



ENGLISH PROGRAM

SIRINDHORN SCHOOL

Surin, Thailand 32000

TERM 1/ ACADEMIC YEAR 2023 - 2024

MIDTERM EXAMINATION

Subject: Basic MathematicsDate: July 19, 2023Subject Code: ๓31101Time: 09:40 – 11:10Year Level: Matthayom 4Time Allowed: 90 minutesClass Sections: M4/15Teacher: Ms. Amy Caballero Suralta

Explanation : This test has two parts and has 10 pages including the cover page.

Part I : Multiple – Choice with 4 choices (40 points)

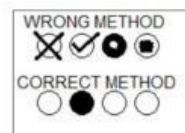
Instructions : 1. Answer sheet should not be folded or crushed.

2. Choose only one answer that is most accurate or appropriate.

3. Circle must be appropriately and totally darkened. Either use a blue or black pen or pencil.

4. To deselect, entirely erase the circle that has been marked.

5. Calculators and other electronic devices are not allowed.



Part II : Problem Solving (30 points)

6. Show your solutions on your answer sheet.

Test Topics in the Curriculum	
Unit 1	Sets • Sets, definitions and elements • Set operations • Set operations and Venn Diagrams • Properties of sets • Applications on sets and set operations

This exam is checked and reviewed by:

(Ms. Amy C. Suralta)

Math Teacher

(Miss Supranee Nakngam)

Head of EP Department

MATTHAYOM 4 BASIC MATHEMATICS
MIDTERM EXAM TERM 1 /Academic Year 2023 – 2024
TEST QUESTIONNAIRE

Subject: Basic MathematicsDate: July 19, 2023Subject Code: ๓31101Time: 09:40 – 11:10Year Level: Matthayom 4Time Allowed: 90 minutesClass Sections: M4/15Teacher: Ms. Amy Caballero Suralta

Part 1: Multiple – Choice (40 items)

- Which of the following best defines a set?
 - an ordered collection of distinct objects
 - a mathematical operation
 - a variable in a programming language
 - a conditional statement
- Which of the following represents a set?
 - $2x + 5 = -10$
 - $x \geq 5$
 - $y^2 - 2 = 35$
 - $\{1, 2, 3, \dots\}$
- Which of the following illustrates an overlapping region in a Venn diagram?
 - Union
 - intersection
 - complement
 - subset
- Given $A \subset B$, which of the following statement is true?
 - $A \cap B = A$
 - $A \cup B = U$
 - $A \cup B = A$
 - $A \cap B = A'$
- Which of the following indicates the region outside all three circles in a Venn diagram with three sets A, B, and C?
 - $A \cup B \cup C$
 - $A \cap B \cap C$
 - $(A \cup B \cup C)'$
 - $(A \cap B \cap C)'$
- Which of the following is the correct set-builder notation for the set of even numbers not less than 10?
 - $\{x/x \text{ is an even number and } x < 10\}$
 - $\{x/x \text{ is an even number or } x < 10\}$
 - $\{x/x \text{ is an even number and } x \geq 10\}$
 - $\{x/x \text{ is an even number and } x > 10\}$
- If $A \subset B$, which of the following statements is true?
 - A is a proper subset of B
 - A is a superset of B
 - A and B are disjoint sets
 - A is an empty set

8. In a Venn diagram, if A represents all the students who study Math and B represents all the students who study Art, what does $A \cup B$ represent?

- a. Students who study both Math and Art
- b. Students who study either Math or Art or both
- c. Students who study only Math
- d. Students who study neither Math nor Art.

9. How many elements are in the power set of a set with n elements?

- a. 2^n
- b. $n!$
- c. n^2
- d. $2n$

10. What is a Universal set?

- a. A set that contains all other sets.
- b. The set that has the largest cardinality.
- c. A set that doesn't contain any elements.
- d. A set that contains only one element.

11. Which of the following operation is equivalent to $(A \cup B)'$, according to De Morgan's Law?

- a. $A' \cup B'$
- b. $A' \cap B'$
- c. $A - B'$
- d. $A - B$

12. Which of the following is not equal to A ?

- a. $A \cup A$
- b. $A \cap \emptyset$
- c. $(A')'$
- d. $A \cap U$

13. Given set $A = \{1, 3, 5\}$ how many power sets does set A have?

- a. 6
- b. 7
- c. 8
- d. 4

14. What are the subsets of set B if it contains all prime numbers not more than 10?

- a. $\{2, 3, 5, 7\}$
- b. $\{2, 3, 5, 7, \{ \}, \{2\}, \{3\}, \{5\}, \{7\}, \{2, 3\}, \{2, 5\}, \{2, 7\}, \{3, 5\}, \{3, 7\}, \{5, 7\}, \{2, 5, 7\}, \{2, 3, 5\}, \{2, 3, 7\}, \{3, 5, 7\}\}$
- c. $\{1, 2, 3, 5, 7, 9\}$
- d. $\{2\}, \{3\}, \{5\}, \{7\}, \{2, 3\}, \{2, 5\}, \{2, 7\}, \{3, 5\}, \{3, 7\}, \{5, 7\}, \{2, 5, 7\}, \{2, 3, 5\}, \{2, 3, 7\}, \{3, 5, 7\}$

For items 15 – 20.

Given : $U = \{\text{set of natural numbers at most } 10\}$

$A = \{\text{set of even numbers}\}$

$B = \{\text{set of prime numbers}\}$

$C = \{1, 2, 4, 8\}$

15. Which of the following are elements of set A ?

a. $\{2, 4, 6, 8, 10\}$

b. $\{2, 4, 6, 8\}$

c. $\{0, 2, 4, 6, 8, 10\}$

d. $\{0, 2, 4, 6, 8\}$

16. What are the elements of the Universal set U ?

a. $\{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

b. $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

c. $\{1, 2, 3, 4, 5, 6, 7, 8, 9, \dots\}$

d. $\{1, 2, 3, 4, 5, 6, 7, 8, 9\}$

17. Which of the following are elements of set B ?

a. $\{1, 2, 3, 5, 7, 9, 11\}$

b. $\{2, 3, 5, 7\}$

c. $\{1, 3, 5, 7, 9\}$

d. $\{1, 2, 3, 5, 7\}$

18. What are the elements of set $C' - (A \cup B)$?

a. $\{3, 5, 6, 7, 9, 10\}$

b. $\{9\}$

c. $\{3, 5, 6, 7, 9\}$

d. $\{7, 9\}$

19. What are the elements of $(A \cup B)' \cap C'$?

a. $\{1, 9\}$

b. $\{1, 9, 10\}$

c. $\{9\}$

d. $\{2, 4, 8\}$

20. Which of the following operations has the elements $\{3, 5, 7\}$?

a. $A - B$

b. $B - A$

c. $(A \cup B) - C$

d. $B \cap U$

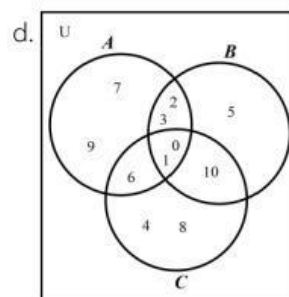
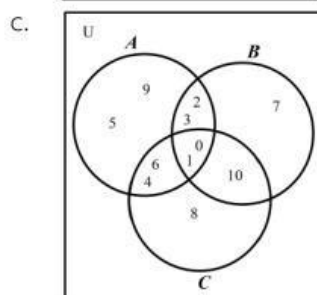
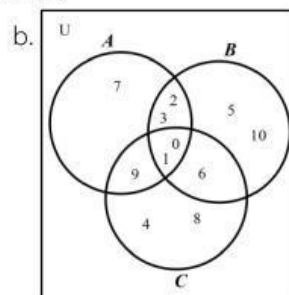
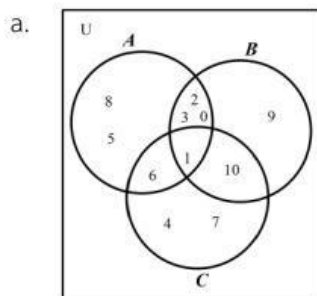
For items 21 – 25.

Given : $(A \cup B \cup C)' = \emptyset$, $A \cap B = \{0, 1, 2, 3\}$, $A \cap C = \{0, 1, 6\}$, $B \cap C = \{0, 1, 10\}$,

$A \cup B = \{0, 1, 2, 3, 5, 6, 7, 9, 10\}$

$A \cup C = \{0, 1, 2, 3, 4, 6, 7, 8, 9, 10\}$

21. Which Venn diagram best describes the three sets: A, B and C ?



22. What are the elements of $(B' - A')'$?

a. $\{7, 6, 9\}$

b. $\{0, 1, 2, 3, 4, 5, 8, 10\}$

c. $\{0, 1, 2, 3, 7, 8, 10\}$

d. $\{0, 1, 2, 3, 4, 7, 9, 10\}$

23. What are the elements of the set $(A - B) \cap C'$?

a. $\{7\}$

b. $\{8, 5\}$

c. $\{7, 9\}$

d. $\{5, 9\}$

24. What are the elements of the set $A' - (B \cap C)$?

a. $\{4, 5, 8\}$

b. $\{4, 5, 8, 10\}$

c. $\{4, 7, 9\}$

d. $\{7, 8\}$

25. What are the elements of $C \cap (A - B)'$?

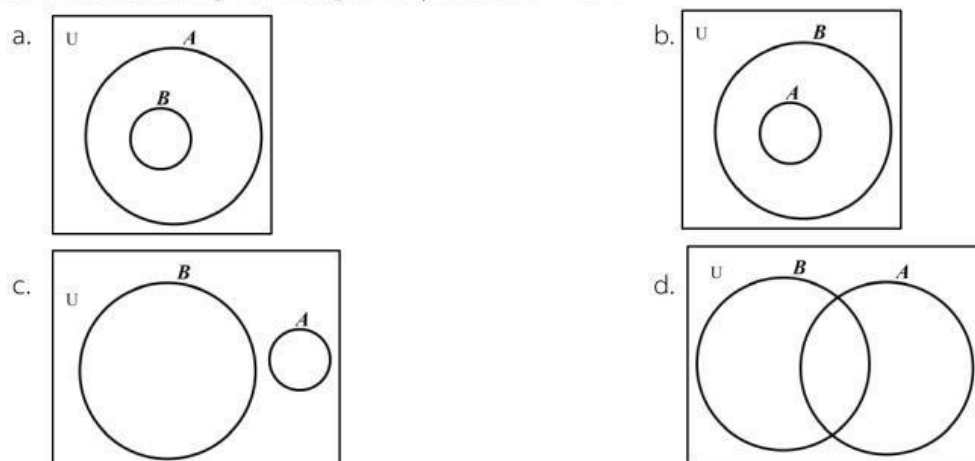
a. $\{4, 8, 10\}$

b. $\{4, 8\}$

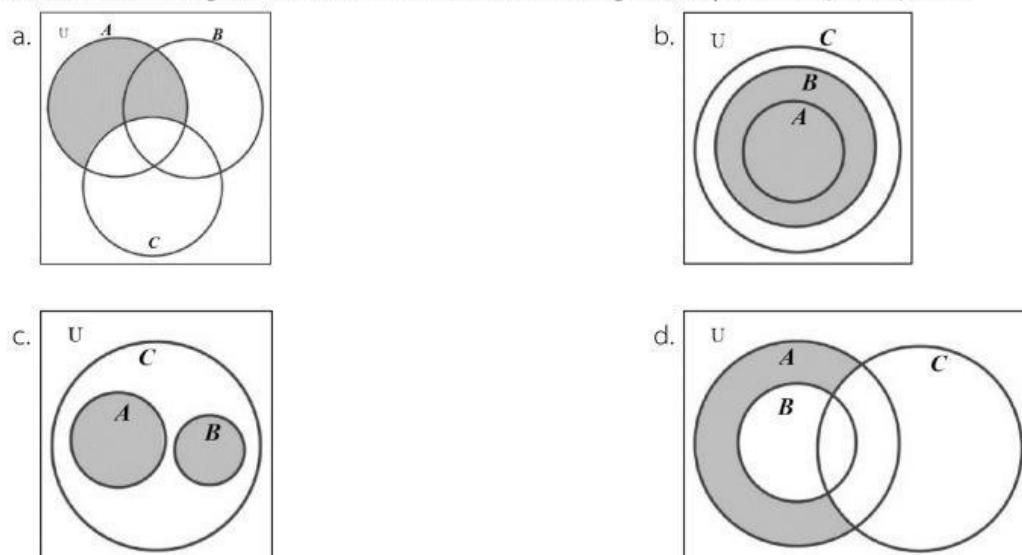
c. $\{4, 7\}$

d. $\{4\}$

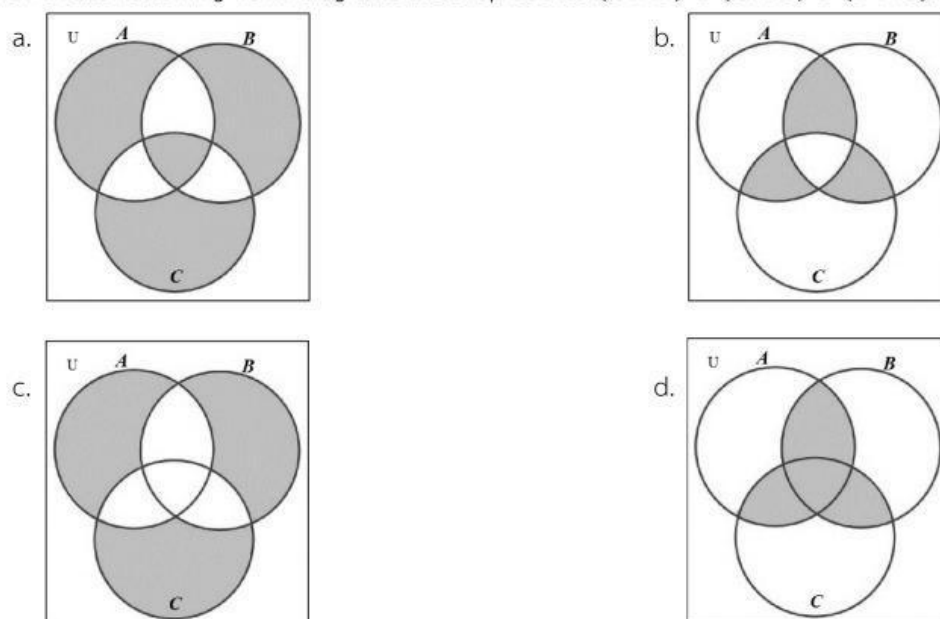
26. Which of the following Venn diagram represents $B \subset A$?



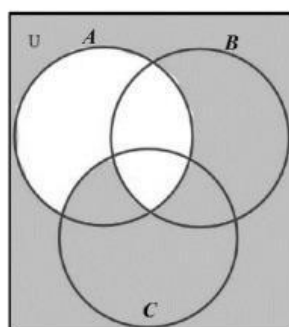
27. Look at the Venn diagrams below, which of the following best represents $(A \cup B) \cap C$?



28. Which of the following Venn diagrams best represents $(A \cap B) \cup (A \cap C) \cup (B \cap C) - (A \cap B \cap C)$?

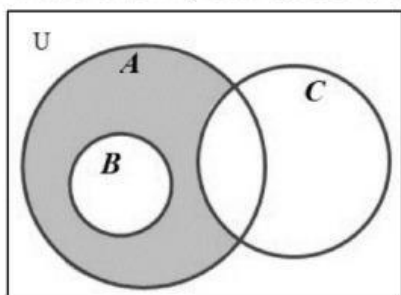


29. Which of the following set operations is best represented by the Venn diagram below?



- a. $A' \cup (B' \cap C)$
- b. $(A \cap C') \cap B'$
- c. $(A - B) \cup C'$
- d. $C \cap A' \cap B'$

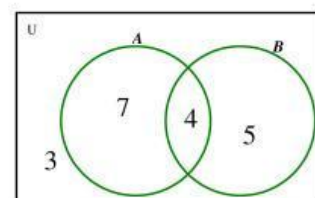
30. Which of the following best represents the diagram below?



- a. $A \cap C'$
- b. $(A \cap B) - C$
- c. $B \cup (A \cap C)$
- d. $(A - B) - C$

For items 31 – 33.

Given a diagram on the right, $A = \{\text{students like to study Math}\}$
 $B = \{\text{students like to study Science}\}$



31. How many numbers of students who like to study Math but not Science?

- a. 4
- b. 7
- c. 16
- d. 10

32. How many students who like to study both Math and Science?

- a. 16
- b. 12
- c. 4
- d. 8

33. How many students dislike neither math nor Science?

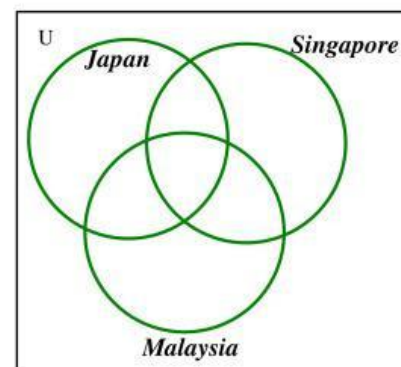
- a. 4
- b. 3
- c. 16
- d. 19

34. What is the value of $n(A \cup B')$?

- a. 10
- b. 7
- c. 14
- d. 9

For items 35 –37.

Given: In a class of 40 students, 18 have traveled to Japan, 15 have been to Singapore, 5 have been to both Singapore and Japan, and 12 have been to Malaysia. Only one student has traveled to each of the three countries mentioned; three students have only been to Malaysia, and seven students have only been to Singapore.



35. How many students who visited both Singapore and Malaysia?

- a. 6 b. 3 c. 24 d. 21

36. What is the value of $n[J' \cap (S \cup M)]$?

(Hint : J = Japan, S= Singapore, M=Malaysia)

- a. 22 b. 34 c. 12 d. 32

37. How many students have been to Singapore but not Japan or Malaysia?

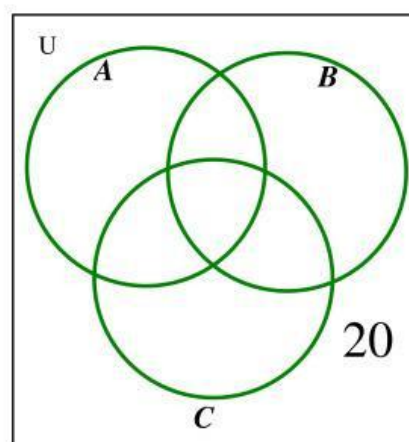
- a. 17 b. 15 c. 25 d. 7

For items 38 – 40.

Given a Venn diagram on the right.

$$n(A) = 31, n(B) = 35, n(C) = 44, n(A \cup B) = 46,$$

$$n(A \cup C) = 61, n(B \cup C) = 59 \text{ and } n(A \cap B \cap C) = 8$$



38. What is the value of $n(A \cap B)$?

- a. 12 b. 10 c. 28 d. 20

39. What is the value of $n(A \cap C)'$?

- a. 76 b. 54 c. 50 d. 70

40. What is the value of $n(A \cup B \cup C)$?

- a. 28 b. 74 c. 64 d. 48

MIDTERM EXAMINATION

MA31101 (Basic Mathematics 4)

Term 1 Academic Year 2023 – 2024

ANSWER SHEET

Nickname: _____ No. _____ M4/15

Part 1: Multiple – Choice Test (40 points)

Instruction for filling the sheet

1. This sheet should not be folded or crushed
2. Use only blue/black ball pen or 2HB pencil
3. Circle should be darkened completely and properly
4. Erase marked circle completely for deselect

WRONG METHOD



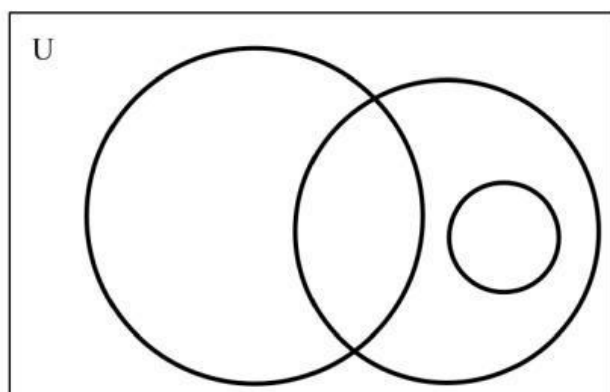
CORRECT METHOD



Class No	M4/15	A B C D	A B C D
0	Midterm exam term 1 2023	17	34
1	A B C D	18	35
2	1	19	36
3	2	20	37
4	3	A B C D	38
5	4	21	39
6	5	22	40
7	A B C D	23	
8	6	24	
9	7	25	
	8	A B C D	
	9	26	
	10	27	
	A B C D	28	
	11	29	
	12	30	
	13	A B C D	
	14	31	
	15	32	
	16	33	

Part 2: Problem Solving (30 points)

1. Label each set and complete the Venn diagram to show this information given below.

Given : $U = \{1, 2, 3, 4, 5, \dots, 15\}$ $A = \{\text{set of even numbers less than 15}\}$ $B = \{\text{set of factors of 20, } 1 \leq x < 20\}$ $5 \in C, n(C) = 1 \text{ and } C \cap A = \emptyset$ 

List the elements of the following sets below:

 $A = \{ \quad \quad \quad \}$ $B = \{ \quad \quad \quad \}$ $C = \{ \quad \quad \quad \}$

1.1 $A' \cap (B \cap C) =$

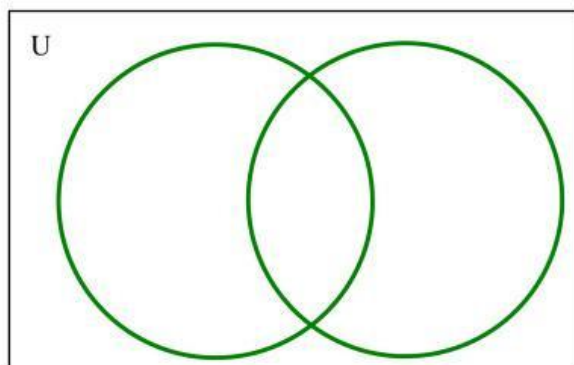
1.2. $(A \cap C') \cup B' =$

1.3. $C' - (A \cap B)' =$

1.4. $(B - A) - C =$

2. Label each set and complete the Venn diagram to show this information given below.

Given: $n(U) = 85$, $n(A) = 39$, $n(B) = 30$, $n(A \cap B) = 11$



Write all the number of elements in each set below:

2.1. $n(A - B) =$

2.4. $n(B') =$

2.2 $n(B - A) =$

2.5. $n(B \cup A) =$

2.3. $n(A') =$

2.6. $n[(A \cup B)'] =$

3. In a survey of 60 cars, 25 use diesel, 24 use liquid hydrogen and 22 use electricity. No cars use all three fuels and 12 cars use both diesel and electricity. There are 7 cars which use diesel only, 14 cars which use liquid hydrogen only and 6 cars which use electricity only.

In the Venn diagram below.

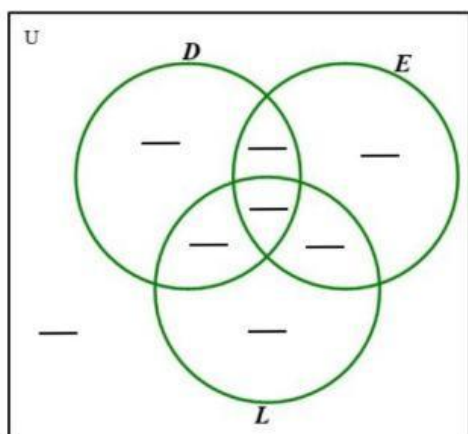
$U = \{\text{cars in the survey}\}$

$D = \{\text{cars which use diesel}\}$

$E = \{\text{cars which use electricity}\}$

$L = \{\text{cars which use liquid hydrogen}\}$

Use the information above to label each set and fill in the information of the Venn Diagram below:



3.1 Find the number of cars which use diesel but not electricity.

3.2 Find $n(D' \cap (E \cap L))$
