ALL formulas

Continuity & Differentiability
Chapter - 5

Category 1 limits related formulas (11th & 12th Both)

1. $\lim_{x \to a} \frac{x^n - a^n}{x - a} = n a^{n-1}$

2. $\lim_{\theta \to 0} \frac{\sin\theta}{\theta} = 1$

3. $\lim_{\theta \to 0} \cos\theta = 1$

4. $\lim_{\theta \to 0} \frac{\tan\theta}{\theta} = 1$

5. $\lim_{x \to 0} \frac{\log(1+x)}{x} = 1$

6. $\lim_{x \to 0} \frac{e^x - 1}{x} = 1$

7. when limit exist $\Rightarrow f(a) = LHL = RHL$

Category 2

1. $y = x^n$ $\quad \frac{dy}{dx} = nx^{n-1}$

2. $y = e^x$ $\quad \frac{dy}{dx} = e^x$

3. $y = a^x$ $\quad \frac{dy}{dx} = a^x \log a$

4. $y = x$ $\quad \frac{dy}{dx} = 1$

5. $y = \sqrt{x}$ $\quad \frac{dy}{dx} = \frac{1}{2\sqrt{x}}$

6. $y = \frac{1}{x}$ $\quad \frac{dy}{dx} = \frac{-1}{x^2}$

7. $y = \frac{1}{x^2}$ $\quad \frac{dy}{dx} = \frac{-2}{x^3}$

8. $y = \log x$ $\quad \frac{dy}{dx} = \frac{1}{x}$

optional to learn 4 to 7

Category 3

1. $y = \sin x \qquad \frac{dy}{dx} = \cos x$

2. $y = \cos x \qquad \frac{dy}{dx} = -\sin x$

3. $y = \tan x \qquad \frac{dy}{dx} = \sec^2 x$

4. $y = \sec x \qquad \frac{dy}{dx} = \sec x \tan x$

5. $y = \operatorname{cosec} x \qquad \frac{dy}{dx} = -\operatorname{cosec} x \cot x$

6. $y = \cot x \qquad \frac{dy}{dx} = -\operatorname{cosec}^2 x$

7. $y = \sin^{-1} x \qquad \frac{dy}{dx} = \frac{1}{\sqrt{1-x^2}}$

8. $y = \cos^{-1} x \qquad \frac{dy}{dx} = \frac{-1}{\sqrt{1-x^2}}$

9. $y = \tan^{-1} x \qquad \frac{dy}{dx} = \frac{1}{1+x^2}$

10. $y = \cot^{-1} x \qquad \frac{dy}{dx} = \frac{-1}{1+x^2}$

11. $y = \sec^{-1} x \qquad \frac{dy}{dx} = \frac{1}{x\sqrt{x^2-1}}$

12. $y = \operatorname{cosec}^{-1} x \qquad \frac{dy}{dx} = \frac{-1}{x\sqrt{x^2-1}}$

Category 4

Product Rule $= \frac{d}{dx}(\mathrm{I})\,\mathrm{II} + \frac{d(\mathrm{II})}{dx}\,\mathrm{I}$

Quotient Rule $= \dfrac{d(\mathrm{I}).\mathrm{II} - \frac{d(\mathrm{II})}{dx}.\mathrm{I}}{(\mathrm{II})^2}$

Category 5

1. $\log(a \times b) = \log a + \log b$

2. $\log(a \times b \times c) = \log a + \log b + \log c$

3. $\log\left(\frac{a}{b}\right) = \log a - \log b$

4. $\log\left(\frac{a \times b}{c}\right) = \log a + \log b - \log c$

5. $\log a^b = b \log a$

6. $\log_e e = 1$

7. $\log 10 = 1$

8. $\log 100 = 2$

9. $\log 1000 = 3$

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VIBA Classes