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journey,
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ENGINEERS

EE & EC ENGINEERING

EXAM TARGET	SUBJECT	TIME	FACULTY
ALL PSUs	ENGINEERING MATHS	10:00 AM	ANANT SIR
GATE 2024-25	NETWORK THEORY	6:00 PM	RAVI SIR
GATE 2024-25	ELECTRICAL MACHINE	7:30 PM	SANTAN SIR
GATE 2024-25	COMMUNICATION	9:00 PM	RENU SIR

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CIVIL ENGINEERING

EXAM TARGET	SUBJECT	TIME	FACULTY
ALL PSUs	ENGINEERING MATHS	10:00 AM	ANANT SIR
ALL PSUs	GEOTECHNICAL	1:00 PM	RUDRA SIR
GATE 2024-25	STEEL STRUCTURE	6.00 PM	REHAN SIR
GATE 2024-25	ENVIRONMENT	8:00 PM	PRATIK SIR
GATE 2024-25	SOM	9:00 PM	MUKESH SIR

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MECHANICAL ENGINEERING

EXAM TARGET	SUBJECT	TIME	FACULTY
ALL PSUs	ENGINEERING MATHS	10:00 AM	ANANT SIR
ALL PSUs	PRODUCTION	11:30 PM	GAURAV SIR
ALL PSUs	THERMODYNAMICS	3:00 PM	KANISTH SIR
GATE 2024-25	HMT	4:30 PM	YOGESH SIR
GATE 2024-25	SOM	9:00 PM	MUKESH SIR

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CLASS SCHEDULE

MECHANICAL ENGINEERING

HMT	MONDAY Live @11AM	YOGESH SIR
PRODUCTION	TUESDAY Live @11AM	GAURAV SIR
SOM	WEDNESDAY Live @8PM	MUKESH SIR
THERMODYNAMICS	THURSDAY Live @11AM	KANISTH SIR
ENGINEERING MATHEMATICS	FRIDAY Live @11AM	ANANT SIR

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CLASS SCHEDULE

EE & ECE ENGINEERING

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NETWORK THEORY	SATURDAY Live @11AM	RAVI SIR
COMMUNICATION	WEDNESDAY Live @8PM	RENU SIR
ANALOG ELECTRONICS	THURSDAY Live @8PM	LAWRENCE SIR
ENGINEERING MATHEMATICS	FRIDAY Live @11AM	ANANT SIR
ELECTRICAL MACHINE	MONDAY Live @8PM	SANTAN SIR

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ENVIRONMENT	THURSDAY Live @8PM	PRATIK SIR
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GEOTECHNICAL	SATURDAY Live @11AM	RUDRA SIR
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Q:34

The value of $\lim_{x\to 0} \frac{1-\cos(x^2)}{2x^4}$ is '0/0' form

(a) 0

(b) $\frac{1}{2}$

(c) $\frac{1}{4}$

(d) undefined

$\lim_{x\to 0} \frac{+\sin x^2 . 2x}{8x^3}$

'0/0' form

$\frac{2\cos x^2 . 2x}{16x}$

$\lim_{x\to 0} \frac{1}{4}\cos x^2$

$= \frac{1}{4}$

Continuity

① $y = f(x)$, $y = mx + c$, $f(a)$, a, x

Conti.

② $y = f(x)$, $y = x^2$, 0, x

Conti.

③ $y = f(x)$, $y = |x|$, 0, x

Conti.

④ $y = f(x)$, a, b, x

$a \rightarrow$ Conti.

$b \rightarrow$ Conti

⑤ y, L.H.L., R.H.L., a, x

disconti.

A function $y=f(x)$ is said to be continuous at a point $x=a$, if

① function is defined at $x=a$ and

② $\lim_{x\to a^-} f(x) = \lim_{x\to a^+} f(x) = f(x=a)$

L.H.L. = R.H.L. = $f(a)$

$$y=f(x)=\begin{cases}\frac{x^3+1}{3} & \text{for } x\le 2\\ \frac{5x-1}{3} & \text{for } x>2\end{cases}$$

Find continuity at $x=2$

$f(x=2)=3$

L.H.L. $= \lim_{x\to 2^-} f(x)$

$= \lim_{x\to 2^-}\left(\frac{x^3+1}{3}\right)=3$

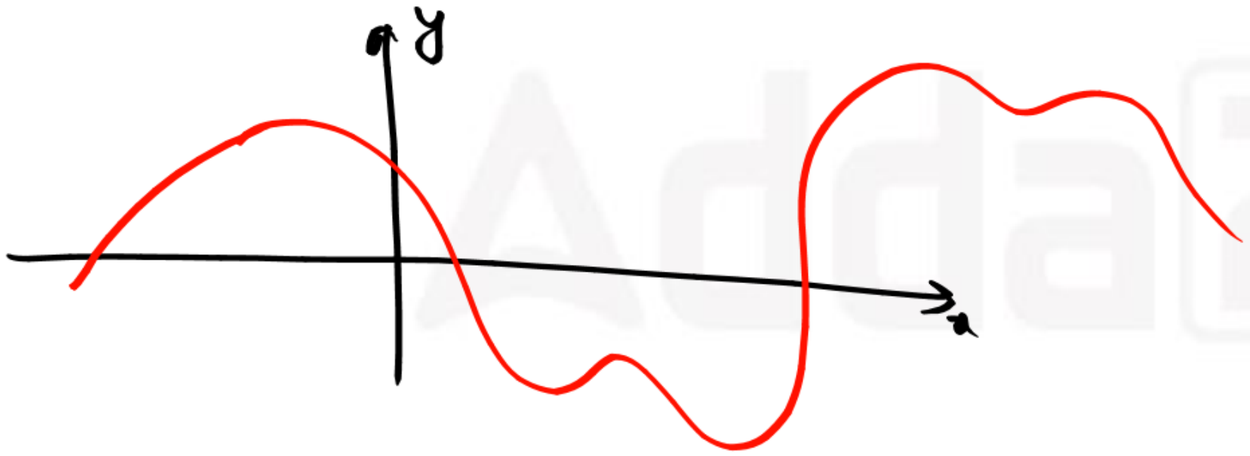
R.H.L. $= \lim_{x\to 2^+} f(x) = \lim_{x\to 2^+}\left(\frac{5x-1}{3}\right)$

$=3$

$f(x)$ is continuous at $x=2$.

* A function in terms of algebric polynomial is always continuous in the entire range of 'x'.

$$y = f(x) = 3x^4 - 2x^2 + 4x$$



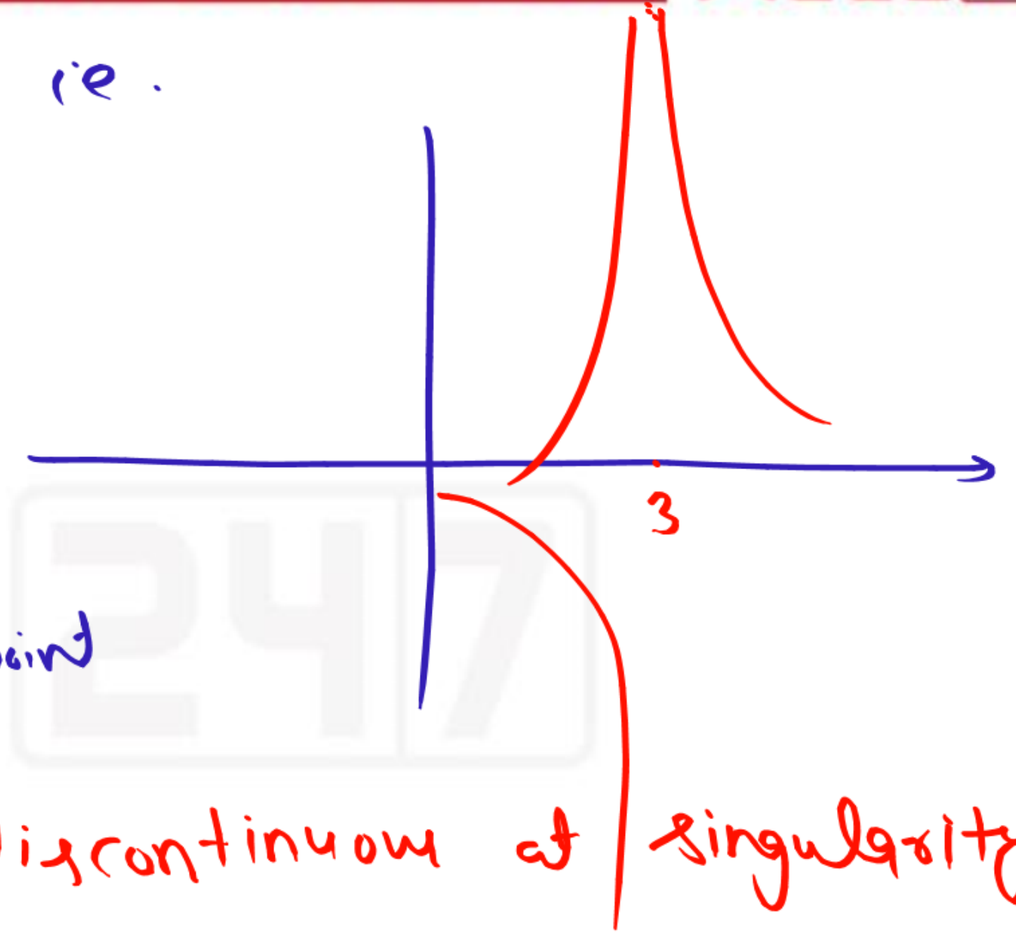
If a function is rational. ie.

$$y = \frac{f(x)}{g(x)}$$

e.g. $y = \frac{5x-1}{(x-3)}$.

for $x-3=0$
i.e. $x=3$ ← singularity point
poles

$y = \infty$



→ A rational function is discontinuous at singularity points.

Removable singularity :→ Some of the singularity points does not affect the function because their effect is removed by the numerator part of the function.

e.g.

$$y = \frac{(x^2-1)}{(x+1)} = \frac{(x-1)(x+1)}{(x+1)}$$

$x+1=0$

$x=-1 \rightarrow$ removable singularity

$$y = \frac{5\sin x}{x}$$

removable

$x=0 \leftarrow$ singularity point

$$\sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!}$$

$$= x\left(1 - \frac{x^2}{3!} + \frac{x^4}{5!} + \cdots\right)$$

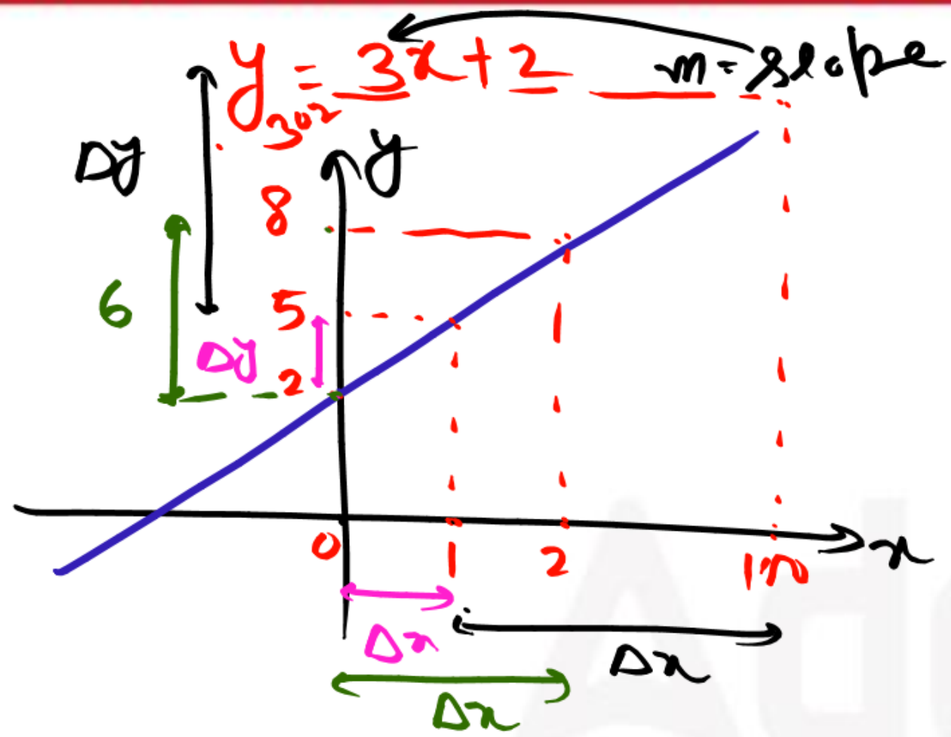
$$y = 5\left(1 - \frac{x^2}{3!} + \frac{x^4}{5!} + \cdots\right)$$

Differentiability A function $y=f(x)$ is differentiable at $x=a$ if

① It is continuous at $x=a$.

② left hand derivative and right hand derivative should be same at the point.

$$\lim_{x\to a^-}\left(\frac{dy}{dx}\right) = \lim_{x\to a^+}\left(\frac{dy}{dx}\right)$$



$$\frac{dy}{dx} = 3$$

$\frac{dy}{dx}$ = rate of change of 'y' w.r.t. 'x'

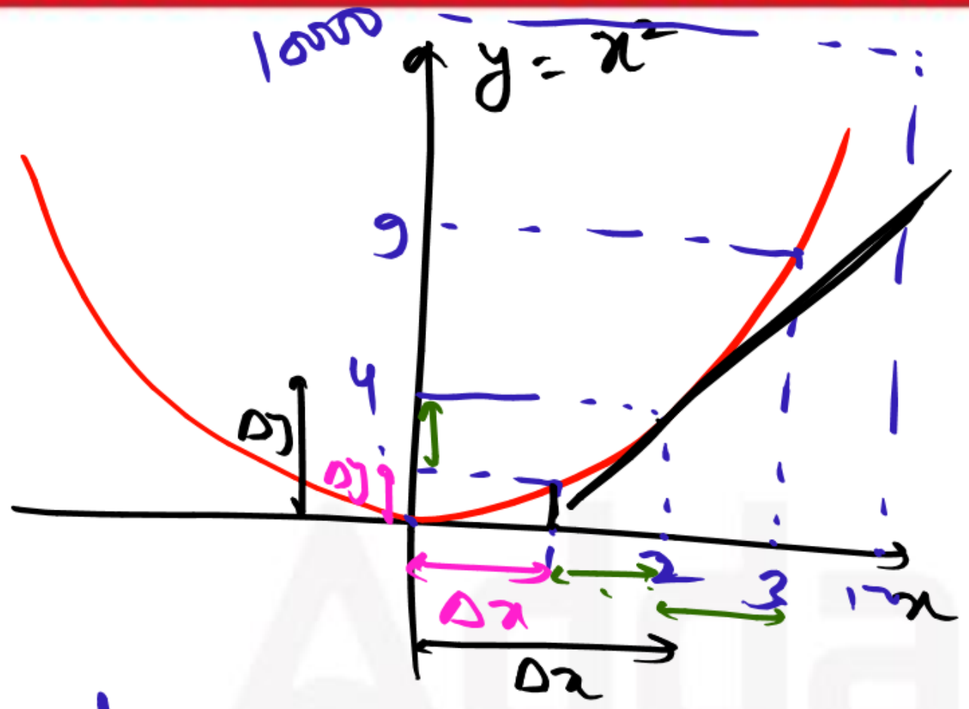
$$= \frac{\Delta y}{\Delta x}$$

$$= \frac{3}{1}$$

$$\frac{6}{2} = 3$$

$$\frac{297}{99} = \frac{27}{9} = 3$$

$$\frac{dy}{dx} = \lim_{\Delta x \to 0} \frac{\Delta y}{\Delta x}$$



$$\frac{dy}{dx} = \frac{\Delta y}{\Delta x}$$

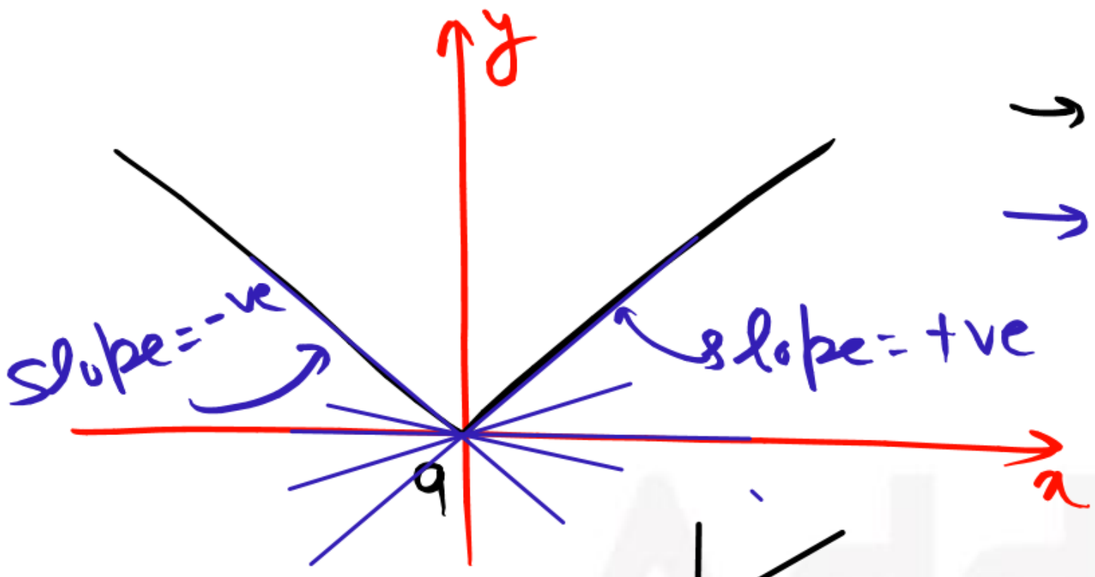
$$= \frac{1}{\frac{1}{4}} = 4$$

$$\frac{-5}{-1} = 5$$

$$\left.\frac{dy}{dx}\right|_{x=9} = \text{rate of change of } y \text{ w.r.t. } x \text{ at } x=9$$

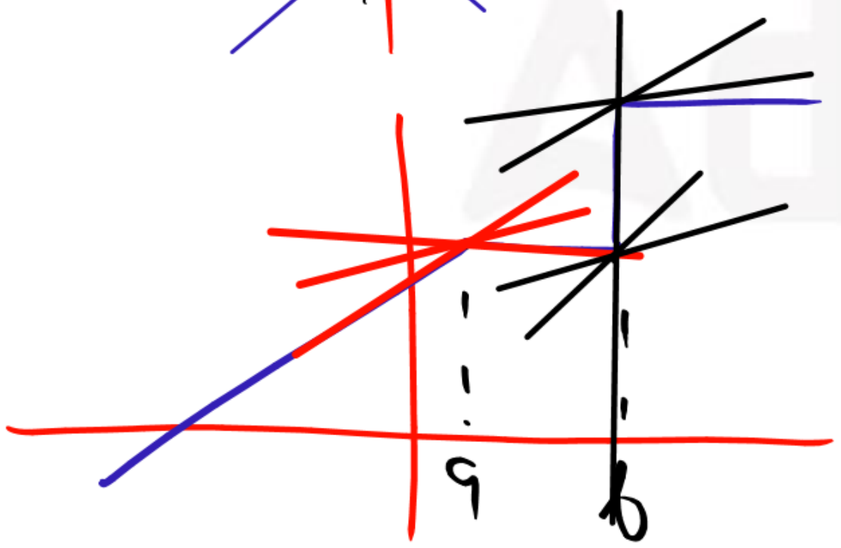
$$= \lim_{\Delta x \to 0} \left.\frac{\Delta y}{\Delta x}\right|_{x=9}$$

= slope of the tangential to the curve at $x = 9$.



→ Conti.

→ Non differentiable



at a → Continuous
→ Non. differentiable

at b → Non. continuous
→ Non. differentiable

THANKS FOR

Watching

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