

Sets and Relations

Questions

- Which of the following is a **finite set**?
 - A) Set of natural numbers
 - B) Set of integers
 - C) Set of even numbers
 - D) Set of prime numbers less than 20

- The **power set** of a set with 3 elements contains:
 - A) 3 elements
 - B) 6 elements
 - C) 8 elements
 - D) 9 elements

- If $A = \{1, 2, 3\}$ and $B = \{3, 4, 5\}$, then $A \cap B = ?$
 - A) $\{1, 2\}$
 - B) $\{3\}$
 - C) $\{4, 5\}$
 - D) $\{1, 2, 3, 4, 5\}$

- The **empty set** is a subset of:
 - A) Only finite sets
 - B) Only infinite sets
 - C) Every set
 - D) No set

- What is the **cardinality** of $\{\{1\}, \{2, 3\}, \emptyset\}$?
 - A) 2
 - B) 3
 - C) 4
 - D) 5

6. $A = \{x : x \text{ is a vowel in English alphabet}\}$ is:

- A) Finite set
- B) Infinite set
- C) Null set
- D) None of these

7. If $U = \{1, 2, 3, 4, 5\}$ and $A = \{2, 4\}$, then $A' = ?$

- A) $\{2, 4\}$
- B) $\{1, 3, 5\}$
- C) $\{1, 2, 3, 4, 5\}$
- D) $\{1, 2, 3\}$

8. The total number of **subsets** of a set with 4 elements is:

- A) 4
- B) 8
- C) 12
- D) 16

9. If $A = \{1, 2\}$, $B = \{x, y\}$, then $A \times B$ has how many elements?

- A) 2
- B) 3
- C) 4
- D) 5

10. Which of the following is a **universal set** for $A = \{2, 4\}$, $B = \{4, 6\}$?

- A) $\{2, 4\}$
 - B) $\{2, 4, 6\}$
 - C) $\{4\}$
 - D) $\{6\}$
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11. A relation on a set A is a subset of:

- A) $A \cup A \cup A$
 - B) $A \cup A \cup A$
 - C) $A \times A \times A$
 - D) $A - A - A$
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12. A relation R on set A is **reflexive** if:

- A) $(a,b) \in R \Rightarrow (b,a) \in R$
 - B) $(a,a) \in R \forall a \in A$
 - C) $(a,b), (b,c) \in R \Rightarrow (a,c) \in R$
 - D) None of these
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13. A relation is **symmetric** if:

- A) $(a,b) \in R \Rightarrow (b,a) \in R$
 - B) $(a,a) \in R$
 - C) $(a,b), (b,c) \in R \Rightarrow (a,c) \in R$
 - D) $(a,b) \in R \Rightarrow (a,a) \in R$
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14. A relation is **transitive** if:

- A) $(a,a) \in R \forall a \in A$
 - B) $(a,b) \in R \Rightarrow (b,a) \in R$
 - C) $(a,b), (b,c) \in R \Rightarrow (a,c) \in R$
 - D) None of these
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15. Which relation is **not** an equivalence relation?

- A) "is equal to" on real numbers
 - B) "is similar to" on triangles
 - C) "is greater than" on natural numbers
 - D) "has the same birthday as" on set of people
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16. The relation $R = \{(1,1), (2,2), (1,2), (2,1)\}$ is:

- A) Reflexive only
 - B) Symmetric only
 - C) Reflexive and symmetric
 - D) Equivalence relation
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17. If $A = \{1, 2, 3\}$, number of relations on A is:

- A) 9
 - B) 27
 - C) 64
 - D) 512
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18. The relation "divides" (\mid) on positive integers is:

- A) Reflexive and symmetric
 - B) Reflexive and transitive
 - C) Symmetric only
 - D) None of these
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19. Which of the following is **not** a set?

- A) The collection of all odd numbers
 - B) The collection of all good books
 - C) The set of vowels in the English alphabet
 - D) The set of planets in the solar system
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20. If $A = \{x : x \text{ is a natural number less than } 4\}$, then A is:

- A) Infinite
 - B) Singleton
 - C) Finite
 - D) Null set
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 **Answers**

1. **D**
2. **C**
3. **B**
4. **C**
5. **B**
6. **A**
7. **B**
8. **D**
9. **C**
10. **B**
11. **C**
12. **B**
13. **A**
14. **C**
15. **C**
16. **D**
17. **C** (Since $2n^2=29=5122^{\{n^2\}} = 2^{\{9\}} = 512$)
18. **B**
19. **B**
20. **C**