

الف) $\lim_{x \rightarrow 0} [f(x) - g(x)]$ $\rightarrow$ $\lim_{x \rightarrow 0} [x^2 - (x^2 + x)] = \lim_{x \rightarrow 0} [-x] = 0$

ب) $\lim_{x \rightarrow 0^+} [f(x) - g(x)] = \lim_{x \rightarrow 0^+} [x^2 - (x^2 + x)] = \lim_{x \rightarrow 0^+} [-x] = 0$

ج) $\lim_{x \rightarrow 0^-} [f(x) - g(x)] = \lim_{x \rightarrow 0^-} [x^2 - (x^2 + x)] = \lim_{x \rightarrow 0^-} [-x] = 0$

در نتیجه: $\lim_{x \rightarrow 0} [f(x) - g(x)] = 0$

الف) $\lim_{x \rightarrow 1} \frac{x^2 - 1}{x^2 - x}$ $\rightarrow$ $\lim_{x \rightarrow 1} \frac{(x-1)(x+1)}{x(x-1)} = \lim_{x \rightarrow 1} \frac{x+1}{x} = \frac{2}{1} = 2$

ب) $\lim_{x \rightarrow 0} \frac{\sin x}{x}$ $\rightarrow$ $\lim_{x \rightarrow 0} \frac{\cos x}{1} = \frac{1}{1} = 1$

ج) $\lim_{x \rightarrow 0} \frac{1 - \cos x}{x^2}$ $\rightarrow$ $\lim_{x \rightarrow 0} \frac{\sin x}{2x} = \lim_{x \rightarrow 0} \frac{\cos x}{2} = \frac{1}{2}$

الف) $\lim_{x \rightarrow 0} \cos x = 1$

ب) $\lim_{x \rightarrow 0} \sin x = 0$

ج) $\lim_{x \rightarrow 0} \tan x = 0$

در نتیجه: $\lim_{x \rightarrow 0} \cos x = 1$

الف) $\lim_{x \rightarrow 0} \frac{(-1)^{\sin x}}{x^2 - x^2}$ $\rightarrow$ $\lim_{x \rightarrow 0} \frac{(-1)^{\sin x}}{0} = \frac{1}{0} = \infty$

ب) $\lim_{x \rightarrow 0} \frac{x^2}{x^2 - x^2}$ $\rightarrow$ $\lim_{x \rightarrow 0} \frac{x^2}{0} = \frac{0}{0} = \infty$

الف) $y = \sin x$ $y' = \cos x$

ب) $y = \cos x$ $y' = -\sin x$

ج) $y = \tan x$ $y' = \sec^2 x$

د) $y = \cot x$ $y' = -\csc^2 x$

ه) $y = \sec x$ $y' = \sec x \tan x$

و) $y = \csc x$ $y' = -\csc x \cot x$