

از عبارت مشتق می گیریم و جهت تعیین علامت می رسم

الف) $\lim_{x \rightarrow 1} [fx^3 - 2x^2 + 3] = [f^-] = 3$ ✓

ب) $\lim_{x \rightarrow 0} [fx^3 - 2x^2 + 3] \rightarrow [3^+] = 3$ ✓
 $\rightarrow [3^-] = 2$

تعیین علامت: $-1 \quad 0 \quad 1 \quad 1 \quad -$

الف) $\lim_{x \rightarrow 2} \frac{|x^3 - 8|}{x^2 - 4}$

$\rightarrow \frac{x^3 - 8}{x^2 - 4} = \frac{(x-2)(x^2 + 2x + 4)}{(x-2)(x+2)} = \frac{12}{4} = 3$ ✓
 $\rightarrow \frac{-(x^3 - 8)}{x^2 - 4} = -\frac{(x-2)(x^2 + 2x + 4)}{(x-2)(x+2)} = -\frac{12}{4} = -3$

الف) $\lim_{x \rightarrow \pi} \frac{|\sin x|}{\sin 2x}$

$\rightarrow \frac{-\sin x}{\sin 2x} = \frac{-\sin x}{2 \sin x \cos x} = \frac{-1}{2} = -\frac{1}{2}$ ✓
 $\rightarrow \frac{\sin x}{\sin 2x} = \frac{\sin x}{2 \sin x \cos x} = \frac{1}{2} = \frac{1}{2}$

الف) $\lim_{x \rightarrow \frac{\pi}{2}} \sqrt{\cos x}$

$\rightarrow \sqrt{0^+} = 0$ ✓
 $\rightarrow \sqrt{0^-}$ تعریف نشده ✓

ب) $\lim_{x \rightarrow 0} \sqrt{x - 2\sqrt{x}}$

$\rightarrow \sqrt{0/0} = \sqrt{-0/0} = \sqrt{-0/0} = \sqrt{-0/0}$ تعریف نشده ✓
 $\rightarrow \sqrt{0^- - 2\sqrt{0^-}}$ تعریف نشده ✓

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

ب) $\lim_{x \rightarrow 2} \frac{x^2 - [x^2]}{x - [x]}$

$\rightarrow \frac{x^2 - [f^+]}{x - [f^+]} = \frac{x^2 - 4}{x - 2} = \frac{(x-2)(x+2)}{x-2} = x+2 = 4$ ✓
 $\rightarrow \frac{x^2 - [f^-]}{x - [f^-]} = \frac{x^2 - 3}{x - 1} = \frac{4-3}{2-1} = 1$

