۱۷٫۵

«ضحی گل سرخی» «دوازدهم دفتر A» «شماره تکلیف ۱۹»

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

از یک کوچکتر است $= 0$ — از یک کوچکتر است $= 0$

2) $\lim_{x\to -2^-} 2\left[\frac{-2^-}{2}\right]+2+a\left[\frac{-2^- +2}{3}\right] = 4-a$ (II) $\Rightarrow 4-a=2 \to \boxed{a=2} \to \left[\frac{2}{3}\right] = \boxed{0}$

بیشتر از ۱ $= 1$ — از صفر کوچکتر $= -1$

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

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داخل براکت عدد صحیح نمی‌شود ← نیازی به دوشاخه کردن نیست

③ $\lim_{x\to-\frac{1}{2}}[8x^3-x]$

→ ① $\lim_{x\to-\frac{1}{2}^+}[8x^3-x] \to \lim\left[-4^+ + \frac{1}{2}^-\right] = -4$

→ ② $\lim_{x\to-\frac{1}{2}^-}[8x^3-x] \to \lim\left[-4^- + \frac{1}{2}^+\right] = -4$

→ (-4)

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

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④ $\lim_{x\to-\frac{1}{2}^-}\frac{10x-5+\left[\frac{3}{x^2}\right]}{16x-\left[-\frac{2}{x^2}\right]} \to \frac{-5^- -5+[12^+]}{-8^- -[-8^-]} \to \frac{2^+}{\cancel{0^+}} = \cancel{+\infty} \to -\infty$

$\frac{3}{\frac{1}{4}^+} = 12^+$ ، $-\frac{2}{(\frac{1}{2})^2} \to -8^-$ ، 0

⑤ $\lim_{x\to1^+}\frac{\sin^2\pi x}{[1^+]+\cos\pi x} \to \frac{(1-\cos\pi x)(1+\cos\pi x)}{1+\cos\pi x} \to \lim_{1^+} 1-\cos\pi = \boxed{2}$

$1-\cos^2\pi x$

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⑥ $\lim_{x\to-1}\frac{\sqrt{2x+3}-\sqrt{3x+4}}{1+\sqrt[3]{x}}\times\frac{(\sqrt[3]{x^2}-\sqrt[3]{x}+1)}{(\sqrt[3]{x^2}-\sqrt[3]{x}+1)}\times\frac{\sqrt{2x+3}+\sqrt{3x+4}}{\sqrt{2x+3}+\sqrt{3x+4}}$

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$\to \lim_{x\to-1}\frac{2x+3-3x-4}{1+x}\times\frac{\sqrt[3]{x^2}-\sqrt[3]{x}+1}{\underbrace{\sqrt{2x+3}+\sqrt{3x+4}}_{2}} = -\frac{3}{2}$

$-(1+x)$ ، 3

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(۷) $\lim_{x\to 1} \dfrac{2x-7\sqrt{x}+5}{2x-\sqrt{3x+1}} \to \dfrac{(2\sqrt{x}-5)(\sqrt{x}-1)}{2x-\sqrt{3x+1}} \times \dfrac{2x+\sqrt{3x+1}}{2x+\sqrt{3x+1}} = \dfrac{(2\sqrt{x}-5)(\sqrt{x}-1)(2x+\sqrt{3x+1})}{4x^2-3x-1}$

$\times \dfrac{\sqrt{x}+1}{\sqrt{x}+1} \to \dfrac{\overset{-3}{(2\sqrt{x}-5)}\cancel{(x-1)}\overset{4}{(2x+\sqrt{3x+1})}}{\underset{5}{(4x+1)}\cancel{(x-1)}\underset{2}{(\sqrt{x}+1)}} = -\dfrac{6}{5} = \boxed{-1.2}$ ✓ ۲

(۸) $\lim_{x\to 0} \dfrac{a+\sqrt{bx+c}}{x} \times \dfrac{a-\sqrt{bx+c}}{a-\sqrt{bx+c}} \to \lim_{x\to 0} \dfrac{\cancel{a^2}-bx-\cancel{c}}{x(a-\sqrt{bx+c})} \to \dfrac{-b}{a-\sqrt{c}} = \dfrac{1}{4}$ ۱٫۷۵

عامل صفرکننده باید حذف شود

پس: $* \; a^2=c$

$* \; a+\sqrt{c}=0 \to \boxed{a=-\sqrt{c}}$ $\qquad \dfrac{+b}{+2b+\sqrt{3b}} = \dfrac{1}{4}$ $\qquad b=\dfrac{\sqrt{c}}{2}$ $\qquad \dfrac{-b}{a-\frac{\sqrt{c}}{a}} = \dfrac{1}{4} \to \dfrac{-b}{2a} = \dfrac{1}{2}$

$\to \dfrac{b}{2\sqrt{c}} = \dfrac{1}{4} \to \boxed{\sqrt{c}=2b}\;(I)$ $\qquad \boxed{-2b=a}\;(I)$

$\to 4b=2b+\sqrt{3b} \to 2b=\sqrt{3b} \to 2b-\sqrt{3b}=0 \to \sqrt{b}\,(2\sqrt{b}-\sqrt{3})=0$ (II)

$\dfrac{ab}{c} = \dfrac{c}{-2c} = -\dfrac{1}{2}$

(۹) $\lim_{x\to -2\pi} \dfrac{4+k\left[\frac{x}{\pi}\right]}{\sin x} = +\infty \longrightarrow$ ① $\lim_{x\to -2\pi^+} \dfrac{4+k\left[\frac{-2\pi^-}{\pi}\right]}{\sin(-2\pi^+)} = \dfrac{4-3k}{0^-} \xrightarrow{=+\infty} 4-3k<0 \to \boxed{k>\dfrac{4}{3}}$ $\qquad [-2^-]=-3$

$\longrightarrow$ ② $\lim_{x\to -2\pi^-} \dfrac{4+k\left[\frac{x}{\pi}\right]}{\sin x} \to \lim_{x\to -2\pi^-} \dfrac{4+k\left[\frac{-2\pi^+}{\pi}\right]}{\sin(-2\pi^-)} = \dfrac{4-2k}{0^+} = +\infty \to 4-2k>0 \to \boxed{k<2}$ $\qquad [-1^-]=-2$

$\longrightarrow \dfrac{4}{3}<k<2 \longrightarrow -\dfrac{4}{3}>-k>-2 \longrightarrow [-k]=\boxed{-2}$ ✓ ۲

(۱۰) $\lim_{x\to 8} \dfrac{b\sqrt{2+\sqrt[3]{x}}-2b}{ax-b}$ $\xrightarrow{\text{هوپیتال}}$ $\dfrac{\dfrac{\frac{b}{3\sqrt[3]{x^2}}}{2\sqrt{2+\sqrt[3]{x}}}}{a} \to \dfrac{b=8a}{48a} = \boxed{\dfrac{1}{6}}$ ✓ ۲

$\boxed{8a=b}$

۸ ادامه سوال $\xrightarrow{(II)}$ $\underset{\text{غ ق ق}}{b=0}$ یا $\sqrt{b}=\dfrac{3}{2} \to \boxed{b=\dfrac{9}{4}} \to c=\dfrac{9}{2}\,,\; a=-\dfrac{9}{2}$

$\to \dfrac{ab}{c} = \dfrac{-\frac{\cancel{9}}{2}\times\frac{9}{4}}{\frac{\cancel{9}}{\cancel{2}}} = \boxed{-\dfrac{9}{4}}$

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