MATHEMATICS

Topic: *Monotonocity*

Q.1 When x < 0, function $f(x) = x^2$ is -

(A) decreasing

(B) increasing

(C) constant

(D) not monotonic

Q.2 Function $f(x) = 2x^3 - 9x^2 + 12x + 29$ is decreasing when –

(A) x < 2   (B) x > 2

(C) x > 3   (D) 1 < x < 2

Q.3 In the interval (0, 1), $f(x) = x^2 - x + 1$ is -

(A) monotonic   (B) not monotonic

(C) decreasing   (D) increasing

Q.4 $f(x) = x + 1/x$, x ≠ 0 is increasing when -

(A) | x | < 1   (B) | x | > 1

(C) | x | < 2   (D) | x | > 2

Q.5 The function $f(x) = \dfrac{|x|}{x}$ (x ≠ 0), x > 0 is -

(A) decreasing   (B) increasing

(C) constant function   (D) None of these

Q.6 When $x \in (0, 1)$, function $f(x) = \dfrac{1}{\sqrt{x}}$ is

(A) increasing

(B) decreasing

(C) neither increasing nor decreasing

(D) constant

Q.7 Function $f(x) = 3x^4 + 7x^2 + 3$ is

(A) monotonically increasing

(B) monotonically decreasing

(C) not monotonic

(D) odd function

Q.8 For what values of x, the function $f(x) = x + \dfrac{4}{x^2}$ is monotonically decreasing

(A) x < 0   (B) x > 2

(C) x < 2   (D) 0 < x < 2

Q.9 If $f(x) = \dfrac{x}{2} + \dfrac{2}{x}$ for $-7 \leq x \leq 7$, then f(x) is increasing function of x in the interval

(A) [7, 0]   (B) (2, 7]

(C) [−2, 2]   (D) [0, 7]

Q.10 The function $y = \dfrac{x}{1+x^2}$ decreases in the interval

(A) (−∞, ∞)   (B) (−1, 1)

(C) (0, ∞)   (D) (−∞, −1)

Q.11 Function $f(x) = x^{100} + \sin x - 1$ is increasing in the interval

(A) (0, 1)   (B) (−π/2, π/2)

(C) (−1, 1)   (D) None of these

Q.12 Function $f(x) = \dfrac{x-2}{x+1}$, $x \neq -1$ is

(A) increasing   (B) decreasing

(C) not monotonic   (D) None of these

Q.13 For all values of x, function

$f(x) = 2x^3 + 6x^2 + 7x - 19$ is -

(A) Increasing   (B) Decreasing

(C) Not monotonic   (D) None of these

Q.14 Function $f(x) = x \mid x \mid$ is

(A) monotonic increasing

(B) monotonic decreasing

(C) not monotonic

(D) None of these

Q.15 If f and g are two decreasing functions such that fog is defined then fog is

(A) decreasing   (B) increasing

(C) Can't say   (D) None of these

Q.16 If f and g are two increasing function such that fog is defined then fog is ?
(A) increasing
(B) decreasing
(C) neither increasing nor decreasing
(D) None of these

Q.17 In the following, monotonic increasing function is

(A) x + | x | (B) x − | x |

(C) | x | (D) x | x |

Q.18 If f '(x) = g(x)(x − λ)² where g(λ) ≠ 0 and g(x) is continuous at x = λ then function f(x) -

(A) increasing near to λ if g(λ) > 0

(B) decreasing near to λ if g(λ) > 0

(C) increasing near to λ if g(λ) < 0

(D) increasing near to λ for every value of g(λ)

Q.19 If f(x) = 2x³ − 9x² + 12x − 6, then in which interval f(x) is monotonically increasing
(A) (1, 2)   (B) (−∞, 1)
(C) (2, ∞)   (D) (−∞, 1) or (2, ∞)

Q.20 For the function f(x) = x³ − 6x² − 36x + 7 which of the following statement is false
(A) f(x) is decreasing, if −2 < x < 6
(B) f(x) is increasing, if −3 < x < 5
(C) f(x) is increasing, if x < −2
(D) f(x) is increasing, if x > 6

Q.21 If f(x) = x⁵ − 20x³ + 240x, then f(x) is -

(A) monotonic increasing everywhere

(B) monotonic decreasing only in (0, ∞)

(C) monotonic decreasing everywhere

(D) monotonic increasing only in (−∞, 0)

Q.22 Function f(x) = x²(x −2)² is
(A) increasing in (0, 1) ∪ (2, ∞)
(B) decreasing in (0, 1) ∪ (2, ∞)
(C) decreasing function
(D) increasing function

Q.23 For 0 ≤ x ≤ 1, the function
f(x) = |x| + |x − 1| is
(A) monotonically increasing
(B) monotonically decreasing
(C) constant function
(D) identity function

Q.24 The function $y = x^3 - 3x^2 + 6x - 17$

(A) increases everywhere

(B) decreases everywhere

(C) increases for positive x and decreases for negative x

(D) increases for negative x and decreases for positive x

Q.25 For every value of x of the function $f(x) = \dfrac{1}{5^x}$ is-

(A) decreasing

(B) increasing

(C) neither increasing nor decreasing

(D) increasing for x > 0 and decreasing for x < 0

Q.26 The function $f(x) = e^x$, $-1 \le x < 0$ is -

(A) decreasing

(B) increasing

(C) constant function

(D) neither increasing, nor decreasing

Q.27 Function $f(x) = e^{-1/x}$ (x > 0) is -

(A) increasing

(B) decreasing

(C) not monotonic

(D) None of these

Q.28 Which of the following function is not monotonic -

(A) $e^x - e^{-x}$ (B) $e^x + e^{-x}$

(C) $e^{-1/x}$ (D) None of these

Q.29 In the following, decreasing function is -

(A) $\ell n\ x$ (B) $\dfrac{1}{|x|}$

(C) $e^{1/x}$ (D) None of these

Q.30 If a < 0 then function ($e^{ax} + e^{-ax}$) is monotonic decreasing when -

(A) x < 0 (B) x > 0

(C) x > 1 (D) x < 1

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10
Ans.	A	D	B	B	C	B	C	D	B	D
Que.	11	12	13	14	15	16	17	18	19	20
Ans.	A	A	A	A	B	A	D	A	D	B
Que.	21	22	23	24	25	26	27	28	29	30
Ans.	A	A	C	A	A	B	A	B	C	A