $\{1, 3, 4, 6\} \subset \{3, 4, 6, 8\}$
 - $\{1, 3, 4, 6\} \subset \{1, 3, 5, 7, 9\}$
 - $\{1, 3, 4, 6\} \subset \{1, 2, 3, 4, 5, 6\}$
- Given $A = \{-9, -8, -7, \dots, 0\}$, what is the value of $n(A)$?
 - 1
 - 4
 - 9
 - 10
- Given $U = \{1, 2, 4, 5, a, b, c, d, e\}$. What is the complement of $C = \{a, b, d, e, 1, 2, 4, 5\}$?
 - \emptyset
 - $\{c\}$
 - $\{c, 3\}$
 - U

8. Given $A = \{2, 3, 7, 9\}$ and $B = \{0, 1, 2, 4, 7, 8\}$, which set represents $A \cap B$?
- (A) $\{0, 1, 3, 4, 8, 9\}$
 (B) $\{0, 1, 2, 3, 4, 7, 8, 9\}$
 (C) $\{2, 7\}$
 (D) $\{3, 9\}$
9. Given $C = \{a, c, d, e\}$ and $D = \{b, c, e, f, g\}$, which set represents $D \setminus C$?
- (A) $\{a, d\}$
 (B) $\{b, f, g\}$
 (C) $\{c, e\}$
 (D) $\{a, b, c, e, f, g\}$
10. What is the value of $n(A \cap B)$ if $n(A) = 6$, $n(B) = 10$ and $n(A \cup B) = 12$?
- (A) 2
 (B) 4
 (C) 6
 (D) 16

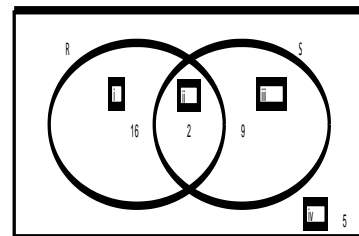
11. This Venn diagram represents the students of Holy Heart. B is the set of boys and S is the set of students who are on student council. What does the shaded area of this diagram represent?

- (A) The boys who are not on student council.
 (B) The boys who are on student council.
 (C) The girls who are not on student council.
 (D) The girls who are on student council.



12. A Girl Guide leader has 30 girls in her group. In this group, 16 of them are good runners, 11 of them are good swimmers, 2 of them are good runners and good swimmers and 5 are neither good runners nor good swimmers. Jason drew this Venn diagram to represent this information. In which region is his error?

- (A) i
 (B) ii
 (C) iii
 (D) iv

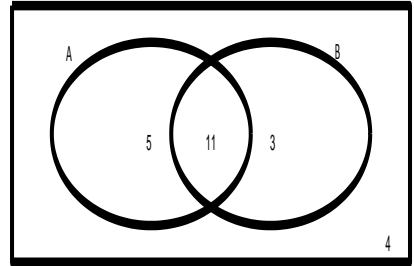


13. Let $U = \{\text{all soft drinks}\}$, $C = \{\text{soft drinks in cans}\}$, and $D = \{\text{diet soft drinks}\}$. What does the set $C \cap D'$ represent?
- (A) All diet soft drinks in cans.
 (B) All diet soft drinks not in cans.
 (C) All non-diet soft drinks in cans.
 (D) All non-diet soft drinks not in cans.

14. Given $n(U) = 60$, $n(A) = 27$, $n(B) = 19$ and $n(A \cap B) = 6$. What is the value of $n((A \cup B)')$?
- (A) 14
 (B) 20
 (C) 40
 (D) 46

15. What is the value of $n(A' \cap B)$ in this Venn diagram?

- (A) 3
 (B) 7
 (C) 8
 (D) 11



Answers for Part I

Choose the best answer for each question above. Write your answer in the space provided. Please use CAPITAL letters.

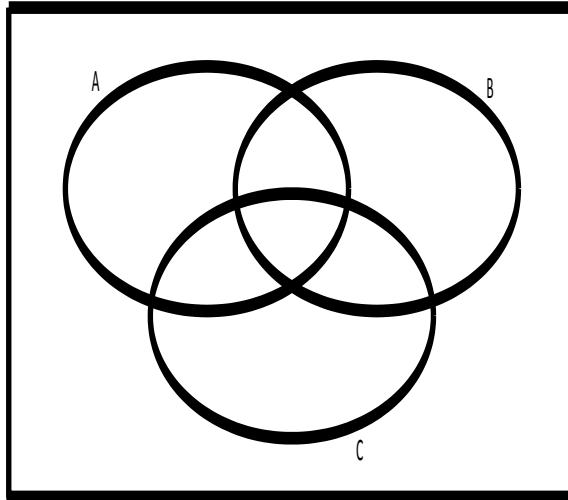
1. ____ 2. ____ 3. ____ 4. ____ 5. ____ 6. ____ 7. ____ 8. ____ 9. ____ 10. ____
 11. ____ 12. ____ 13. ____ 14. ____ 15. ____

Answer each question in the space provided. You MUST show ALL your workings to receive full marks. Correct answers based on incorrect mathematical reasoning will NOT receive full marks.

16. Let $U = \{1, 2, 3, 4, 5, 6, 7, 8\}$, $A = \{1, 3, 4, 6\}$, $B = \{3, 6, 7\}$ and $C = \{x \mid x \in U \text{ and } x \text{ is an even numbers greater than } 3\}$.

(A) Illustrate the given sets on a Venn diagram.

(4 Marks)



(B) Determine $(A \cup B)'$.

(1 Mark)

(C) Determine $A \setminus C$.

(1 Mark)

(D) Determine $B' \setminus A$.

(1 Mark)

17. If $n(S \cup T) = n(S) + n(T)$, what can you conclude about sets S and T ?

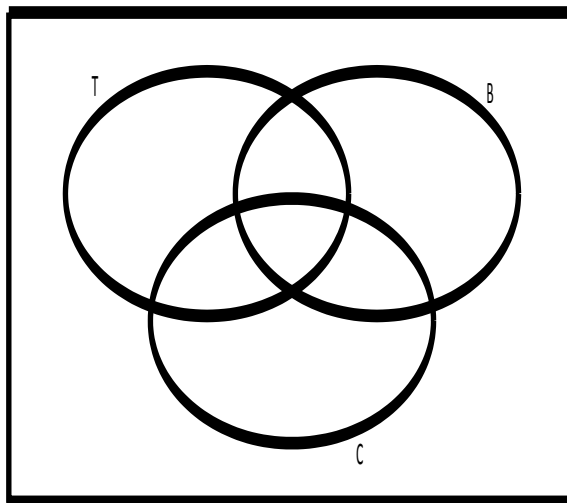
(1 Mark)

18. The Lettuce Romaine Friends Club, which consists of people from St. John's who have small vegetable gardens, obtained the following information from its members:

- 80 grew tomatoes
- 69 grew green beans
- 58 grew carrots
- 23 grew all three
- 19 grew carrots and beans but not tomatoes
- 31 grew only tomatoes
- 33 grew tomatoes and beans
- 21 grew neither tomatoes nor carrots nor beans.

(A) Illustrate the given information on a Venn diagram.

(4 Marks)



(B) How many members are in the club?

(1 Mark)

(C) How many grew carrots or beans but not tomatoes?

(1 Mark)

(D) How many grew tomatoes or beans?

(1 Mark)

19. NTV television station sent out questionnaires to determine if viewers would rather see a documentary, an interview show or reruns of a game show. There were 900 responses with the following results:

- 395 were interested in a documentary.
- 595 were interested in an interview show.
- 340 were interested in reruns.
- 65 were interested in all three.
- 175 were interested in documentaries and interview shows but not reruns.
- 190 were interested in interview shows and reruns but not documentaries.
- 120 were interested in none of the three.

How many are interested in exactly one kind of show?

(8 Marks)

