

1. If two sets A and B are such that $A \subseteq B$ and $B \subseteq A$ then
- A and B are equivalent sets
 - A and B are equal sets
 - A and B are disjoint sets
 - Power set of A and B are null sets
2. 1. $(A \cup B) \cap C = A \cap (B \cup C)$ 2. $A \cup \emptyset = A$ 3. $A \cup A = A$ 4. $A \cup (A \cap B) = A$
- 1 and 2 are true
 - 3 and 4 are true
 - All the 4 are true
 - 3 alone is true
3. If A and B are two sets such that $A \times B \neq B \times A$ then
- $A \subseteq B$
 - $B \subseteq A$
 - $A = B$
 - $A \neq B$
4. 1. $\{(x_1, 2x) : x \in \mathbb{R}\}$ 2. $\{(x_1, x^2), x \in \mathbb{R}\}$ 3. $\{(x, \sqrt{x}) : x \text{ is a non-negative real number}\}$ 4. $\{(x^2, x) : x \in \mathbb{R}\}$
- 1 and 2 are only subsets of $\mathbb{R} \times \mathbb{R}$
 - 3 & 4 are the only subsets of $\mathbb{R} \times \mathbb{R}$
 - None of the above are subsets of $\mathbb{R} \times \mathbb{R}$
 - All the above 4 are subsets of $\mathbb{R} \times \mathbb{R}$
5. If P(A) denotes the power set of A, then $n(P(P(P(\emptyset)))) =$
- 0
 - 1
 - 2
 - 4
6. If $n(A) = 10$ and $n(A \cap B) = 3$, $n((A \cap B)' \cap A)$ is
- 13
 - 7
 - 128
 - cannot be determined
7. $\{x \in \mathbb{N} : x \text{ is an even prime number}\}$ is
- A finite set
 - Infinite set
 - Null set
 - None of these
8. In the equation $A = \pi r^2$, π is
- a dependent variable
 - independent variable
 - constant
 - interval
9. The study of the techniques used in creating, coding and decoding these ciphers is called _____.
- holography
 - cryptography
 - pictography
 - codography
10. Let S be any non-empty set. Let R be a relation on R. The S is said to be reflexive if
- a is related b for all a, $b \in S$
 - if a is related to b implies that b is related to a
 - if a is related to b and b is related to c implies a is related c
 - a is related to a for all $a \in S$
11. Let $S = \{1, 2, 3, 4\}$ and $R = \{(1, 1), (1, 3), (2, 3)\}$ on S
- R is reflexive
 - R is symmetric
 - R is transitive
 - R is an equivalence relation
12. An empty relation is
- symmetric and transitive
 - symmetric and reflexive
 - reflexive and transitive
 - equivalence relation
13. If a relation contains a single element, then it is
- symmetric
 - reflexive
 - transitive
 - equivalence relation
14. The number of relations on a set containing n elements is
- 2^n
 - n
 - $2n^2$
 - n^2
15. If R is a relation from A to B which is an equivalence relation, R^{-1} from B to A is
- an equivalence relation
 - reflexive
 - symmetric
 - transitive
16. Vertical line test is used for
- Testing if the curve is a function
 - Testing if the function is one-to-one
 - Testing if the function is onto
 - Testing if the function is a bijection
17. The range of a function is a
- subset of its co-domain
 - proper subset of its co-domain

- c) superset of its co-domain d) None of these
18. The relation $f: \text{Nu}\{-1,0\} \rightarrow \mathbb{N}$ defined by $f(n)=n+2$ is
 a) one-to-one not onto b) onto not one-to-one
 c) one-to-one and onto d) is not a function
19. Horizontal line test is used to test
 a) if a relation is a function b) a function is one-to-one
 c) a function is onto d) a function is one-to-one and onto
20. The largest possible domain for the real valued function given by $f(x)=\frac{\sqrt{9-x^2}}{\sqrt{x^2-1}}$ is
 a) $[-3, 3] - \{-1,1\}$ b) $(-1,1)$ c) $\{-3,3\}$ d) $\mathbb{R}-\{-1,1\}$
21. If $f=\{(1,2), (3,4), (2,2)\}$ and $g=\{(2,1), (3,1), (4,2)\}$
 a) $f \circ g$ is defined, $g \circ f$ is not defined
 b) $g \circ f$ is defined, $f \circ g$ is not defined
 c) $f \circ g$ and $g \circ f$ are defined d) $f \circ g$ and $g \circ f$ are not defined
22. (i) If f and g are one-to-one, $f \circ g$ is one-to-one
 (ii) If f and $g \circ f$ are one-to-one, then g is one-to-one
 a) (i) is true (ii) is false b) (ii) is true, (i) is false
 c) Both (i) and (ii) are true d) Both (i) and (ii) are false
23. If $f: X \rightarrow Y$ is function, f is invertible if
 a) f is one-to-one b) f is onto c) f is a bijection
 d) none of these
24. The only function which is both even and odd is
 a) the constant function b) Identity function
 c) Zero function d) Polynomial function
25. A horizontal or vertical shift of a graph producing congruent graph is called
 a) dilation b) translation c) reflection d) none of these
26. Multiplying a function by a positive constant makes the graph
 a) move away or towards x-axis
 b) shifts the graph to the left
 c) shifts the graph to the right
 d) shifts the graph upwards
27. The number of transformations required to get the graph of $y=2\sin(x-1)+3$ from $y=\sin x$ is
 a) 1 b) 2 c) 3 d) 4
28. The sum of an even function and an odd function is
 a) odd function b) even function
 c) neither even nor odd d) both even and odd
29. Product of two odd functions is
 a) odd function b) even function c) neither even nor odd
 d) both even and odd
30. The function $f: \mathbb{R} \rightarrow \mathbb{R}$ defined by $f(x)=2x-|x|$ is
 a) even function b) odd function c) neither even nor odd
 d) both even and odd