## Chapter 01. FUNCTIONS AND LIMITS

1) The domain of binary relation $y^2 = -4x$ is,

A) R
B) Z
C) $R^+$
D) Negative real numbers including zero.

Answer: D

2) If S = {a, b, c} then the number of distinct relations on S is

A) 9
B) $2^9$
C) $2^3$
D) $9^2$

Answer: B

3) The domain of the binary relation $2x^2 + 2y^2 = 18$ is

A) R
B) $R^+$
C) Z
D) {- 3, 3}

Answer: D

4) The range of the binary relation $4x^2 + 9y^2 = 36$ is

A) {- 2, 2}
B) {– 3, 3}
C) {- 2, 3}
D) R

Answer: A

5) If R1 = {(x, y) | x, y ∈ R and x >y} is a binary relation `then its inverse is

A) {(1, 2), (2, 3)}
B) {(2, 1), (3, 2), (4, 3)}
C) {(x, y) | x = y}
D) {(x, y) | x, y ∈ R and y > x}

Answer: D

6) The graph of the binary relation $y = x^2 – 6x + 5$ represents

A) Line
B) Circle
C) Parabola
D) Ellipse

Answer: C

7) The graph of R1 = {(x, y) | x, y ∈ R and y > x} is

A) Line
B) Points on the line y = x
C) All points below the line y = x
D) All points above the line y = x

Answer: D

8) If f (x) = ax + b, where a, b ∈ R, a ≠ 0, then f is called a

A) Constant Function
B) Linear Function
C) Quadratic Function
D) Polynomial Function

Answer: B

9) The graph of a linear function represents a

A) Circle
B) Line
C) Parabola
D) Ellipse

Answer: B

10) The equation having null set as its solution set is

A) x = cos x
B) $x = e^x$
C) x = sin x
D) x = tan x

Answer: B

11) The composition of two functions f and g is defined as (fog) (x) = f {g (x)}, for all x in the set

A) $R_g$
B) $D_g$
C) $D_g \cap D_f$
D) $R_g \cap D_f$

Answer: D

12) If f(x) = x and $g(x) = x^2$ then the value of (fog) (x) is

A) $x^2$
B) x
C) $x^3$
D) $x^4$

Answer: A

13) Let f: S → T be a one – to – one function such that $f(x_1) = 6$ and f(2) = 6 then the value of $x_1$ is :

A) 6
B) 2
C) 3
D) 12

Answer: B

14) Let f(x) = 5x + 3 then f is

A) One – to – one function
B) Onto function
C) Constant function
D) Both one-to-one and onto function

Answer: D

15) Let : S → S be an identity function and 2 ∈ S, then the value of f(2) is

A) 2
B) – 2

C) 3
D) ½
Answer: A

16) Let g = {(1, 1), (2, 3), (3, 2), (4, 4)} be a function from S onto S, then the value of $g^{-1}$ (2) is,
A) 2
B) 3
C) 4
D) 1
Answer: B

17) Let f(x) = 5x + 1, x ∈ R then value of $f^{-1}$ (6) is,

A) 31
B) 1
C) 6
D) 1/6
Answer: B

18) If g(x) = 2x + 1 then the value of $g^2(1)$ is

A) 3
B) 9
C) 7
D) 8
Answer: C

20) The graph of the function y = x and y = tan x intersect at the point

A) x = π/4
B) x = 0
C) x = π/2
D) x = π/3
Answer: B

21) The solution set of the equation x = tan x is

A) ϕ
B) {π/4}
C) {1}
D) {0}
Answer: D

22) The solution set of $2x^3 - 3x^2 + 4x - 5 = 0$ can have at the most,

A) 4 members
B) 3 members
C) 2 members
D) 5 members
Answer: B

23) If f (x) = $2x^2 - 1$ and g(x) = 5x + 2 then value of f[g(2)] is

A) 312
B) 87
C) 287
D) 288
Answer: C

24) The inverse function of the function $y = \frac{x-1}{x+1}, \quad x \neq -1$ is

A) $f^{-1}(y) = \frac{y+1}{y-1}$

B) $f^{-1}(y) = \frac{1-y}{1+y}$

C) $f^{-1}(y) = \frac{1+y}{1-y}$

D) $f^{-1}(y) = \frac{1-y}{y-1}$

Answer: C

25) If $y = \frac{x}{x+2}, \quad x \neq -2$ is a function then the value of $f^{-1}$ (2) is, (Here y = f(x))
A) ½
B) 4
C) ¼
D) – 4
Answer: D

**26)** If x & y are not separable, then it is called _____ function.

**A)** Lim h(x) = L
B) Even
C) Implicit
D) Odd
Answer: C

27) **If the degree of a polynomial function is 1, then it is called a _____ function.**
A) Non linear
B) linear
C) Even
D) Odd
Answer: B

28) **The term function was recognized by a German Mathematician_____.**

A) Euler
B) Leibniz
C) Pythagoras
D) Boyle
Answer: B

## FUNCTIONS ON ℕ PORTION

1) The nth term of 3,9,27, . . . is

A) $9^n$
B) $3^n$
C) $3^{n+1}$

D) $3^{2n-1}$

Answer: B

2) First three terms of the sequence whose nth term is $\frac{1}{3n+1}$

A) $\frac{1}{4}, \frac{1}{5}, \frac{1}{6}$
B) $\frac{1}{4}, \frac{1}{5}, \frac{1}{7}$
C) $\frac{1}{4}, \frac{1}{7}, \frac{1}{10}$
D) $\frac{1}{2}, \frac{1}{5}, \frac{1}{6}$

Answer: C

3) If $a_n = n+1$ and $b_n = \frac{1}{n+1}$, then nth term of the sequence $a_nb_n$ is

A) $n^2 + 2n + 1$
B) n+1
C) 1
D) 2n+1

Answer: C

4) Limit of the sequence whose general term is $\frac{n^2+1}{n^2-1}$

A) 2
B) 3
C) 4
D) 1

Answer: D

5) All the sequences are the function whose domain is the set of

A) irrational number
B) Imaginary number
C) Natural number
D) Whole number

Answer: C

6) $\lim_{n\to\infty} a_n$ =

A) $\lim_{n\to-\infty} a_n$
B) $\lim a_n$
C) $\lim_{n\to 0} a_n$
D) None of these

Answer: B

7) The sequence 1,2,3,4,. . . is

A) Monotonic increasing
B) Monotonic decreasing
C) maxima
D) minima

Answer: A

8) The sequence $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \ldots$ is

A) Monotonic increasing
B) Monotonic decreasing
C) Maxima
D) Minima

Answer: B

9) The sequence $\frac{1}{3}, \frac{1}{9}, \frac{1}{27}$, is

A) convergent
B) divergent
C) Maxima
D) Minima

Answer: A

10) The sequence 4,16,64, . . . is

A) convergent
B) divergent
C) Maxima
D) Minima

Answer: B

11) The limit of a convergent sequence is _____.

A) Unique
B) Not unique
C) Both A and B
D) None of these

Answer: A

## LIMIT OF A FUNCTION PORTION

1) $\lim_{x\to a} f(x)$ = h is read as

A) limit of f(x) is equal to h as x tends to a
E) f(x) limit x tends to a is h
F) Limit f(x) is equal to h
G) All of these

Answer: A

2) $\lim_{x\to a} f(x)$ = h can be written as f(x) →has x→a and us read as

A) f(x) tends to h as x tends to a
E) limit of f(x) is equal to h as x tends to a
F) limit f(x) is h
G) none of these

Answer: A

3) x→a describes that x

A) Is very close to a but not actually equal to a
E) Approaches a or tends to a
F) Both A and B
G) None of these

Answer: C

4) $\lim_{x\to 0} \frac{sinx}{x}$ = 1, here x is measured in

A) degree

E) radian
F) gradian
G) all of these

Answer: B

5) $\lim_{x\to 2} \frac{x^2-4}{x-2}$ =

A) 4
E) 5
F) 6
G) 7

Answer: A

6) $\lim_{x\to 0} \frac{tanx}{x}$ =

A) 2
E) 3
F) 4
G) 1

Answer: D

7) $\lim_{x\to 0} \frac{sin5x}{sin7x}$ =

A) $\frac{25}{49}$
E) $\frac{5}{7}$
F) $\frac{1}{7}$
G) $\frac{5}{17}$

Answer: B

8) $\lim_{x\to 1} \frac{x^3-x}{x^2-1}$ =

A) 2
B) undefined
C) infinity
D) 1

Answer: D

9) $\lim_{x\to 1} \frac{x+1}{x-1}$ =

A) undefined
E) infinity
F) Both A and B
G) None of these

Answer: B

10) $\lim_{n\to\infty} \left(1+\frac{1}{n}\right)^n$ =

A) Natural logarithm
B) e
C) $e^2$
D) 1

Answer: B

11) $\lim_{n\to\infty} \left(1+\frac{5}{n}\right)^n$ =

A) $e^5$
E) e
F) $e^4$
G) none of these

Answer: A

12) Maclaurance series of $e^x$ is

A) $1 + x + x^2 + x^3 + \ldots$
B) $\frac{1}{0!}+\frac{x}{1!}+\frac{x^2}{2!}+\frac{x^3}{3!}+\ldots$
C) $1 - x + x^2 - x^3 + \ldots$
D) All of these

Answer: B

13) $\lim_{x\to 0} \frac{e^x-1}{x}$=

A) 0
B) 1
C) 2
D) infinity

Answer: B