۱) $f(x) = 2\left[\frac{2-x}{2}\right] + a\left[\frac{x+2}{3}\right]$ $\quad x=-2$ پیوسته $\quad \left[\frac{a}{3}\right] = ?$

$x \to -2^+ \to 2\left[\cancel{\frac{4^-}{2}}\right] + a\left[\cancel{\frac{0^+}{3}}\right] = 2 \qquad x \to -2^- \to 2\left[\frac{4^+}{2}\right] + a\left[\frac{0^-}{3}\right] = 4 - a$

$1 \qquad 0$

$4 - a = 2 \to a = 2 \qquad \left[\frac{a}{3}\right] = \left[\frac{2}{3}\right] = 0 \qquad 0$

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۲) $\lim_{x \to \left(\frac{\pi}{6}\right)^-} [2\sin x - 1]$ $\quad \sin\frac{\pi}{6} = \frac{1}{2}$ $\quad \sin\frac{\pi^-}{6} < \frac{1}{2}$ $\quad [1^- - 1] = [0^-] = -1$

1^-

-1

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۳) $\lim_{x \to -\frac{1}{2}} [8x^3 - x]$ $\quad 8 \times \frac{-1}{8} = -1 \quad -1 + \frac{1}{2} = -\frac{1}{2} \quad \left[-\frac{1}{2}\right] = -1$

$-\frac{1}{2}^+, -\frac{1}{2}^-$ فرقی ندارد

-1

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۴) $\lim_{x \to \left(-\frac{1}{2}\right)^-} \frac{10x - 5 + \left[\frac{3}{x^2}\right]}{16x - \left[-\frac{2}{x^2}\right]}$ $\quad \frac{-5^- - 5 + \left[\frac{3}{\frac{1}{4}^+}\right]}{-8^- - \left[-\frac{2}{\frac{1}{4}^+}\right]} = \frac{-5^- - 5 + [12^-]}{-8^- - [-8^+]} = \frac{-10^- + 11}{-8^- + 8} = \frac{1^-}{0^-}$

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

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۵) $\lim_{x \to 1^+} \frac{\sin^2 \pi x}{[x] + \cos \pi x} = \frac{\sin^2 \pi}{1 + \cos \pi} = \frac{1 - \cos^2 \pi}{1 + \cos \pi} = \frac{(1 - \cos \pi)\cancel{(1 + \cos \pi)}}{\cancel{1 + \cos \pi}}$

$1 - \cos \pi = 1 + 1 = 2 \qquad 2$

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۶) $\lim_{x \to -1} \frac{\sqrt{2x+3} - \sqrt{3x+4}}{1 + \sqrt[3]{x}} \to \frac{\frac{2}{2\sqrt{2x+3}} - \frac{3}{2\sqrt{3x+4}}}{\frac{1}{3\sqrt[3]{x^2}}} = \frac{\cancel{1 - \frac{3}{2}}\ -\frac{1}{2}}{\frac{1}{3}} = -\frac{3}{2}$

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۷) $\lim_{x \to 1} \frac{2x - 7\sqrt{x} + 5}{2x - \sqrt{3x+1}} \to \frac{2 - \frac{49}{\cancel{14\sqrt{49x}}}}{2 - \frac{3}{\cancel{2\sqrt{3x+1}}}} = \frac{2 - \frac{7}{2}}{2 - \frac{3}{4}} = \frac{-\frac{3}{2}}{\frac{5}{4}} = -\frac{6}{5}$

$-\frac{6}{5}$

$$\lim_{x\to 0}\frac{a+\sqrt{bx+c}}{x}=\frac{1}{4}\qquad \frac{ab}{c}=?$$ ۸

$$\frac{a+\sqrt{c}}{0}=\frac{1}{4}\longrightarrow a+\sqrt{c}=0\longrightarrow a=-\sqrt{c}$$

تقریبی

$$\frac{b}{2\sqrt{bx+c}}=\frac{1}{4}\longrightarrow 2b=\sqrt{c}\longrightarrow b=\frac{\sqrt{c}}{2}\qquad \frac{ab}{c}=\frac{-\sqrt{c}\times\sqrt{c}}{2\cancel{c}}=-\frac{1}{2}$$

$-\frac{1}{2}$

$$\lim_{x\to -2\pi}\frac{4+k\left[\frac{x}{\pi}\right]}{\sin x}=+\infty\qquad [-k]=?$$ ۹

$$-2\pi^+\longrightarrow 4+k\left[\frac{-2\pi^+}{\pi}\right]\Rightarrow\frac{4-2k}{0^+}=+\infty\longrightarrow 4-2k>0\to 2k<4$$

$$-2\pi^-\longrightarrow 4+k\left[\frac{-2\pi^-}{\pi}\right]=\frac{4-3k}{0^-}=+\infty\longrightarrow 4-3k<0\longrightarrow 3k>4$$

$k<2$

$k>\frac{4}{3}$

$$-2<-k<-\frac{4}{3}\longrightarrow[-k]=-2$$

-2

$$\lim_{x\to 8}\frac{b\sqrt{2+\sqrt[3]{x}}-2b}{ax-b}=\frac{2b-2b}{8a-b}\longrightarrow 8a=b$$ ۱۰

تقریبی

$$\frac{8a\sqrt{2+\sqrt[3]{x}}-2b}{ax-b}\longrightarrow\frac{8a\times\frac{1}{3\sqrt[3]{x^2}\,2\sqrt{2+\sqrt[3]{x}}}}{a}=\frac{8a\times\frac{\frac{1}{12}}{4}}{a}=\frac{2}{12}$$

$=\frac{1}{6}$

$\frac{1}{6}$