SET THEORY

A DEFINITIONS

A.1 LISTING THE ELEMENTS

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

Choose one answer:

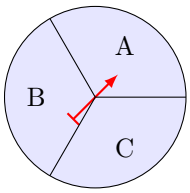
- ☐ $A =$ die, coin, duck
- ☐ $A =$ {duck, coin}
- ☐ $A =$ {die, duck, coin}

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}

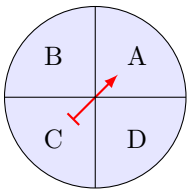
MCQ 3: List the elements of the set A, which includes all possible results the spinner can land on:



Choose one answer:

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

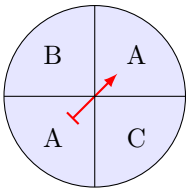
MCQ 4: List the elements of the set A, which includes all possible results the spinner can land on:



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.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.3 CHECKING MEMBERSHIP

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

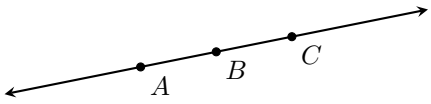
Ex 12: 7 ☐ $\in$ ☐ $\notin$ $\{1, 2, 3, 4, 5, 6\}$

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

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

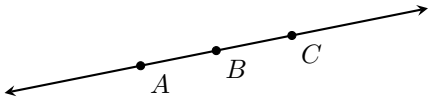
A.4 CHECKING MEMBERSHIP IN GEOMETRY

Ex 15:



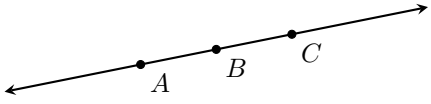
C ☐ $\in$ ☐ $\notin$ $\overleftrightarrow{AB}$

Ex 16:



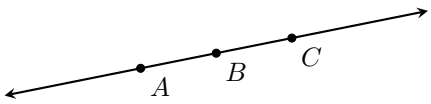
C ☐ $\in$ ☐ $\notin$ $\overline{BA}$

Ex 17:



B ☐ $\in$ ☐ $\notin$ $\overline{AC}$

Ex 18:



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

A.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

B ORDERED PAIR

B.1 COMPARING PAIRS AND SETS

MCQ 23: 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 24: 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 25: 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 26: 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)?

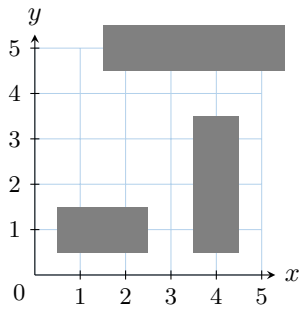
Choose one answer:

☐ True

☐ False

B.2 TARGETING SHIPS WITH COORDINATES

MCQ 27: In Battleship, players guess ship locations on a 5x5 grid using coordinates (x, y). Player 1 guesses $(2, 3)$. Check this grid:

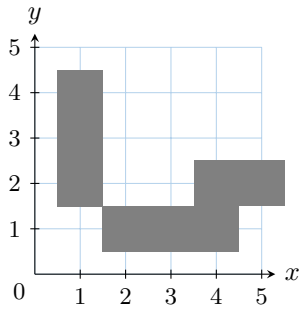


Does Player 2 say:

☐ Hit

☐ Miss

MCQ 28: In Battleship, players guess ship locations on a 5x5 grid using coordinates (x, y). Player 1 guesses $(4, 2)$. Check this grid:

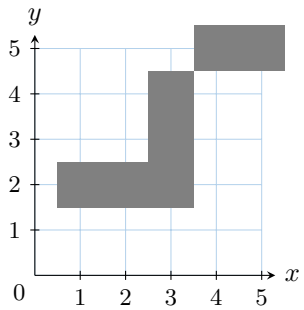


Does Player 2 say:

☐ Hit

☐ Miss

MCQ 29: In Battleship, players guess ship locations on a 5x5 grid using coordinates (x, y). Player 1 guesses $(3, 4)$. Check this grid:

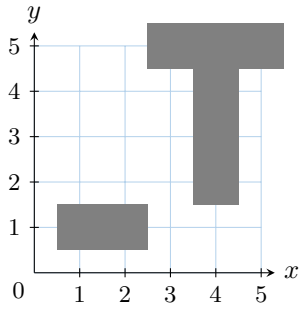


Does Player 2 say:

☐ Hit

☐ Miss

MCQ 30: 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

C CARDINALITY

C.1 COUNTING

Ex 31: $n(\{1, 2, 3\}) =$ ☐

Ex 32: $n(\{a, b, c, d, e\}) =$ ☐

Ex 33: $n(\{\text{apple, cherry, lemon, orange}\}) =$ ☐

Ex 34: Let $A = \{\text{die, duck, coin}\}$. Find the number of elements in A.

$n(A) =$ ☐

Ex 35: Let $A = \{1, 2, 3, 4, 5\}$. Find the number of elements in A.

$n(A) =$ ☐

C.2 COUNTING WAYS

Ex 36: Three friends race in a sprint. How many different podiums are possible?

☐ podiums

Ex 37: 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 38: Three students line up for a photo. How many different orders are possible?

☐ orders

Ex 39: You choose 2 toppings from 3 pizza options (pepperoni, cheese, olives). Order doesn't matter. How many different pizzas can you make?

☐ pizzas

D COMPLEMENT

D.1 FINDING THE COMPLEMENT

MCQ 40: 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 41: 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 42: 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 43: 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 44: 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:

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