SET THEORY

A DEFINITIONS

A.1 SET

A.1.1 LISTING THE ELEMENTS

MCQ 1: List the elements of the set A, which includes all objects shown in this figure:

Choose one answer:

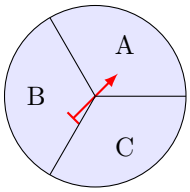
- ☐ $A =$ die, coin, duck
- ☐ $A = \{$duck, coin$\}$
- ☐ $A = \{$die, duck, coin$\}$

MCQ 2: List the elements of the set A, which includes all objects in this figure:

Choose one answer:

- ☐ $A =$ apple, cherry, lemon, orange
- ☐ $A = \{$apple, cherry$\}$
- ☐ $A = \{$apple, cherry, lemon, orange$\}$
- ☐ $A = \{$apple, cherry, lemon, orange, apple$\}$

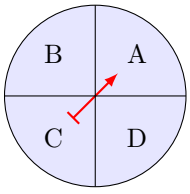
MCQ 3: List the elements of the set A, which includes all possible results the spinner can land on:



Choose one answer:

- ☐ $A = \{A, B, C\}$
- ☐ $A = \{A, B\}$
- ☐ $A = \{A, C\}$

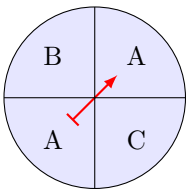
MCQ 4: List the elements of the set A, which includes all possible results the spinner can land on:



Choose two correct answers:

- ☐ $A = \{A, B, C, D\}$
- ☐ $A = \{A, B, C\}$
- ☐ $A = \{A, B\}$
- ☐ $A = \{D, B, C, A\}$

MCQ 5: List the elements of the set A, which includes all possible results the spinner can land on:



Choose one answer:

- ☐ $A = \{A, B, A, C\}$
- ☐ $A = \{A, B\}$
- ☐ $A = \{A, C\}$
- ☐ $A = \{A, B, C\}$

MCQ 6: Let A be the set of all possible combinations of two children in a family, where B means boy and G means girl (e.g., BG is a boy then a girl). List the elements of A.

Choose one answer:

- ☐ $A = \{BB, BG, GB, GG\}$
- ☐ $A = \{BB, GG\}$
- ☐ $A = \{B, G\}$

A.1.2 LISTING THE ELEMENTS IN ARITHMETIC

MCQ 7: What is the set A of all factors of 6?

Choose one answer:

- ☐ $A = \{1, 2, 3, 6\}$
- ☐ $A = \{0, 6, 12, 18, 24, \ldots\}$
- ☐ $A = \{0, 6, 12, 18, 24\}$
- ☐ $A = \{2, 3\}$

MCQ 8: What is the set A of all prime numbers between 1 and 10?

Choose one answer:

- ☐ $A = \{1, 2, 3, 5, 7\}$
- ☐ $A = \{2, 4, 6, 8, 10\}$
- ☐ $A = \{3, 5, 7, 9\}$
- ☐ $A = \{2, 3, 5, 7\}$

MCQ 9: What is the set A of all factors of 8?

Choose one answer:

- ☐ $A = \{1, 2, 4, 8\}$
- ☐ $A = \{0, 8, 16, 24, 32, \ldots\}$

☐ $A = \{2, 4, 6\}$

☐ $A = \{1, 3, 5, 7\}$

MCQ 10: What is the set A of all prime numbers between 10 and 20?

Choose one answer:

☐ $A = \{11, 13, 15, 17\}$

☐ $A = \{10, 12, 14, 16, 18\}$

☐ $A = \{13, 15, 17, 19\}$

☐ $A = \{11, 13, 17, 19\}$

A.1.3 CHECKING MEMBERSHIP

Ex 11: 2 ☐ $\in$ ☐ $\notin$ $\{1, 2, 3, 4, 5, 6\}$

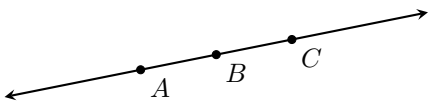
Ex 12: 7 ☐ $\in$ ☐ $\notin$ $\{1, 2, 3, 4, 5, 6\}$

Ex 13: d ☐ $\in$ ☐ $\notin$ $\{a, b, c, d\}$

Ex 14: z ☐ $\in$ ☐ $\notin$ $\{a, b, c, d\}$

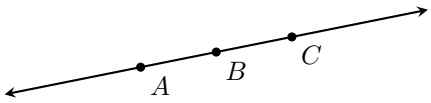
A.1.4 CHECKING MEMBERSHIP IN GEOMETRY

Ex 15:



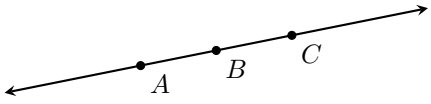
C ☐ $\in$ ☐ $\notin$ $\overleftrightarrow{AB}$

Ex 16:



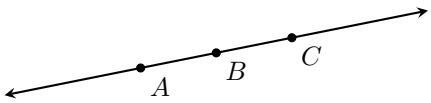
C ☐ $\in$ ☐ $\notin$ $\overline{BA}$

Ex 17:



B ☐ $\in$ ☐ $\notin$ $\overline{AC}$

Ex 18:



A ☐ $\in$ ☐ $\notin$ $\overleftrightarrow{BC}$

A.1.5 CHECKING SET EQUALITY

MCQ 19: Is this statement true or false?
$\{a, b, c\} = \{b, a, c\}$

Choose one answer:

☐ True

☐ False

MCQ 20: Is this statement true or false?
$\{a, b, c, d\} = \{a, b, c, d, e\}$

Choose one answer:

☐ True

☐ False

MCQ 21: Is this statement true or false?
$\{1, 2, 3\} = \{2, 1, 3\}$

Choose one answer:

☐ True

☐ False

MCQ 22: Is this statement true or false?
$\{1, 2, 3, 4\} = \{1, 2, 3, 4, 5\}$

Choose one answer:

☐ True

☐ False

A.2 NATURAL NUMBERS

A.2.1 CHECKING MEMBERSHIP

Ex 23: 2 ☐ $\in$ ☐ $\notin$ $\mathbb{N}$

Ex 24: -2 ☐ $\in$ ☐ $\notin$ $\mathbb{N}$

Ex 25: $\frac{1}{2}$ ☐ $\in$ ☐ $\notin$ $\mathbb{N}$

Ex 26: $10^{10^{1000}}$ ☐ $\in$ ☐ $\notin$ $\mathbb{N}$

Ex 27: 0 ☐ $\in$ ☐ $\notin$ $\mathbb{N}$

A.3 SUBSETS

A.3.1 CHECKING SUBSETS

MCQ 28: Given $A = \{1, 3, 5\}$ and $B = \{1, 2, 3, 4, 5\}$, is $A \subseteq B$?

☐ Yes

☐ No

MCQ 29: Given $A = \{4, 9\}$ and $B = \{1, 2, 3, 4, 5, 6, 7\}$, is $A \subseteq B$?

☐ Yes

☐ No

MCQ 30: Given $A = \{7, 8\}$ and $B = \{6, 7, 8, 9, 10\}$, is $A \subseteq B$?

☐ Yes

☐ No

MCQ 31: Given $A = \{2, 7, 10\}$ and $B = \{1, 2, 3, 4, 5, 6\}$, is $A \subseteq B$?

☐ Yes

☐ No

A.4 SET-BUILDER NOTATION

A.4.1 CHECKING MEMBERSHIP

MCQ 32: Does "triangle" belong to the set $\{x \mid x \text{ is a polygon}\}$?

Choose one:

☐ Yes

☐ No

MCQ 33: Does "January" belong to the set $\{x \mid x \text{ is a day of the week}\}$?

Choose one:

☐ Yes

☐ No

MCQ 34: Does "red" belong to the set $\{x \mid x \text{ is a color in the rainbow}\}$?

Choose one:

☐ Yes

☐ No

MCQ 35: Does 9 belong to the set $\{n \in \mathbb{N} \mid n \text{ is a prime number}\}$?

Choose one:

☐ Yes

☐ No

A.4.2 LISTING THE ELEMENTS

MCQ 36: List the elements in the set

$$A = \{n \in \mathbb{N} \mid n \text{ factor of } 6\}$$

Choose one answer :

☐ $A = \{1, 2, 3, 6\}$

☐ $A = \{0, 6, 12, 18, 24, \ldots\}$

☐ $A = \{0, 6, 12, 18, 24\}$

☐ $A = \{2, 3\}$

MCQ 37: List the elements in the set

$$A = \{n \in \mathbb{N} \mid n \text{ is a multiple of } 5\}$$

Choose one answer :

☐ $A = \{1, 2, 3, 5\}$

☐ $A = \{0, 5, 10, 15, 20\}$

☐ $A = \{2, 3\}$

☐ $A = \{0, 5, 10, 15, 20, \ldots\}$

MCQ 38: List the elements in the set

$$A = \{n \in \mathbb{N} \mid n \text{ is a multiple of } 6\}$$

Choose one answer :

☐ $A = \{1, 2, 3, 6\}$

☐ $A = \{0, 6, 12, 18, 24, \ldots\}$

☐ $A = \{0, 6, 12, 18, 24\}$

☐ $A = \{2, 3\}$

MCQ 39: List the elements in the set

$$A = \{n \in \mathbb{N} \mid n \text{ is a factor of } 20\}$$

Choose one answer :

☐ $A = \{0, 20, 40, 60, \ldots\}$

☐ $A = \{0, 10, 20, 30\}$

☐ $A = \{1, 2, 4, 5, 10, 20\}$

☐ $A = \{2, 5\}$

MCQ 40: List the elements in the set

$$A = \{n \in \mathbb{N} \mid n \text{ is a prime number less than } 20\}$$

Choose one answer :

☐ $A = \{2, 3, 5, 7, 11, 13, 17, 19\}$

☐ $A = \{1, 2, 3, 5, 7, 11, 13, 17, 19\}$

☐ $A = \{2, 4, 6, 8, 10, 12, 14, 16, 18\}$

☐ $A = \{2, 3, 5, 7\}$

MCQ 41: List the elements in the set

$$A = \{n \in \mathbb{N} \mid n \text{ is an even number}\}$$

Choose one answer:

☐ $A = \{1, 3, 5, 7, 9, \ldots\}$

☐ $A = \{0, 2, 4, 6, 8, \ldots\}$

☐ $A = \{0, 2, 4, 6, 8\}$

☐ $A = \{2, 4\}$

A.4.3 WRITING IN SET-BUILDER FORM

MCQ 42: Given the set

$$A = \{0, 2, 4, 6, 8, \ldots\}$$

Choose correct answers :

- ☐ $A = \{n \in \mathbb{N} \mid n \text{ is an even number}\}$
- ☐ $A = \{n \in \mathbb{N} \mid n \text{ is an odd number}\}$
- ☐ $A = \{n \in \mathbb{N} \mid n \text{ is a prime number}\}$
- ☐ $A = \{n \in \mathbb{N} \mid n \text{ is a multiple of 2}\}$

MCQ 43: Given the set

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

Choose correct answers :

- ☐ $A = \{n \in \mathbb{N} \mid n \text{ is an even number}\}$
- ☐ $A = \{n \in \mathbb{N} \mid n \text{ is an odd number}\}$
- ☐ $A = \{n \in \mathbb{N} \mid n \text{ is a prime number}\}$
- ☐ $A = \{n \in \mathbb{N} \mid n \text{ is a factor of 8}\}$

MCQ 44: Given the set

$$A = \{1, 3, 5, 7, \ldots\}$$

Choose correct answers :

- ☐ $A = \{n \in \mathbb{N} \mid n \text{ is an even number}\}$
- ☐ $A = \{n \in \mathbb{N} \mid n \text{ is an odd number}\}$
- ☐ $A = \{n \in \mathbb{N} \mid n \text{ is a prime number}\}$
- ☐ $A = \{n \in \mathbb{N} \mid n \text{ is a multiple of 2}\}$

A.4.4 CHECKING SUBSETS

MCQ 45: Given

$$A = \{n \in \mathbb{N} \mid n \text{ is a prime number greater than 2}\}$$

$$B = \{n \in \mathbb{N} \mid n \text{ is an odd number}\}$$

is $A \subseteq B$?

Choose one:

- ☐ Yes
- ☐ No

MCQ 46: Given

$$A = \{x \mid x \text{ is a person who owns a driver's license}\}$$

$$B = \{x \mid x \text{ is a person who owns a car}\}$$

is $A \subseteq B$?

Choose one:

- ☐ Yes
- ☐ No

MCQ 47: Given

$$A = \{n \in \mathbb{N} \mid n \text{ is divisible by 9}\}$$

$$B = \{n \in \mathbb{N} \mid n \text{ is divisible by 3}\}$$

is $A \subseteq B$?

Choose one:

- ☐ Yes
- ☐ No

MCQ 48: Given

$$A = \{x \mid x \text{ is a person who is a vegetarian}\}$$

$$B = \{x \mid x \text{ is a person who does not eat meat}\}$$

is $A \subseteq B$?

Choose one:

- ☐ Yes
- ☐ No

MCQ 49: Given

$$A = \{n \in \mathbb{N} \mid n \text{ is divisible by 4}\}$$

$$B = \{n \in \mathbb{N} \mid n \text{ is divisible by 2}\}$$

is $A \subseteq B$?

Choose one:

- ☐ Yes
- ☐ No

A.5 ORDERED PAIR AND N-TUPLE

A.5.1 COMPARING PAIRS AND SETS

MCQ 50: A teacher picks one student to present on Monday and another for Tuesday from Louis and Hugo. The pair $(Louis, Hugo)$ means Louis presents on Monday and Hugo on Tuesday. Is this the same as $(Hugo, Louis)$?

Choose one answer:

- ☐ True
- ☐ False

MCQ 51: A teacher selects Louis and Hugo for a presentation. The set $\{Louis, Hugo\}$ shows both are chosen. Does $\{Louis, Hugo\}$ equal $\{Hugo, Louis\}$?

Choose one answer:

- ☐ True
- ☐ False

MCQ 52: A club picks two helpers, Zoe and Eli, for an event. The set $\{Zoe, Eli\}$ shows both are chosen. Does $\{Zoe, Eli\}$ equal $\{Eli, Zoe\}$?

Choose one answer:

- ☐ True
- ☐ False

MCQ 53: A coach assigns two players, Mia and Sam, to shoot baskets: one goes first, the other second. The pair (Mia, Sam) means Mia shoots first and Sam second. Is this the same as (Sam, Mia)?

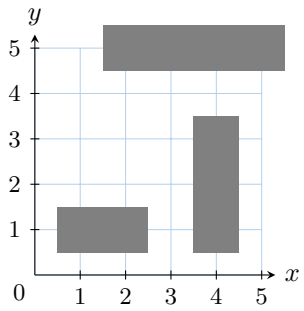
Choose one answer:

☐ True

☐ False

A.5.2 TARGETING SHIPS WITH COORDINATES

MCQ 54: In Battleship, players guess ship locations on a 5x5 grid using coordinates (x, y). Player 1 guesses $(2, 3)$. Check this grid:

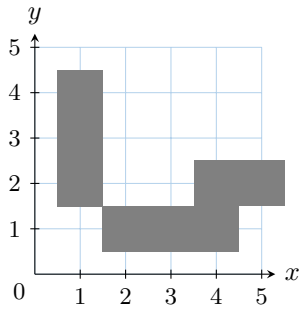


Does Player 2 say:

☐ Hit

☐ Miss

MCQ 55: In Battleship, players guess ship locations on a 5x5 grid using coordinates (x, y). Player 1 guesses $(4, 2)$. Check this grid:

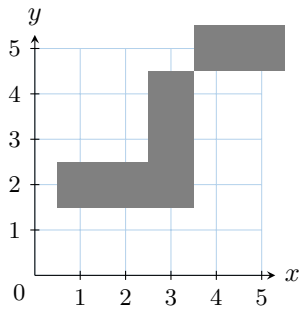


Does Player 2 say:

☐ Hit

☐ Miss

MCQ 56: In Battleship, players guess ship locations on a 5x5 grid using coordinates (x, y). Player 1 guesses $(3, 4)$. Check this grid:

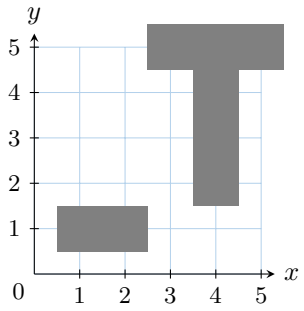


Does Player 2 say:

☐ Hit

☐ Miss

MCQ 57: In Battleship, players guess ship locations on a 5x5 grid using coordinates (x, y). Player 1 guesses $(2, 2)$. Check this grid:



Does Player 2 say:

☐ Hit

☐ Miss

A.6 CARDINALITY

A.6.1 COUNTING

Ex 58: $n(\{1, 2, 3\}) =$ ☐

Ex 59: $n(\{a, b, c, d, e\}) =$ ☐

Ex 60: $n(\{\text{apple, cherry, lemon, orange}\}) =$ ☐

Ex 61: Let $A = \{\text{die, duck, coin}\}$. Find the number of elements in A.

$$n(A) = \square$$

Ex 62: Let $A = \{1, 2, 3, 4, 5\}$. Find the number of elements in A.

$$n(A) = \square$$

A.6.2 COUNTING WAYS

Ex 63: Three friends race in a sprint. How many different podiums are possible?

☐ podiums

Ex 64: You pick 2 flavors from 3 ice cream options (chocolate, vanilla, and strawberry). Order doesn't matter. How many different ice creams can you make?

☐ ice creams

Ex 65: Three students line up for a photo. How many different orders are possible?

☐ orders

Ex 66: You choose 2 toppings from 3 pizza options (pepperoni, cheese, olives). Order doesn't matter. How many different pizzas can you make?

☐ pizzas

A.6.3 COUNTING IN SET-BUILDER

Ex 67: Let $A = \{n \in \mathbb{N} \mid n \text{ is a factor of } 18\}$.

$$n(A) = \square$$

Ex 68: Let $A = \{x \mid x \text{ is a day of the week}\}$.

$$n(A) = \square$$

Ex 69:

$$A = \{n \in \mathbb{N} \mid n \text{ is a prime number less than } 20\}$$

$$n(A) = \square$$

Ex 70: Dr. Tariel has two sons, Hugo and Louis. Find the number of elements in the set $A = \{x \mid x \text{ is a son of Dr Vincent}\}$.

$$n(A) = \square$$

Ex 71: Let $A = \{n \in \mathbb{N} \mid n \text{ is a positive two-digit whole number which contains the digit 4}\}$.

$$n(A) = \square$$

A.6.4 FINITE OR INFINITE SETS

MCQ 72: Is the set $A = \{n \in \mathbb{N} \mid n \text{ is a multiple of } 10\}$ finite or infinite?

- ☐ Finite
- ☐ Infinite

MCQ 73: Is the set $A = \{x \mid x \text{ is a distinct letter in the word 'BANANA'}\}$ finite or infinite?

- ☐ Finite
- ☐ Infinite

MCQ 74: Is the set $A = \{n \in \mathbb{N} \mid n \text{ is an even number}\}$ finite or infinite?

- ☐ Finite
- ☐ Infinite

MCQ 75: Is the set $A = \{n \in \mathbb{N} \mid n \text{ is a factor of } 1000\}$ finite or infinite?

- ☐ Finite
- ☐ Infinite

B OPERATIONS

B.1 COMPLEMENT

B.1.1 FINDING THE COMPLEMENT

MCQ 76: You are given the universe $U = \{1, 2, 3, 4, 5, 6\}$ and the set $A = \{1, 3, 5\}$. What is the complement A'?

Choose one answer:

- ☐ $A' = \{2, 4, 6\}$
- ☐ $A' = \{1, 2, 4, 6\}$
- ☐ $A' = \{1, 2, 3, 4, 5, 6\}$
- ☐ $A' = \{3, 5\}$

MCQ 77: You are given the universe $U = \{a, b, c, d, e, f\}$ and the set $B = \{a, c, e\}$. What is the complement B'?.

Choose one answer:

- ☐ $B' = \{a, b, d, f\}$
- ☐ $B' = \{a, b, c, d, e, f\}$
- ☐ $B' = \{c, e\}$
- ☐ $B' = \{b, d, f\}$

MCQ 78: You are given the universe $U = \{1, 2, 3, 4, 5, 6, 7, 8\}$ and the set $C = \{2, 4, 6, 8\}$. What is the complement C'?. Find the complement of C.

Choose one answer:

- ☐ $C' = \{1, 2, 3, 5, 7\}$
- ☐ $C' = \{1, 3, 5, 7\}$
- ☐ $C' = \{2, 4, 6, 8\}$
- ☐ $C' = \{1, 2, 3, 4, 5, 6, 7, 8\}$

MCQ 79: The universe $U = \{BB, BG, GB, GG\}$ lists all two-child family combinations (B = boy, G = girl; e.g., BG = boy then girl). The set $A = \{BB\}$ includes only families with two boys. What is A'?

Choose one answer:

- ☐ $A' = \{BG, GB, GG\}$
- ☐ $A' = \{BB, BG\}$
- ☐ $A' = \{BG, GB\}$
- ☐ $A' = \{BB, GG\}$

MCQ 80: The universe $U = \{BB, BG, GB, GG\}$ lists all two-child family combinations (B = boy, G = girl; e.g., BG = boy then girl). The set $A = \{BG, GB\}$ includes families with one boy and one girl. What is A'?

Choose one answer:

- ☐ $A' = \{BG, GB, GG\}$
- ☐ $A' = \{BB, BG\}$
- ☐ $A' = \{BG, GB\}$
- ☐ $A' = \{BB, GG\}$

B.2 INTERSECTION AND UNION

B.2.1 FINDING THE INTERSECTION/UNION

Ex 81:

$$\{1,2,3\} \cap \{2,3,4\} = \begin{array}{l} \square\ \{1,2,3,4\} \\ \square\ \{2,3\} \\ \square\ \{2\} \\ \square\ \{1,2,3\} \end{array}$$

Ex 82:

$$\{1,2\} \cup \{2,3,4\} = \begin{array}{l} \square\ \{2,3,4\} \\ \square\ \{1,2,3,4\} \\ \square\ \{1,4\} \\ \square\ \{1,2\} \end{array}$$

Ex 83:

$$\{5,6,7\} \cap \{6,8,9\} = \begin{array}{l} \square\ \{5,6,7,8,9\} \\ \square\ \{5,6\} \\ \square\ \{7,8\} \\ \square\ \{6\} \end{array}$$

Ex 84:

$$\{a,b\} \cup \{b,c,d\} = \begin{array}{l} \square\ \{a,b\} \\ \square\ \{b,c\} \\ \square\ \{a,c,d\} \\ \square\ \{a,b,d\} \end{array}$$

Ex 85:

$$\{1,2,3\} \cap \{4,5,6\} = \begin{array}{l} \square\ \{1,2,3,4,5,6\} \\ \square\ \{\} \\ \square\ \{3,4\} \\ \square\ \{1,4\} \end{array}$$

Ex 86:

$$\{3,4,5\} \cap \{5,4,3\} = \begin{array}{l} \square\ \{3,4,5,6,7\} \\ \square\ \{5\} \\ \square\ \{4,5\} \\ \square\ \{3,4,5\} \end{array}$$

Ex 87:

$$\{5,6,7\} \cup \{\} = \begin{array}{l} \square\ \{5,6,7,\{\}\} \\ \square\ \{\} \\ \square\ \{5,7\} \\ \square\ \{5,6\} \end{array}$$

Ex 88:

$$\{a,b,c\} \cap \{\} = \begin{array}{l} \square\ \{a\} \\ \square\ \{b,c\} \\ \square\ \{a,c\} \\ \square\ \{\} \end{array}$$

B.3 PERFORMING SET OPERATIONS

Ex 89: Given the sets:

- $A = \{2,4,6,8\}$
- $B = \{4,5,6\}$
- $C = \{6,7,9\}$

Find the intersection $A \cap B \cap C$.

$$A \cap B \cap C = \begin{array}{l} \square\ \{4\} \\ \square\ \{4,6\} \\ \square\ \{6\} \end{array}$$

Ex 90: Given the sets:

- $A = \{2,4,6,8,9\}$
- $B = \{4,5,6\}$
- $C = \{6,7,9\}$

Find the set $A \cap (B \cup C)$.

$$A \cap (B \cup C) = \begin{array}{l} \square\ \{6,9\} \\ \square\ \{4,6\} \\ \square\ \{4,5,6,7,9\} \\ \square\ \{4,6,9\} \end{array}$$

Ex 91: Given the sets:

- $A = \{2,4,6,8,9\}$
- $B = \{4,5,6\}$
- $C = \{6,7,9\}$

Find the set $(A \cup B) \cap C$.

$$(A \cup B) \cap C = \begin{array}{l} \square\ \{4,6,9\} \\ \square\ \{6,9\} \\ \square\ \{6,7,9\} \\ \square\ \{4,5,6\} \end{array}$$

Ex 92: Given the sets:

- $A = \{2,4,6,8,9\}$
- $B = \{4,5,6\}$
- $C = \{6,7,9\}$

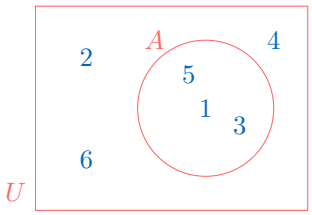
Find the set $A \cup B \cup C$.

$$A \cup B \cup C = \begin{array}{l} \square\ \{4,5,6,7,9\} \\ \square\ \{2,4,6,8,9\} \\ \square\ \{2,4,5,6,7,8,9\} \\ \square\ \{4,5,6\} \end{array}$$

B.4 VENN DIAGRAMS

B.4.1 IDENTIFYING ELEMENTS USING VENN DIAGRAMS

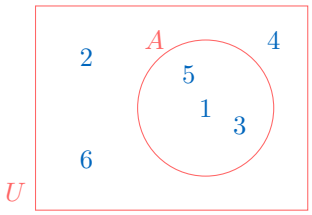
MCQ 93: For this Venn diagram:



Find A.

- ☐ $A = \{2, 4, 6\}$
- ☐ $A = \{1, 3, 5\}$
- ☐ $A = \{1, 2, 3, 4, 5, 6\}$

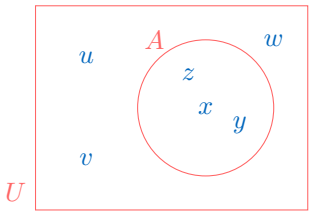
MCQ 94: For this Venn diagram:



Find A'.

- ☐ $A' = \{2, 4, 6\}$
- ☐ $A' = \{1, 3, 5\}$
- ☐ $A' = \{2, 4, 6\}$

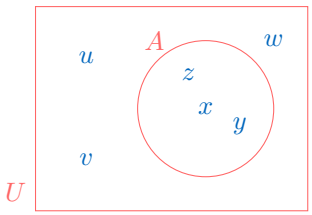
MCQ 95: For this Venn diagram:



Find A'.

- ☐ $A' = \{u, v, w\}$
- ☐ $A' = \{x, y, z\}$
- ☐ $A' = \{u, v, w, x, y, z\}$

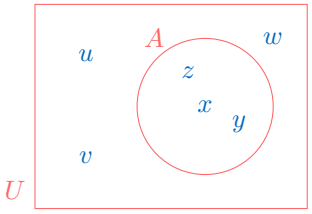
MCQ 96: For this Venn diagram:



Find the universe U.

- ☐ $U = \{u, v, w\}$
- ☐ $U = \{x, y, z\}$
- ☐ $U = \{u, v, w, x, y, z\}$

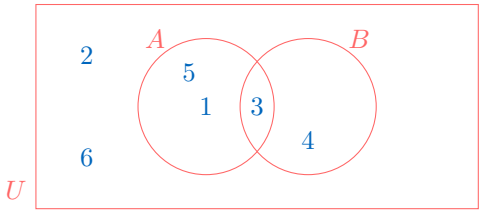
MCQ 97: For this Venn diagram:



Find A.

- ☐ $A = \{u, v, w\}$
- ☐ $A = \{x, y, z\}$
- ☐ $A = \{u, v, w, x, y, z\}$

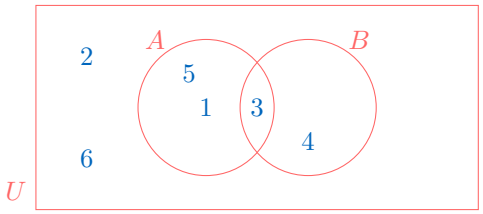
MCQ 98: For this Venn diagram:



Find B.

- ☐ $B = \{4\}$
- ☐ $B = \{4, 3\}$
- ☐ $B = \{1, 3, 4, 5\}$
- ☐ $B = \{2, 6\}$

MCQ 99: For this Venn diagram:

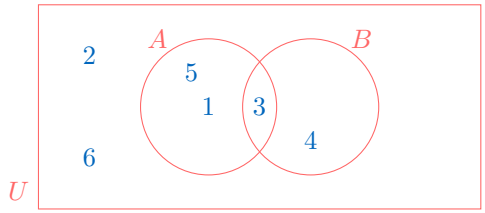


Find B'.

- ☐ $B' = \{4\}$
- ☐ $B' = \{4, 3\}$
- ☐ $B' = \{1, 2, 5, 6\}$
- ☐ $B' = \{2, 6\}$

B.4.2 IDENTIFYING ELEMENTS USING VENN DIAGRAMS

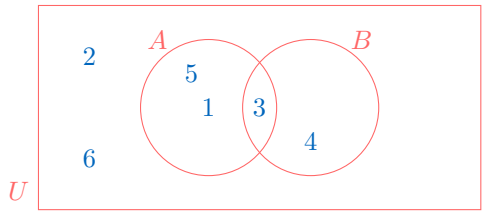
MCQ 100: For this Venn diagram:



Find $A \cup B$.

- ☐ $A \cup B = \{1, 3, 4, 5\}$
- ☐ $A \cup B = \{1, 2, 3, 4, 5, 6\}$
- ☐ $A \cup B = \{2, 4, 6\}$
- ☐ $A \cup B = \{1, 3, 4\}$

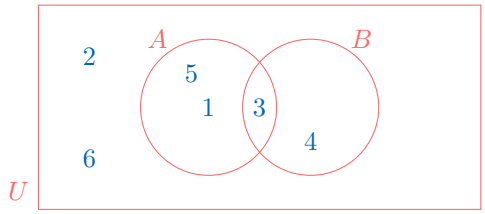
MCQ 101: For this Venn diagram:



Find $A \cap B$.

- ☐ $A \cap B = \{1, 3, 5\}$
- ☐ $A \cap B = \{3\}$
- ☐ $A \cap B = \{3, 4\}$
- ☐ $A \cap B = \{2, 6\}$

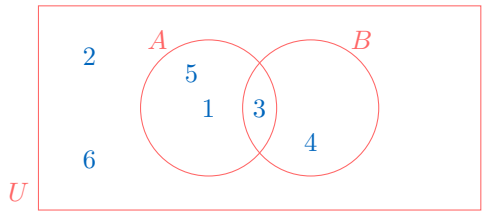
MCQ 102: For this Venn diagram:



Find $A' \cap B$.

- ☐ $A' \cap B = \{2, 6\}$
- ☐ $A' \cap B = \{4\}$
- ☐ $A' \cap B = \{4, 3\}$
- ☐ $A' \cap B = \{1, 3, 4, 5\}$

MCQ 103: For this Venn diagram:

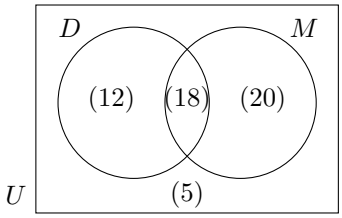


Find $A \cup B'$.

- ☐ $A \cup B' = \{1, 2, 5, 6\}$
- ☐ $A \cup B' = \{2, 4, 6\}$
- ☐ $A \cup B' = \{1, 2, 3, 5, 6\}$
- ☐ $A \cup B' = \{1, 3, 4, 5\}$

B.4.3 SOLVING WORD PROBLEMS WITH VENN DIAGRAMS

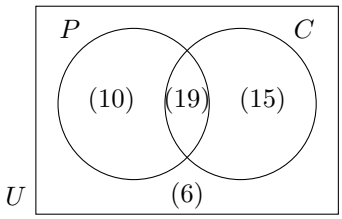
Ex 104: The Venn diagram shows the number of students in a school who participate in the drama club (D) and the music club (M).



How many students:

- are in the school? ☐ students
- participate in the music club? ☐ students
- participate in both clubs? ☐ students
- do not participate in either club? ☐ students
- participate in at least one club? ☐ students

Ex 105: The Venn diagram shows the number of participants in a community center attending painting (P) and cooking (C) classes.



How many participants:

- attend the community center? ☐ participants
- attend cooking classes? ☐ participants
- attend both classes? ☐ participants
- attend neither class? ☐ participants
- attend at least one class? ☐ participants

Ex 106: In a class of 40 students, 22 like mathematics (M), 18 like physics (P), and 10 like both. How many students:

- like at least one subject?
- like mathematics but not physics?
- like exactly one subject?
- like neither subject?

Ex 107: In a group of 40 employees, 25 work in sales (S), 20 in marketing (M), and 12 in both. How many employees:

- work in at least one department?
- work in sales but not marketing?
- work in exactly one department?
- work in neither department?

C NUMBER SETS

C.1 COMMON NUMBER SETS

C.1.1 CHECKING MEMBERSHIP

Ex 108: $6 \begin{array}{l}\square \in \\ \square \notin\end{array} \mathbb{Z}$

Ex 109: $-2 \begin{array}{l}\square \in \\ \square \notin\end{array} \mathbb{N}$

Ex 110: $-\frac{2}{3} \begin{array}{l}\square \in \\ \square \notin\end{array} \mathbb{Q}$

Ex 111: $0.1 \begin{array}{l}\square \in \\ \square \notin\end{array} \mathbb{R}$

Ex 112: $3 \begin{array}{l}\square \in \\ \square \notin\end{array} \mathbb{Q}$

Ex 113: $\sqrt{2} \begin{array}{l}\square \in \\ \square \notin\end{array} \mathbb{Q}$

C.2 INTERVALS

C.2.1 CONVERTING SETS TO INTERVAL NOTATION

Ex 114: Express the set $\{x \in \mathbb{R} \mid -1 < x\}$ using interval notation.

Ex 115: Express the set $\{x \in \mathbb{R} \mid 2 \leq x \leq 3\}$ using interval notation.

Ex 116: Express the set $\{x \in \mathbb{R} \mid x \leq 2\}$ using interval notation.

Ex 117: Express the set $\{x \in \mathbb{R} \mid 2 < x \leq 3\}$ using interval notation.

C.2.2 CONVERTING NUMBER LINE GRAPHS TO INTERVAL NOTATION

Ex 118: Express the interval shown on the number line below using interval notation:

Ex 119: Express the interval shown on the number line below using interval notation:

Ex 120: Express the interval shown on the number line below using interval notation:

Ex 121: Express the interval shown on the number line below using interval notation:

C.2.3 CHECKING MEMBERSHIP

Ex 122: $2 \begin{array}{l}\square \in \\ \square \notin\end{array} (2, 3)$

Ex 123: $-0.5 \begin{array}{l}\square \in \\ \square \notin\end{array} (-1, 1)$

Ex 124: $\frac{3}{2} \begin{array}{l}\square \in \\ \square \notin\end{array} [1, 2]$

Ex 125: $-3 \begin{array}{l}\square \in \\ \square \notin\end{array} (-\infty, 2)$

C.2.4 SOLVING LINEAR INEQUALITIES

Ex 126: Find the solution set S of the inequality:

$$2x - 1 \geq 0$$

Express your answer in interval notation.

Ex 127: Find the solution set S of the inequality:

$$-2x - 1 \geq 0$$

Express your answer in interval notation.

Ex 128: Find the solution set S of the inequality:

$$-2x + 4 < 2$$

Express your answer in interval notation.

Ex 129: Find the solution set S of the inequality:

$$3x + 2 < -2x + 12$$

Express your answer in interval notation.