

INDIAN SCHOOL DARSAIT**Class XII****Mathematics Worksheet****Worksheet # 11 Differentiability # 5****(Chapter – 5 : Continuity & Differentiability)****CLASS WORK****ROLLE'S THEOREM & LAGRANGE'S MEAN VALUE THEOREM**

Verify Rolle's Theorem for the following functions

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| 1. | $f(x) = x^2 - 5x + 6$ on $[2, 3]$ |
| 2. | $f(x) = x^3 - 6x^2 + 11x - 6$ on $[1, 3]$ |
| 3. | $f(x) = (x-a)^m (x-b)^n$ on $[a, b]$ |
| 4. | $f(x) = \sin^2 x$ on $[0, \pi]$ |
| 5. | $f(x) = \sin x + \cos x - 1$ on $\left[0, \frac{\pi}{2}\right]$ |
| 6. | Find the value of c of the Rolle's Theorem for the function $f(x) = e^x \sin x$, $x \in [0, \pi]$ |
| 7. | It is given that for the function $f(x) = x^3 - 6x^2 + ax + b$ on $[1, 3]$, Rolle's theorem holds with $c = 2 + \frac{1}{\sqrt{3}}$. Find the values of a and b . |
| 8. | It is given that for the function $f(x) = x^3 + bx^2 + ax$ on $[1, 3]$, Rolle's theorem holds with $c = 2 + \frac{1}{\sqrt{3}}$. Find the values of a and b . |

Verify Mean Value Theorem for the following functions

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| 9. | $f(x) = (x-3)(x-6)(x-9)$ on $[3, 5]$ |
| 10. | $f(x) = x(x-1)(x-2)$ on $[0, \frac{1}{2}]$ |
| 11. | $f(x) = \sqrt{25-x^2}$ on $[-3, 4]$ |
| 12. | $f(x) = x - 2\sin x$ on $[-\pi, \pi]$ |
| 13. | $f(x) = 2\sin x + \sin 2x$ on $[0, \pi]$ |
| 14. | Using Rolle's Theorem, find the point on the curve $y = x^2$, $x \in [-2, 2]$, where the tangent is parallel to the x -axis. |
| 15. | Using Mean Value Theorem, prove that there is a point on the curve $y = 2x^2 - 5x + 3$ between the points $(1, 0)$ and $(2, 1)$ where the tangent is parallel to the chord AB. Also find the point. |

HOME WORK

Verify Rolle's Theorem for the following functions

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| 16. | $f(x) = x(x-3)^2$, $0 \leq x \leq 3$ |
| 17. | $f(x) = \sqrt{4-x^2}$ on $[-2, 2]$ |
| 18. | $f(x) = \sin x - \sin 2x$ on $[0, \pi]$ |
| 19. | $f(x) = \log(x^2 + 2) - \log 3$ in $[-1, 1]$ |

INDIAN SCHOOL DARSAIT

Class XII

Mathematics Worksheet

Worksheet # 11 Differentiability # 5

(Chapter – 5 : Continuity & Differentiability)

20.	$f(x) = x(x+3)e^{\frac{-x}{2}}$ in $[-3, 0]$
	Verify Mean Value Theorem for the following functions
21.	$f(x) = x(x-2)$ on $[1, 3]$
22.	$f(x) = (x-1)(x-2)(x-3)$ on $[0, 4]$
23.	$f(x) = x + \frac{1}{x}$ in $[1, 3]$
24.	$f(x) = x^2 - 4x - 3$ in $[a, b]$ where $a = 1, b = 4$
25.	Find the point on the curve $y = x^2 + x$, where the tangent is parallel to the chord joining $(0, 0)$ and $(1, 2)$.
26.	Find the point on the curve $y = (x-3)^2$, where the tangent is parallel to the chord joining $(3, 0)$ and $(4, 1)$.