



INDIAN SCHOOL AL WADI AL KABIR

Class XII, Applied Mathematics

CHAPTER SUMMARY- DERIVATIVES

23-05-2021

TOPIC

- Differentiation
- Product rule, quotient rule and chain rule
- Differentiation of implicit functions
- Differentiation of parametric functions
- Higher order derivatives
- Differentiation of various functions (implicit functions, parametric functions etc.) up to second order

FORMULA/RULES

1. $\frac{d}{dx}(a \text{ constant}) = 0$

2. $\frac{d}{dx}(x) = 1$

3. $\frac{d}{dx}(x^n) = nx^{n-1}$

4. $\frac{d}{dx}(\sqrt{x}) = \frac{1}{2\sqrt{x}}$

5. $\frac{d}{dx}(\log x) = \frac{1}{x}$

6. $\frac{d}{dx}(a^x) = a^x \log a$

7. $\frac{d}{dx}(e^x) = e^x$

- Product Rule:

$$\frac{d}{dx}(uv) = u \cdot \frac{dv}{dx} + v \frac{du}{dx}$$

- Quotient Rule

$$\frac{d}{dx}\left(\frac{u}{v}\right) = \frac{v \cdot \frac{du}{dx} - u \frac{dv}{dx}}{v^2}$$

- Chain rule:

$$\frac{d}{dx}(f(g(x))) = f'(g(x)) \cdot g'(x)$$

IMPORTANT POINTS

1. When a relationship between x and y is expressed in a way that it is easy to solve for y and write $y = f(x)$, we say that y is given as an explicit function of x . Otherwise it is an implicit function.
2. A relation expressed between two variables x and y in the form $x = f(t), y = g(t)$ is said to be parametric form with t as a parameter and $\frac{dy}{dx} = \frac{\frac{dy}{dt}}{\frac{dx}{dt}}$
3. Logarithmic rules:
 1. $\log ab = \log a + \log b$
 2. $\log\left(\frac{a}{b}\right) = \log a - \log b$
 3. $\log a^b = b \cdot \log a$
 4. $\log e = 1$
 5. $\log 1 = 0$
