A·O·D (WORKSHEET NO: 8)

← (INCREASING DECREASING) → Class No: 10

Qn: 1 Find the Intervals in which $f(x)$ is Strictly ↑ & Strictly ↓

$f(x) = 2x^3 + 9x^2 + 12x + 20$

Ans Strictly ↑ in $(-\infty, -2) \cup (-1, \infty)$; Strictly ↓ in $(-2, -1)$

Qn: 2 → Find the Intervals for Strictly ↑ & Strictly ↓

$f(x) = (x+1)^3 (x-3)^3$

Ans Strictly ↑ in $(1,3) \cup (3, \infty)$ & Strictly ↓ in $(-\infty, -1) \cup (-1, 1)$

Qn 3 → Find the Intervals for ↑ & ↓

$f(x) = \frac{3}{10}x^4 - \frac{4}{5}x^3 - 3x^2 + \frac{36}{5}x + 11$

Ans ↑ in $[-2, 1] \cup (3, \infty)$ & ↓ in $(-\infty, -2] \cup [1, 3]$

Qn. 4 → Find the Intervals for which $f(x) = \frac{4x^2+1}{x}$ is Strictly ↑ or Strictly ↓

Ans Strictly ↑ in $(-\infty, -1/2) \cup (1/2, \infty)$

Strictly ↓ in $(-1/2, 0) \cup (0, 1/2)$

Remember $f(x)$ is not defined at $x = 0$

Qn. 5 → Find the intervals for ↑ & ↓

$f(x) = \frac{x}{2} + \frac{2}{x}$

Ans ↑ in $(-\infty, -2] \cup [2, \infty)$

↓ in $[-2, 0) \cup (0, 2]$

Rem $f(x)$ is not defined at $x = 0$

Qn. 6 Find the Intervals on which $f(x) = 2\log(x-2) - x^2 + 4x + 1$ is Strictly ↑ or Strictly ↓

Ans Str ↑ in $(2,3)$ & Str ↓ in $(3,\infty)$

Remember $f(x)$ is defined only when $x-2>0$ or $x>2$

Qn. 7 → Prove that $f(x) = x^3 - 3x^2 + 4x$ is Strictly increasing on R

Qn. 8 → Show that $f(x) = \tan^{-1}(\sin x + \cos x)$ is Strictly decreasing in $(\pi/4, \pi/2)$

Qn. 9 → Find the Intervals in which $f(x) = \log(1+x) - \frac{x}{1+x}$ is increasing and decreasing

Ans ↑ in $[0,\infty)$ & ↓ in $(-1,0]$

Remember $f(x)$ is not defined at $x=-1$

Qn 10 → Show that $f(x) = \cos(2x + \pi/4)$ is Strictly increasing on $(3\pi/8, 7\pi/8)$

Qn 11 → Find the values of x for which $f(x) = [x(x-2)]^2$ is an increasing function

Ans ↑ in $[0,1] \cup [2,\infty)$

— x —