

$$\lim_{x \rightarrow a} \frac{\int_a^x \sin(t^2) dt}{x^2 - a^2} \stackrel{\text{limit same}}{=} \frac{\int_a^a \sin t^2 dt}{a^2 - a^2} = \left(\frac{0}{0}\right) \text{ form}$$

we will use L'Hopital rule

Leibnitz rule

$$\frac{d}{dx} \left(\int_{\phi_1(x)}^{\phi_2(x)} f(t) dt \right) = f(\phi_2(x)) \times \frac{d(\phi_2(x))}{dx} - f(\phi_1(x)) \times \frac{d(\phi_1(x))}{dx}$$

$$\lim_{x \rightarrow a} \frac{\sin x^2 \times \frac{d(x)}{dx} - \sin(a^2) \times \frac{d(a)}{dx}}{2x - 0} \Rightarrow \lim_{x \rightarrow a} \frac{\sin x^2 \times 1 - 0}{2x}$$

$\Rightarrow$

$$\boxed{\frac{\sin a^2}{2a}}$$