شماره تکلیف: ۱۹ — دوازدهم دختر A — ۱۸٫۵ — رونیا ایوبی

1.

$$\lim_{x\to -2^+} f(x) = 2\left[\frac{2-(-2^+)}{2}\right] + a\left[\frac{-2^+ + 2}{3}\right] = \overbrace{2\times[2^-]}^{2\times 1} + \overbrace{a[0^+]}^{a\times 0} = 2$$

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

2

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

2.

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

2

3.

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

2

4.

$$\lim_{x\to(-\frac{1}{2})^-}\frac{10x-5+\left[\frac{3}{x^2}\right]}{14x-\left[-\frac{2}{x^2}\right]} = \frac{10x-5-11}{14x+8} = \frac{1}{0^-} = \boxed{-\infty}$$

2

$$x<-\frac{1}{2} \Rightarrow x^2>\frac{1}{4} \Rightarrow \frac{1}{x^2}<4 \Rightarrow \frac{-2}{x^2}>-8 \quad و \quad \frac{3}{x^2}<12$$

5.

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

$$= \frac{1-\cos\pi x}{1} \Rightarrow \lim_{x\to 1^+} 1-\cos\pi x = 1+1 = \boxed{2}$$

2

6.

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

$$= \boxed{-\frac{3}{2}}$$

2

رونیا الویی

$$\lim_{x\to 1}\frac{2x-7\sqrt{x}+5}{2x-\sqrt{3x+1}}=\frac{(2x+5)^2-49x}{4x^2-3x-1}=\frac{4x^2+20x-49x+25}{4x^2-3x-1}$$ ۷

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$$=\frac{(x-1)\left(x-\frac{25}{4}\right)}{(x-1)\left(x+\frac{1}{4}\right)}=\boxed{\frac{-21}{5}}$$

پایین صفحه

$$\lim_{x\to 0}\frac{a+\sqrt{bx+c}}{x}=\frac{1}{4}\Rightarrow\frac{\frac{b}{2\sqrt{bx+c}}}{1}=\frac{b}{2\sqrt{bx+c}}=\frac{1}{4}$$ ۸

$$\Rightarrow a+\sqrt{c}=0\Rightarrow a=-\sqrt{c}\ ①$$

$$\xrightarrow{x=0}\frac{b}{2\sqrt{c}}=\frac{1}{4}\Rightarrow 2b=\sqrt{c}\xrightarrow{\text{طبق }①}2b=\sqrt{c}=-a$$

$$\frac{ab}{c}=\frac{-2b\times b}{4b^2}=\boxed{-\frac{1}{2}}$$

۲

$$\lim_{x\to -2\pi}\frac{4+k\left[\frac{x}{\pi}\right]}{\sin x}=+\infty\xrightarrow{x\to -2\pi^+}\frac{4+k(-2)}{0^-}=+\infty$$ ۹

$$\Rightarrow 4-2k<0\Rightarrow k>2\ ①$$

$$\xrightarrow{x\to -2\pi^-}\frac{4+k(-3)}{0^+}=+\infty\Rightarrow 4-3k>0\Rightarrow k<\frac{4}{3}\ ②$$

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$$\xrightarrow[\text{①و②}]{\text{طبق}}\quad \frac{4}{3}<k<2\Rightarrow\boxed{[-k]=-2}$$

۱۰ به ازای $x=8$ صورت حد صفر می‌شود.

$$8a-b=0\Rightarrow 8a=b$$

$$\xrightarrow[\text{هوپیتال}]{HOP}\frac{\frac{\frac{b}{3\sqrt[3]{x^2}}}{2\sqrt{2+\sqrt[3]{x}}}}{a}\xrightarrow{x=8}\frac{b}{48a}=\frac{8a}{48a}=\boxed{\frac{1}{6}}$$

۲

سوال ۷

$$\lim_{x\to ۱} \frac{(\sqrt{x}-۱)(۲\sqrt{x}-۵)}{۲x-\sqrt{۳x+۱}} = \frac{(\sqrt{x}-۱)(۲\sqrt{x}-۵)}{۲x-\sqrt{۳x+۱}} \times \frac{۲x+\sqrt{۳x+۱}}{۲x+\sqrt{۳x+۱}} \longrightarrow$$

$$\lim_{x\to ۱} \frac{(\sqrt{x}-۱)(۲\sqrt{x}-۵)\times(۲x+\sqrt{۳x+۱})}{۴x^۲-۳x-۱} = \lim_{x\to ۱} \frac{\cancel{(\sqrt{x}-۱)}(۲\sqrt{x}-۵)(۴)}{(۴x+۱)\underbrace{(x-۱)}_{\cancel{(\sqrt{x}-۱)}(\sqrt{x}+۱)}} =$$

$$\lim_{x\to ۱} \frac{(۲\sqrt{x}-۵)(۴)}{(۴x+۱)(\sqrt{x}+۱)} = \frac{(-۳)(۴)}{۵\times ۲} = -۱٫۲$$