INDETERMINATE FORM

⇒ $\lim_{x \to 2} \frac{x^2 - 3x + 2}{x - 2}$

$x^2 - x - 2x + 2$

$x(x-1) - 2(x-1)$

$x - 2 = 0$

⇒ A limit $\lim_{x \to a} \frac{f(x)}{g(x)}$ is $\frac{0}{0}$ if $\lim_{x \to a} f(x) = 0$ & $\lim_{x \to a} g(x) = 0$

Q) Check form & compute limits:

$\lim_{x \to 2} \frac{x^2 - 3x + 2}{x - 2}$ form $\left(\frac{0}{0}\right)$

⇒ $\lim_{x \to 2} \frac{x^2 - x - 2x + 2}{x - 2}$

⇒ $\lim_{x \to 2} \frac{x(x-1) - 2(x-1)}{x - 2}$

⇒ $\lim_{x \to 2} (x - 1)$

⇒ 2 //

Q) $\lim_{x \to 1} \frac{\frac{1}{x+1} - \frac{3}{x+5}}{x - 1}$

⇒ $\frac{x + 5 - 3x - 3}{(x+1)(x+5)}$

$x - 1$

$$\Rightarrow \quad \frac{-2x+2}{(x^2+6x+5)(x-1)}$$

$$\Rightarrow \quad \frac{-2(x-1)}{x^2+6x+5(x-1)}$$

$$\Rightarrow \quad \frac{-2}{1+6+5} = \frac{-2}{12}$$

$$= -\frac{1}{6}$$

Q) $\lim_{x \to -5} \frac{\sqrt{4-x}-3}{x+5}$

$$\Rightarrow \quad \frac{\sqrt{4-x}-3}{x+5} \times \frac{\sqrt{4-x}+3}{\sqrt{4-x}+3}$$

$$\Rightarrow \quad \frac{(4-x)^2-(3)^2}{(x+5)(\sqrt{4-x}+3)}$$

$$\Rightarrow \quad \frac{4-x-9}{x\sqrt{4-x}+3x+5\sqrt{4-x}+15}$$

$$\Rightarrow \quad \frac{-(5+x)}{(x+5)(\sqrt{4-x}+3)}$$

$$\Rightarrow \quad \frac{-1}{\sqrt{9}+3}$$

$$\Rightarrow \quad \frac{-1}{6}$$

Defn:- A form that gives no information about wheather the limit (or) value of limit exsits, is an indeterminant form.

Determinat form :- $\frac{\#}{\#}$, $\frac{0}{\#}$, $\frac{\#}{0}$

→ $\frac{\#}{0}$ form:-

① $f(x) = \infty$ if f grows arbitrarily large as $x \to a$

② $f(x) = -\infty$ if $|f(x)|$ grows arbitrarily large

eg:- $\lim_{x \to 0^+} \frac{\cos x}{x}$ form $\left(\frac{\#}{0}\right)$

As $x \to 0^+$, numerator = +ve , denom: +ve

$\Rightarrow \infty$