ALBERTA DISTANCE LEARNING CENTRE

Mathematics 30-2

MAT3792

Unit 1: Set Theory

Unit Assignment

Student's Questions and Comments

FOR STUDENT USE ONLY

Student Name:

_____

FOR ADLC USE ONLY

Assigned to

_____

Marked by

_____

Date received

_____

Summary

	Marks Earned	Total Marks	Percent
Unit 1 Assignment		**46**	

Teacher's Comments:

_____

Teacher's Signature

REVISED December 2019

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Unit 1: Set Theory
Unit Assignment

Read the course material and complete the practice questions in the Unit 1 Set Theory Guide for Learning Booklet before working on this Unit Assignment. The following chart shows you which lesson to review if you're having difficulty with the questions in this assignment booklet.

Unit Assignment Question	Lesson
1, 2	1A
3, 4, 5, 6, 7, 8	1B
9, 10	1C
11	*Logic and Reasoning

*Contact your teacher if you need help with Logic and Reasoning.

For full marks, show all calculations, steps, and/or explain your answers.

Total Marks: 46

1. Consider the following sets:

$$C: \{x \mid -5 \le x \le -1\}$$
$$D: \{y \mid 1 \le y \le 5\}$$

Are sets C and D disjoint or intersecting sets? Use words or a diagram to explain your answer. (2 marks)

2. Consider the following sets:

$$U = \{x \mid 1 \le x \le 50, x \in N\}$$
$$P = \{\text{numbers that are perfect squares}\}$$
$$N = \{\text{numbers that are not perfect squares}\}$$
$$E = \{\text{even perfect square numbers}\}$$

The Venn diagram that correctly represents the sets above is Diagram _____. (1 mark)

Diagram 1

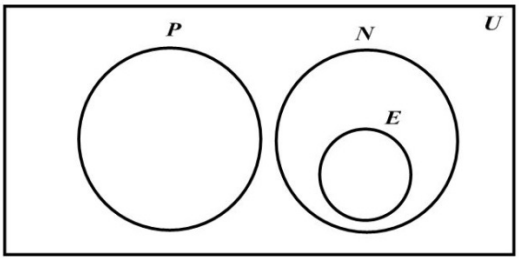


Diagram 2

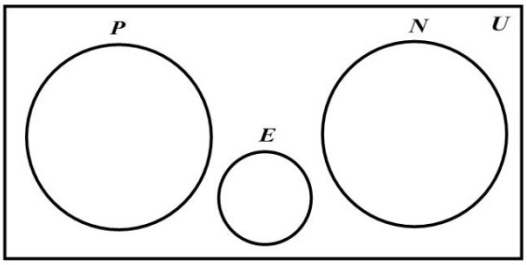


Diagram 3

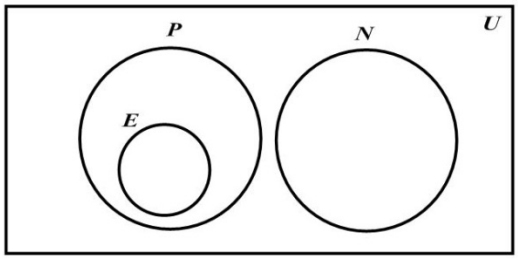
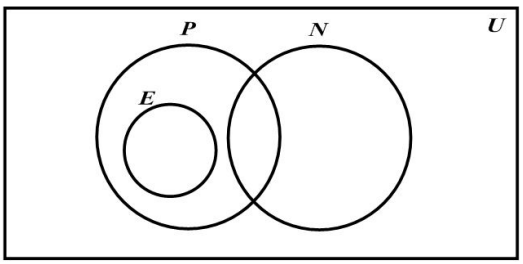


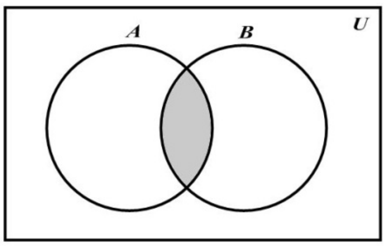
Diagram 4

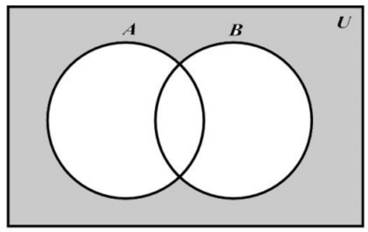


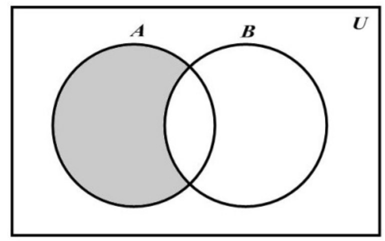
3. A local high school offers a hockey or a soccer program for its Grade 12 students. There are 75 students enrolled in hockey and 60 students enrolled in soccer. However, there are only 100 students in Grade 12. Explain how this is possible. (1 mark)

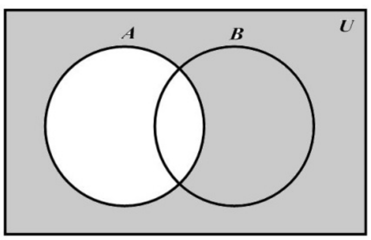
4. Match the following sets with the diagram that has the shaded region representing it. Write the set on the line below the diagram. (9 marks)

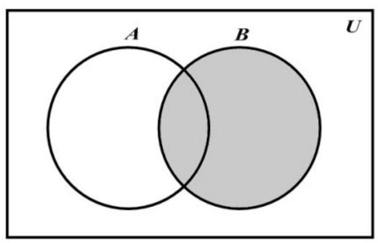
$A \cup B$	$A \cap B$	$A \setminus B$
$B \setminus A$	B	$(A \cup B)'$
$(A \cap B)'$	A'	B'

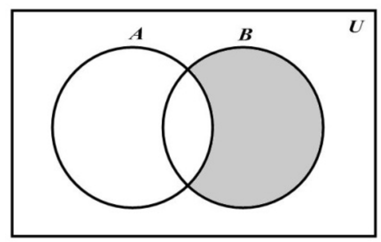


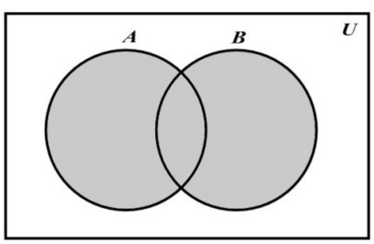


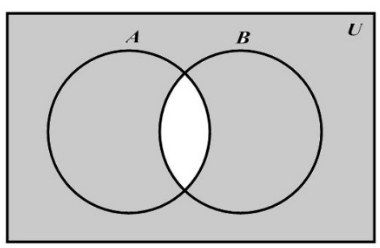


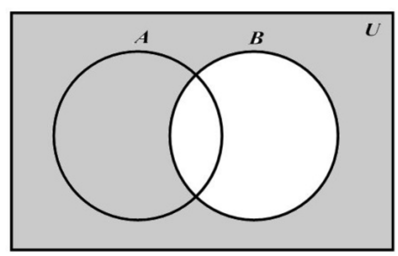




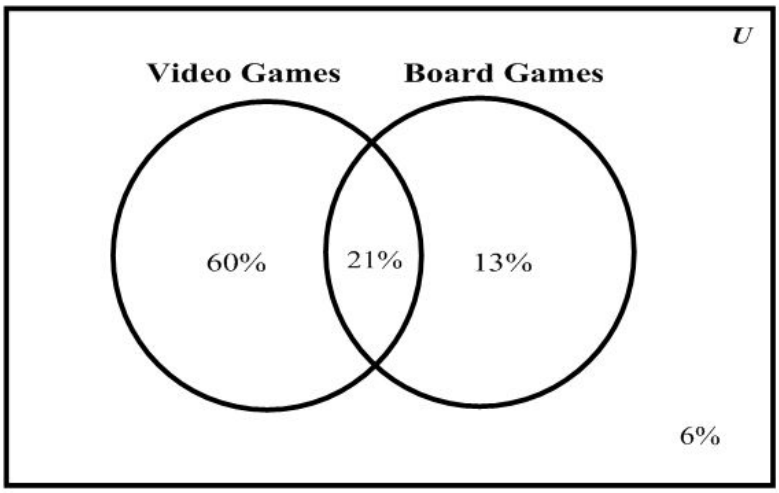








5. The organizers of an after-school program surveyed the students to find out if they would be interested in playing video games or board games. The survey results can be found in the Venn diagram below.



State the percentage of students that want to play:

a. video games only (1 mark)

b. board games (1 mark)

c. neither (1 mark)

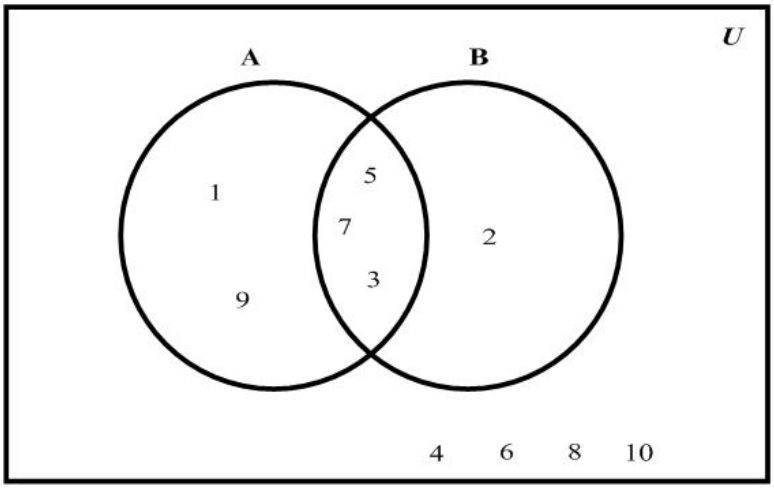
d. video games and board games (1 mark)

e. video games or board games (1 mark)

f. board games but not video games (1 mark)

6. Use the Venn diagram to answer the questions.

$U = \{x \mid 1 \le x \le 10, x \in N\}$
$A = \{\text{odd numbers}\}$
$B = \{\text{prime numbers}\}$



Write the following using the Roster Method:

a. The element(s) in set A. (1 mark)

b. The element(s) in set B. (1 mark)

c. The element(s) in A union B. (1 mark)

d. The element(s) in the complement of A. (1 mark)

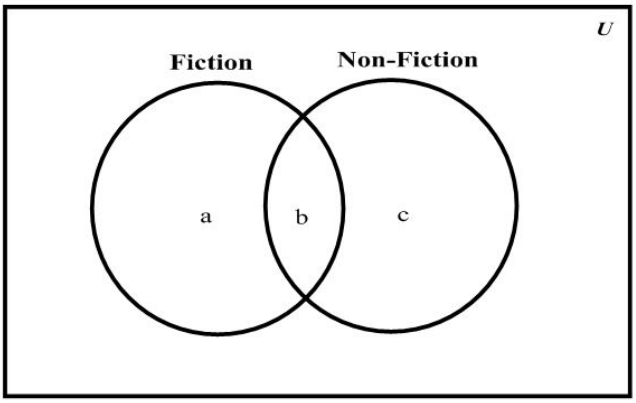
e. List the element(s) in A intersection B. (1 mark)

f. State $n\{U\}$. (1 mark)

g. State $n\{A \cup B\}'$. (1 mark)

h. State $n\{B \setminus A\}$. (1 mark)

7. People leaving a library were surveyed to determine if they read fiction or non-fiction books. Out of 200 people surveyed, 150 read fiction and 70 read non-fiction.



State the values of a, b, and c that would correctly complete the diagram. (3 marks)

a. _____ b. _____ c. _____

8. Consider the following sets.

Set	Set Description
J	{factors of 24}
K	{multiples of 4 between 0 and 30}
L	{5, 7, 9, 10, 11, 13}
M	(1, 2, 3}
U	The Universal set containing only the sets J, K, L and M.

Is each statement is true or false? For false statements, justify your answer.

a. $J \cap L = \varnothing$ (1 mark)

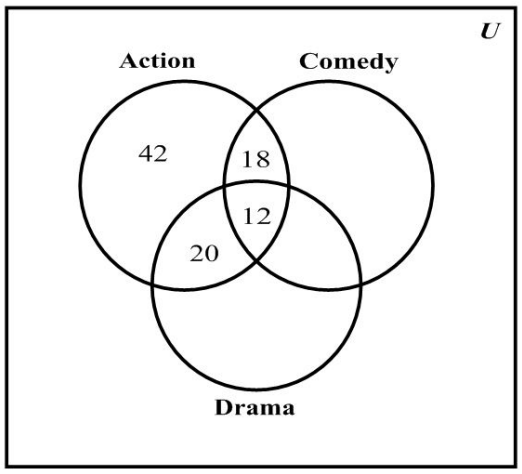
b. J and K are disjoint sets. (1 mark)

c. $J \subset M$ (1 mark)

d. $L' = J \cup K$ (1 mark)

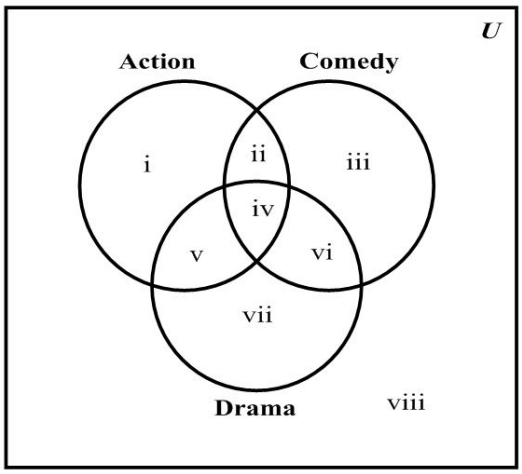
9. An online survey asked movie goers about the type of movies they like to watch. Based on the survey results, a student started to complete the Venn diagram shown.

Action	42%
Comedy	46%
Drama	47%
Action and Drama	20%
Comedy and Action	18%
Comedy and Drama	16%
All three types	12%



a. Identify and describe the error(s) that the student made. (1 mark)

b. Correctly complete the Venn diagram below by filling in the values for each region. (4 marks – 0.5 marks each)



i. _____ ii. _____ iii. _____ iv. _____

v. _____ vi. _____ vii. _____ viii. _____

10. A survey was conducted at a local food court. People were asked if they would like to have a pizza, a sandwich, or a burger for lunch. The following data was collected:

    - 123 people would like a pizza
    - 88 people would like a sandwich
    - 120 people would like a burger
    - 35 people would like a pizza and a sandwich, but not a burger
    - 18 people would like a sandwich and a burger, but not a pizza
    - 42 people would like a pizza and a burger, but not a sandwich
    - 28 people would like all three foods for lunch
    - 20 people would not like to have any of the three choices for lunch

    a. In the space below, draw a Venn diagram to represent this data. (4 marks)

    b. How many people were surveyed? (1 mark)

    c. How many people would like to have at least one of these choices for lunch? (1 mark)

11. Patterns and Games: Making a Comparison (1 mark)

    A student makes the following statement:

    "The word MATHEMATICS compares to the word CASH as the number 12345123678 compares to the number _____."

    The 4 digit number that completes the statement is _____ .

End of Assignment

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