۵-

الف) $\lim_{x\to -3} [-3x] : [5x]$

$x\to -3^+$ → $8+15 =$

$x\to -3^-$ → $9+16 =$

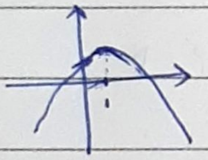
ب) $\lim_{x\to(-\frac{1}{2})^-} \left[\frac{-1}{x^4}\right] = \left[\frac{-1}{(\frac{1}{16})^+}\right] = \left[-1\times(\frac{16}{1})^+\right] = \left[-16^-\right] = -17$

۶-

الف) $\lim_{x\to 1} [4x^3-3x^4+3]$ $\xrightarrow{\text{مشتق}}$ $12x^2 - 12x^3 = 0$

	0		1	
+		+		−

شکل نسبت به این ⟶

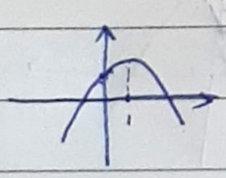


با توجه به شکل در 1^+ و 1^- کمتر از ۴ است ⟹ $\lim_{x\to 1} [4^-] = 3$

ب) $\lim_{x\to 1} 4x^3-3x^4+3$ $\xrightarrow{\text{مشتق}}$ $12x^2 - 12x^3 = 0$

	0		1	
+		+		−

شکل نسبت به این ⟶



$x\to 0^+$: $[3^+] = 3$

$x\to 0^-$: $[3^-] = 2$

۷-

۲ را جا گذاری می کنیم صورت و مخرج صفر می شود پس

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

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

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

باید رفع ابهام کنیم پس

ب) $\lim_{x\to\pi} \frac{|\sin x|}{\sin 2x}$

$x\to\pi^+$: $\frac{-\sin x}{\sin 2x} = \frac{-\sin x}{2\sin x\cos x} = \frac{-1}{2\cos x} = \frac{+1}{+2} = \frac{1}{2}$

$x\to\pi^-$: $\frac{+\sin x}{\sin 2x} = \frac{\sin x}{2\sin x\cos x} = \frac{1}{2\cos} = \frac{1}{-2}$

۸- الف) $\lim_{x\to \frac{3\pi}{2}} \sqrt{\cos x}$

$x\to\frac{3\pi}{2}^+ \quad \sqrt{0^+} = 0^+ \to 0$

$x\to\frac{3\pi}{2}^- \quad \sqrt{0^-} =$ ت ن

ب) $\lim_{x\to 0} \sqrt{x-2\sqrt{x}}$

$0^- \to \sqrt{-2\sqrt{0^-}} =$ ت ن

$0^+ \to \sqrt{0^+ - 2\sqrt{0^+}} = \sqrt{0.01 - 2\sqrt{0.01}} = \sqrt{0.01 - 0.2}$ زیر رادیکال منفی ت ن

۹- الف) $\lim_{x\to 0^+} \frac{(-1)^{[\sin x]}}{x^3 - x^2} = \frac{(-1)^0}{(0^+)^3 - (0^+)^2} = \frac{1}{0^-}$

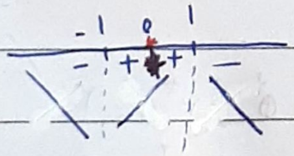
0^+ هرچه به توان بزرگتری برسد کوچکتر می‌شود

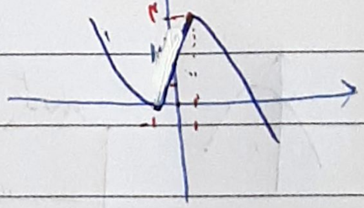
ب) $\lim_{x\to 2} \frac{x^2 - [x^2]}{x - [x]}$

$2^+ \to \frac{x^2 - 4}{x - 2} = \frac{(x-2)(x+2)}{x-2} = x + 2 = 4$

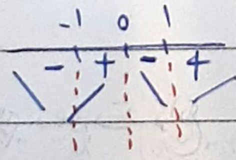
$2^- \to \frac{x^2 - 3}{x - 1} = \frac{4 - 3}{2 - 1} = \frac{1}{1} = 1$

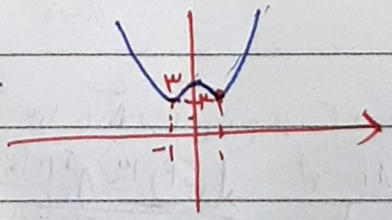
۱۰- الف) $15x^2 - 15x^4$





ب) $4x^3 - 4x$





PAYCO

سبا رازی

۱- الف) $\lim_{x\to 2^+} \frac{2x+5}{x+1} = \frac{2(2)+5}{2+1} = 3$

ب) $\lim_{x\to 2^-} \frac{2x+5}{x+1} = \frac{2(2)+5}{3} = 3$

ج) $\lim_{x\to 0} \frac{3x+7}{[x^2]} = \frac{3(0)+7}{0 \to 0^+}$

۲- الف) $\lim 4[x] - 2 = 4(2) - 2 = 6$

ب) $\lim_{x\to 3^-} [4x-2] = [10^-] = 9$

~~ج) $\left[\lim_{x\to 3^-} \frac{3x+1}{2}\right] = 5$~~

د) $\left[\lim_{x\to 3^+} \frac{3x+1}{2}\right] = 5$

ج) $\left[\lim_{x\to 3^-} 4x-2\right] = 10$

$\left[\lim_{x\to 3^+} 4x-2\right] = 10$

۳- الف) $\lim_{x\to 3^-} \frac{3[x]+1}{2} = \frac{3(2)+1}{2} = \frac{7}{2}$

ب) $\lim_{x\to 3^-} \left[\frac{3x+1}{2}\right] = [5^-] = 4$

ج) $\left[\lim_{x\to 3^-} \frac{3x+1}{2}\right] = 5$

د) $\left[\lim_{x\to 3^+} \frac{3x+1}{2}\right] = 5$

۴- الف) $\lim \frac{x-5}{x^2-6x+5} = \lim_{x\to 1} \frac{x-5}{(x-5)(x-1)} = \lim_{x\to 1} \frac{1}{x-1}$

$1^+ : \frac{1}{0^+} = +\infty$

$1^- : \frac{1}{0^-} = -\infty$

ب) $\lim_{x\to 3} \frac{x-2}{x^2-6x+9} = \lim \frac{x-2}{(x-3)^2}$

$3^+ : \frac{-1}{0^+} = -\infty$

$3^- : \frac{-1}{0^+} = -\infty$