فاطمه رحیمال - دوازدهم ۳ ریاضی

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سوال ۱

$$\lim_{x\to 2} \frac{2x-5}{x^2+ax+b} = -\infty \qquad \frac{-1}{0^+} = -\infty$$

این ریشه مضاعف است

$$(x-2)^2 = x^2-4x+4 \qquad a=-4 \quad b=4$$

$$a+b = -4+4 = 0$$

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سوال ۲

$$\lim_{x\to 2\sqrt{2}} \frac{x}{x^2+ax+b} = +\infty \qquad \frac{2\sqrt{2}}{0^+} = +\infty$$

ریشه مضاعف

$$(x-2\sqrt{2})^2 = x^2 - 4\sqrt{2}\,x + 2\sqrt{16}$$

$$a = -4\sqrt{2} \qquad b = 2\sqrt{16}$$

$$\left[\frac{b}{a}\right] = \left[\frac{2\sqrt{16}}{-4\sqrt{2}}\right] = \left[-\sqrt{\frac{4}{8}}\right] = -1$$

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سوال ۳

$$\lim_{x\to \frac{1}{\sqrt{2}}^+} \frac{[-x]+a}{\left|\frac{\sqrt{2}}{2}x+a\right|+a} = -\infty \qquad \frac{a-1}{\ }$$

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$$a-1<0 \rightarrow \boxed{a<1}$$

سوال ۱

$$\lim_{x\to(-\frac{1}{2})^+} \frac{14x - \left[-\frac{2}{x^2}\right]}{24x + \left[\frac{3}{x^2}\right]}$$

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$$x > -\frac{1}{2} \to \frac{1}{x} < -2 \to \frac{1}{x^2} > 4 \to \frac{-2}{x^2} < -8$$

$$\left[-\frac{2}{x^2}\right] = -9$$

$$\lim_{-\frac{1}{2}^+} \frac{14x+9}{24x+12} = \frac{1}{0^+} = +\infty \qquad \frac{3}{x^2} > 12 \to \left[\frac{3}{x^2}\right] = -12$$

سوال ۲

$$\lim_{x\to 2^+} \frac{x^2-4}{x^3-[x^3]}$$

$$[x^3] = [8^+] = 8$$

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

$$\frac{x+2}{x^2+2x+4} = \frac{4}{12} = \frac{1}{3}$$

سوال ۳

$$\lim_{x\to -8} \frac{x^2+10x+16}{12+6\sqrt[3]{x}} = \frac{(x+2)(x+8)}{6(2+\sqrt[3]{x})}$$

$$\frac{(x+2)\cancel{(2+\sqrt[3]{x})}(4+\sqrt[3]{x^2}-2\sqrt[3]{x})}{6\cancel{(2+\sqrt[3]{x})}}$$

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$$\frac{-6(4+4+4)}{6} = -12$$

سوال ۱۷

$$\lim_{x\to 0^-} \frac{\sqrt{2+3x}-\sqrt{2-x}}{\sqrt{1-\cos}} \times \frac{\sqrt{2+3x}+\sqrt{2-x}}{\sqrt{2+3x}+\sqrt{2-x}}$$

$$\lim_{x\to 0^-} = \frac{\cancel{2}+3x-\cancel{2}+x}{} = \frac{4x}{(\sqrt{1-\cos})(\sqrt{2+3\cancel{x}}+\sqrt{2-\cancel{x}})}$$

$$\frac{4x}{\sqrt{1-\cos}\times 2\sqrt{2}}$$

سوال ۱۸

$$\lim_{x\to 0} \frac{k+\cos(\sqrt{a}\,x)}{kx^2} = 2$$

$$\cos\sqrt{a}\,x = 1-\frac{(\sqrt{a}\,x)^2}{2} = 1-\frac{ax^2}{2}$$

$$\lim \frac{k+1-\frac{ax^2}{2}}{kx^2} = 2 \rightarrow \frac{-a\cancel{x}}{2k\cancel{x}} = 2$$

$$-\frac{a}{2k} = 2 \rightarrow \boxed{\frac{a}{k} = -4}$$

طلع

$$\frac{2\sqrt{x-3a}+3\sqrt{x}-3\sqrt{3a}}{\sqrt{x^2-9a^2}}$$

$x\to(3a)^+$

کسر را تفکیک

$$\frac{2\cancel{\sqrt{x-3a}}}{\cancel{\sqrt{x-3a}}\times\sqrt{x+3a}}+\frac{3\sqrt{x}-3\sqrt{3a}}{\sqrt{x-3a}\times\sqrt{x+3a}}$$

$$\frac{2}{\sqrt{x+3a}}+\frac{3(\sqrt{x}-\sqrt{3a})}{\sqrt{x^2-9a}}\times\frac{\sqrt{x}+\sqrt{3a}}{\sqrt{x}+\sqrt{3a}}$$

$$3\left(\frac{x-3a}{\sqrt{x^2-9a}\,(\sqrt{x}+\sqrt{3a})}\right)$$

$$\frac{\cancel{\sqrt{x-3a}}\times\sqrt{x-3a})}{\cancel{\sqrt{x-3a}}\times\sqrt{x+3a}\times\sqrt{x}+\sqrt{3a}}=\frac{\sqrt{x-3a}}{\sqrt{x+3a}\times(\sqrt{x}+\sqrt{3a})}$$

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$0\to 0$

$$\frac{2}{\sqrt{3a+3a}}=\frac{2}{\sqrt{6a}}$$

(سوال ۱.)

$(k\pi , \cos k\pi)$

$$\lim_{x \to -1} \frac{1 - k(x)}{x^2 - 1} = -\infty$$

$-1^+ \to -0{,}9$

$$\frac{1+k}{\underbrace{x^2-1}_{0^-}} = -\infty \qquad \frac{1+k}{0^-} = -\infty$$

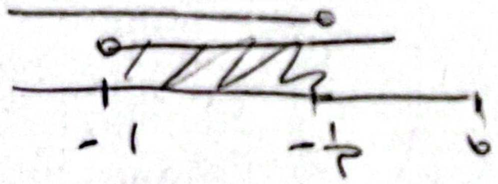
$$1+k>0 \to \boxed{k>-1}$$

$-1^- \quad -1{,}1$

$$\frac{1+2k}{\underbrace{x^2-1}_{0^+}} = -\infty$$

$$1+2k<0$$

$$2k<-1 \to \boxed{k<-\frac{1}{2}}$$



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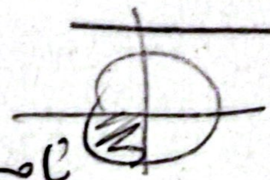
$$\boxed{-1<k<-\frac{1}{2}} \qquad \boxed{-\pi<k\pi<-\frac{\pi}{2}}$$



ناحیه سوم

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حاصل حد هنگامی به بی‌نهایت میل می‌کند که مخرج به صفر میل کند!

$$\lim_{x\to(\frac{\sqrt{3}}{3})^+} \left|\frac{\sqrt{3}}{3}x + a\right| + a = 0 \rightsquigarrow \left|\frac{1}{3} + a\right| + a = 0$$

$a \geq -\frac{1}{3} \longrightarrow 2a + \frac{1}{3} = 0 \longrightarrow a = -\frac{1}{6}$ $\rightsquigarrow [a] = -1$

$a < -\frac{1}{3} \longrightarrow -\frac{1}{3} = 0$ غ ق ق ✗

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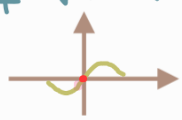
$$\lim_{x\to 0} \frac{\sqrt{2+3x} - \sqrt{2-x}}{\sqrt{1-\cos x}} \times \frac{\sqrt{2+3x} + \sqrt{2-x}}{\sqrt{2+3x} + \sqrt{2-x}} \times \frac{\sqrt{1+\cos x}}{\sqrt{1+\cos x}} =$$



$$\lim_{\to 0^-} \frac{4x \times \sqrt{2}}{\sqrt{1-\cos^2 x}} \times \frac{1}{2\sqrt{2}} = \lim_{x\to 0} \frac{4\sqrt{2}\; x}{|\cancel{\sin x}|\, 2\sqrt{2}} = 2 \times \frac{x}{-\sin x} = \boxed{-2}$$

$\sin$