Chapter 1

FUNCTIONS & LIMITS

OBJECTIVE

(1) If y is expressed in terms of a variable "x" as y = f(x), called ***(Lahore Board 2005)***

(a) Implict function (b) Explicit function

(c) Linear function (d) None

(2) $x = at^2$, $y = 2at$ represents _____ ***(Lahore Board 2007)***

(a) Circle (b) Ellipse

(c) Parabola (d) Hyperbola

(3) If $f: X \to Y$, then Y is called _____

(a) Domain (b) Range

(c) Codomain (d) None of these

(4) $\lim\limits_{x \to a} \frac{x^3 - a^3}{x - a} =$ _____ ***(Lahore Board 2005, 2009)***

(a) Undefined (b) $3a^2$

(c) a^2 (d) 0

(5) A function f(x) is said to be continuous at x = c if

(a) f(c) is defined (b) $\lim\limits_{x \to c}$ f(x) exists

(c) $\lim\limits_{x \to c}$ f(x) = f(c) (d) All are correct ***(Lahore Board 2013)***

(6) A function $I : x \to x$ defined as I(x) = x is called _____

(a) Even function (b) Linear function

(c) Identity function (d) Constant function

(7) If $f : X \to Y$ is function, then y = f(x), $x \in X$ called _____ ***(Lahore Board 2005)***

(a) Domain (b) Co-domain

(c) Range (d) None of these

(8) If $\frac{f(x) + f(-x)}{2} = 0$, then f(x) is _____

(a) Even (b) Odd

(c) Periodic (d) Explicit

(9) If $f(x) = \frac{x}{x^2 - 4}$ f(x) is not defined at x = _____

(a) $x = 4$ (b) $x = 0$

(c) $x = 2, -2$ (d) 1

(10) $\lim_{x \to 0} \frac{3^{3x} - 1}{x}$ = _____

(a) $\ell n3$ (b) $\ell n9$

(c) ∞ (d) $\ell n27$

(11) Range of constant function is _____

(a) Null Set (b) R

(c) Single ton set (d) $[0, \infty)$

(12) $f(x) = \sin x + \cos x$ is _____ function.

(a) Even (b) Odd

(c) Neither even nor odd

(13) $\sin h^{-1} x$ = _____ ***(Lahore Board 2009)***

(a) $\log (x + \sqrt{x^2 + 1})$ (b) $\log (x - \sqrt{x^2 + 1})$

(c) $\log (x + \sqrt{x^2 - 1})$ (d) None

(14) The perimeter P of a square as a function of its Area A is ***(Lahore Board 2008, 2011)***

(a) $P = \sqrt{A}$ (b) $P = 2\sqrt{A}$

(c) $P = 3\sqrt{A}$ (d) $P = 4\sqrt{A}$

(15) The area of circumscribed n-sides Polygon as $n \to \infty$ approaches area of _____.

(a) Square (b) Polygon

(c) Circle (d) Rectangle

(16) $\lim_{x \to \infty} \frac{a}{x^p}$ = _____

(a) a (b) – a

(c) P (d) 0

(17) log x is not defined at x = _____

(a) x = 1 (b) x = 2

(c) x = 3 (d) x = 0

(18) $\lim_{x \to \pi} \frac{\sin(\pi - x)}{x - \pi} =$ _____

(a) 0 (b) 1

(c) – 1 (d) ∞

(19) $\cos h^2 x - \sin h^2 x =$ _____ ***(Lahore Board 2005)***

(a) – 1 (b) 0

(c) 1 (d) 2

(20) The function $f(x) = \frac{1}{x+1}$ is discontinous at _____

(a) x = 0 (b) – 1

(c) 1 (d) None of these

(21) Range of sinx is _____

(a) IR (b) $(0, \infty)$

(c) $[-1, 1]$ (d) None

(22) cosec hx = _____ ***(Lahore Board 2005)***

(a) $\frac{2}{e^x + e^{-x}}$ (b) $\frac{1}{e^x + e^{-x}}$

(c) $\frac{2}{e^x - e^{-x}}$ (d) $\frac{2}{e^{-x} - e^{-x}}$

(23) The term function was recognized by _____ ***(Gujranwala Board 2005)***

(a) Euler (b) Leibnitz

(c) Newton (d) Pascal

(24) If f(x) = x sec x then f(0) = _____ ***(Gujranwala Board 2005)***

(a) – 1 (b) 0

(c) 1 (d) ∞

(25) Area of circle of unit radius is _____ ***(Gujranwala Board 2006)***

(a) 1 (b) $\sqrt{2}$

(c) 3.142 (d) None of these

(26) A function in which the variable appears as exponent, is called _____ function.

(a) Even function (b) Odd function

(c) Logarithmic function (d) None

(27) $\lim_{x \to \infty} \frac{1}{x} =$ _____

(a) ∞ (b) 1

(c) 0 (d) – 1

(28) A function f(x) is said to be odd if f(–x) = _____

(a) f(x) (b) – f(x)

(c) y (d) None

(29) Explicit form of $y - x^2 - 2x + 1 = 0$ is _____

(a) $y = x^2 + 2x - 1$ (b) $y - x^2 = 2x - 1$

(c) $2x + x^2 = y + 1$ (d) None

(30) If a function f(x) is not continuous at x = c, then it is called ___ at c. ***(Gujranwala Board 2007)***

(a) Linear (b) Discontinous

(c) Explicit (d) None

(31) f(x) = x cot x is _____ ***(Lahore Board 2006)***

(a) Linear function (b) Quadratic function

(c) Odd function (d) Even function

(32) If f : X → Y is function, then y ∈ Y is called _____ ***(Lahore Board 2006)***

(a) Dependent variable of f (b) Independent variable of f

(c) Value of f (d) Range of f

(33) $\lim_{x \to 1} \frac{x^3 - x}{x + 1} =$ _____

(a) 0 (b) 1

(c) 2 (d) 3

(34) The value of K for which the function $f(x) = \begin{cases} \frac{\sin x}{x} & x \neq 0 \\ k & x = 0 \end{cases}$ is continuous is

(Lahore Board 2006)

(a) 0 (b) 1

(c) – 1 (d) – 2

(35) $\lim_{\theta \to 0} \frac{\sin 7\theta}{\theta} =$ _____ ***(Lahore Board 2006)***

(a) $\frac{1}{7}$ (b) 7

(c) 1 (d) None

(36) The linear function f(x) = ax + b is an identity function if ***(Gujranwala Board 2007)***

(a) a = 0, b = 1 (b) a =1, b = 0

(c) a = 1 = b (d) a = 0 = b

(37) $\lim_{\theta \to 0} \frac{\sin \theta}{\theta} = 1$ if θ is measured in _____

(a) Degree (b) Radian

(c) Clockwise (d) Anticlockwise

(38) A function f : X → Y defined by f(x) = C ∀ x ∈ X, c ∈ Y has range equal to __
(Gujranwala Board 2007)

(a) $\Re - \{c\}$ (b) $\Re$

(c) Y (d) {c}

(39) When $\lim_{x \to c^-} f(x) \neq \lim_{x \to c^+} f(x)$, then f(x) is _____

(a) Continuous at C (b) $\lim_{x \to c}$ f(x) exists

(c) $\lim_{x \to c}$ f(x) does not exist (d) none of these

(40) If the degree of a polynomial function is _____, then the function is called linear function.

(a) One (b) Two

(c) Zero (d) none

(41) $\lim_{n \to \infty} \left(1 + \frac{1}{n}\right)^{2n} =$ _____ ***(Lahore Board 2007)***

(a) e^{-1} (b) $e^{\frac{-1}{2}}$

(c) e^{2} (d) e^{3}

(42) $\frac{e^{x} + e^{-x}}{e^{x} - e^{-x}} =$ _____

(a) sin hx (b) cosec hx
(c) tan hx (d) cot hx

(43) Domain of $x^2 + y^2 = 1$ is _____
(a) $[-1, 1]$ (b) IR
(c) $[0, \infty]$ (d) $[-\infty, 0]$

(44) Range of $f(x) = \sqrt{x+1}$ is _____ ***(Lahore Board 2007)***
(a) $(-\infty, 0)$ (b) $[0, \infty)$
(c) $(-\infty, \infty)$ (d) $[-\infty, 0]$

(45) $x^2 + y^2 = 4$ is _____ ***(Lahore Board 2008)***
(a) Function (b) Line
(c) Not function (d) Ellipse

(46) $\lim\limits_{x \to 0} \dfrac{e^x - 1}{x} =$ _____
(a) 1 (b) $\log_a e$
(c) e (d) None

(47) If $f(x) = 2x + 1$, $g(x) = x^2 - 1$ then $gog(x) =$ _____
(a) $x^4 - 2x^2$ (b) $4x^2 + 4x$
(c) x (d) $x + 1$

(48) $\lim\limits_{x \to \infty} \dfrac{2 - 3x}{\sqrt{3 + 4x^2}} =$ _____
(a) $\dfrac{3}{2}$ (b) $\dfrac{-3}{2}$
(c) 1 (d) ∞

(49) Domain of $f^{-1}(x)$ is _____ if $f(x) = \sqrt{x^2 - 4}$
(a) IR (b) $IR - \{0\}$
(c) $R - \{-2, 2\}$ (d) None of these

(50) $\cosh^{-1} x =$ _____
(a) $\ell n\,(x - \sqrt{x^2 + 1}\,)$ (b) $\ell n\left(\dfrac{x-1}{x+1}\right)$
(c) $\ell n\,(x + \sqrt{x^2 - 1}\,)$ (d) $\ell n\left(\dfrac{x+1}{x-1}\right)$

(51) $\lim\limits_{x \to 0} (1 - x)^{\frac{1}{x}} =$ _____ ***(Lahore Board 2014, Lahore Board 2009)***

(a) e^{-1} (b) e

(c) e^{2} (d) e^{3}

(52) $\lim\limits_{\theta \to 0} \dfrac{\sin^2\theta}{\theta} =$ _____

(a) 1 (b) – 1

(c) ∞ (d) 0

(53) If $f(x) = \dfrac{1}{x-1}$, then $f^{-1}(x) =$ _____

(a) $\dfrac{x-1}{x}$ (b) $\dfrac{x}{x-1}$

(c) $\dfrac{x}{x+1}$ (d) $\dfrac{x+1}{x}$

(54) Range of $y = x^2 + 1$ is set of +ve real number except

(a) $0 < y \leq 1$ (b) $0 \leq y < 1$

(c) $0 \leq y \leq 1$ (d) $0 < y < 1$

(55) $f(x) = e^{-x}$ is a function which is _____

(a) always increasing (b) always decreasing

(c) niether increasing nor decreasing (d) None of these

(56) Which one is not an exponential function.

(a) 3^x (b) n^x

(c) $e^{\frac{x}{2}}$ (d) x^n

(57) Which one is an implicit function.

(a) $x^3 + x^2 + x + 1 = y$ (b) $y = f(x)$

(c) $y = x^2 + 1$ (d) $xy + xy^2 + x^2 + y = 2$

(58) Range of $\cos hx = \dfrac{1}{2}(e^x + e^{-x})$ is _____

(a) $\Re$ (b) $[-1, 1]$

(c) $[1, \infty]$ (d) None

(59) $\lim\limits_{x \to a^+} f(x) = \ell_1$, $\lim\limits_{x \to a^-} f(x) = \ell_2$, then $\lim\limits_{x \to a} f(x)$ exists if

(a) $\ell_1 \neq \ell_2$ (b) $\ell_1 < \ell_2$

(c) $\ell_1 > \ell_2$ (d) $\ell_1 = \ell_2$

(60) Let f(x) be polynomial such that f(0) = 5, f(–1) = 10, f(1) = 6f(x) = _____

(a) $3x^2 - 2x + 5$ (b) $3x^2 + 2x - 5$

(c) $3x^2 + 2x + 5$ (d) $3x^2 - 2x - 5$

(61) The range of $\frac{3x-2}{2x-1}$ is _____

(a) $\Re - \{-\frac{1}{2}\}$ (b) $\Re - \{1\}$

(c) $\Re - \{\frac{3}{2}\}$ (d) $\Re - \{\frac{1}{2}\}$

(62) $\lim_{\theta \to 0} \frac{1-\cos 9\theta}{1-\cos 3\theta} =$ _____

(a) 0 (b) 3

(c) 9 (d) 12

(63) $\lim_{x \to -\infty} \frac{3x^4 + 2x^3 + 2}{6x^4 + 2x^3 - 1} =$ _____

(a) ∞ (b) -2

(c) $\frac{1}{2}$ (d) $\frac{-1}{2}$

(64) Constant function is always _____

(a) odd (b) even

(c) linear (d) quadratic

(65) If $\cos\theta \leq \frac{\sin\theta}{\theta} \leq 1$ if $\lim_{\theta \to 0} \cos\theta = 1$, then $\lim_{\theta \to 0} \frac{\sin\theta}{\theta} =$ _____

(a) 0 (b) 2

(c) 1 (d) – 1

(66) $y^2 = 4ax$ is symmetric about _____

(a) origin (b) x-axis

(c) y-axis (d) None of these

(67) $\lim_{x \to 0} \frac{a^{2x} - 1}{x} =$ _____

(a) 0 (b) $\ell n\, 2a$

(c) $\ell n a^2$ (d) None of these

(68) $\lim\limits_{x \to 0} \dfrac{\ell n(1+x)}{x} =$ _____

(a) Does not exist (b) 0

(c) 1 (d) None of these

(69) Domain of $f^{-1}(x)$ if $f(x) = 3 + \sqrt{x-1}$

(a) $[1, \infty]$ (b) $[3, \infty)$

(c) $[0, \infty]$ (d) None of these

(70) Which one is a function.

(a) $y^2 = 4x$ (b) $x^2 + y^2 = 16$

(c) $x^2 = 4ay$ (d) None of these

(71) If $f : X \xrightarrow[onto]{1-1} Y$, Y is called _____

(a) co-domain (b) range

(c) domain (d) None of these

(72) Co-domain and range concides if function is _____

(a) onto (b) In to

(c) Injective (d) bijective

(73) $\lim\limits_{x \to 0} \dfrac{x}{\tan x} =$ _____

(a) 0 (b) 1

(c) ∞ (d) 2

(74) $\lim\limits_{x \to 0} \dfrac{\sin x^o}{x} =$ _____

(a) 1 (b) $\dfrac{\pi}{180}$

(c) $\dfrac{180}{\pi}$ (d) None of these

(75) $x = t^2$, $y = t$ are parametoric equations of _____

(a) straight line (b) parabola

(c) circle (d) None of these

(76) $x = a\cos t$, $y = a \sin t$ are parametric equations of _____

(a) parabola (b) circle

(c) ellipse (d) hyperbola

(77) $\lim\limits_{x \to 0} \dfrac{e^{\frac{-1}{x^2}}}{1+e^{\frac{-1}{x^2}}}$ = _____ (Lhr Board 2013)

(a) 0 (b) 1

(c) – 1 (d) ∞

(78) If $f(x) = -2x + 8$ then $f^{-1}(x)$ = _____ ***(Lahore Board 2013)***

(a) $\dfrac{8+x}{2}$ (b) $\dfrac{x-8}{2}$

(c) $\dfrac{8-x}{2}$ (d) $\left(\dfrac{2}{8-x}\right)$

(79) $\lim\limits_{\theta \to 0} \dfrac{1-\cos p\theta}{1+\cos q\theta}$ = _____ ***(Lahore Board 2014)***

(a) 0 (b) $\dfrac{p}{q}$

(c) $\dfrac{p^2}{q^2}$ (d) $\dfrac{q^2}{p^2}$

(80) $\dfrac{e^{2x}-1}{2e^x}$ = _____ ***(Lahore Board 2014)***

(a) sin x (b) cos x

(c) sin hx (d) cos hx

(81) $x = 3\cos t$, $y = 3\sin t$ represent. ***(Lahore Board 2014)***

(a) Line (b) Circle

(c) Parabola (d) Hyperbola

1.	*b*	*2.*	*c*	*3.*	*c*	*4.*	*b*	*5.*	*d*	*6.*	*c*
7.	*c*	*8.*	*b*	*9.*	*c*	*10.*	*d*	*11.*	*c*	*12.*	*c*
13.	*a*	*14.*	*d*	*15.*	*c*	*16.*	*d*	*17.*	*d*	*18.*	*c*
19.	*c*	*20.*	*b*	*21.*	*c*	*22.*	*c*	*23.*	*b*	*24.*	*b*
25.	*c*	*26.*	*d*	*27.*	*c*	*28.*	*b*	*29.*	*a*	*30.*	*b*
31.	*d*	*32.*	*a*	*33.*	*a*	*34.*	*b*	*35.*	*b*	*36.*	*b*
37.	*b*	*38.*	*d*	*39.*	*c*	*40.*	*a*	*41.*	*c*	*42.*	*d*
43.	*a*	*44.*	*b*	*45.*	*c*	*46.*	*a*	*47.*	*a*	*48.*	*b*

49.	d	50.	c	51.	a	52.	d	53.	d	54.	b
55.	b	56.	d	57.	d	58.	c	59.	d	60.	a
61.	c	62.	c	63.	c	64.	b	65.	c	66.	b
67.	c	68.	c	69.	b	70.	c	71.	b	72.	d
73.	b	74.	b	75.	b	76.	b	77.	a	78.	c
79.	a	80.	c	81.	b						