۲۰

صفحه تمرین ←

۱ ← $\lim_{x\to1}\dfrac{4x^2-7x+3}{5x^2-8x+3}=\dfrac{0}{0}\xrightarrow{\text{رفع ابهام}}\dfrac{\cancel{(x-1)}(4x-3)}{\cancel{(x-1)}(5x-3)}=\dfrac{4x-3}{5x-3}\longrightarrow\dfrac{4-3}{5-3}=\boxed{\dfrac{1}{2}}$ د

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۲ ← $\lim_{x\to0}\dfrac{|3x-1|-|3x+1|}{x}=\dfrac{0}{0}\xrightarrow{\text{رفع قدرمطلق}}\dfrac{1-3x-3x-1}{x}=\dfrac{-6x}{x}=\boxed{-6}$ د

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۳ ← $\lim_{x\to4}\dfrac{x-4}{\sqrt{x}-2}=\dfrac{0}{0}\xrightarrow[\text{ضرب در مزدوج مخرج}]{\text{رفع ابهام}}\dfrac{4(x-4)}{x-4}=\boxed{4}$ د

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۴ ← $\lim_{x\to2}\dfrac{x-\sqrt{2x}}{2x^2-x-6}=\dfrac{0}{0}\xrightarrow{\text{رفع ابهام}}\dfrac{x-\sqrt{2x}}{(x-2)(2x+3)}\times\dfrac{\text{مزدوج}}{\text{مزدوج}}=\dfrac{\overbrace{x^2-2x}^{x(\cancel{x-2})}}{4(\cancel{x-2})(2x+3)}\longrightarrow$ د

$\dfrac{x}{4(x+\frac{3}{2})}=\dfrac{\cancel{2}}{\cancel{4}(\frac{7}{\cancel{2}})}=\boxed{\dfrac{1}{14}}$

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۵ ← $\lim_{x\to1}\dfrac{1-\sqrt{x}}{2-\sqrt{5-x}}=\dfrac{0}{0}\xrightarrow{\text{رفع ابهام}}\dfrac{1-\sqrt{x}}{2-\sqrt{5-x}}\times\dfrac{\text{مزدوج}}{\text{مزدوج}}\times\dfrac{\text{مز}}{\text{مز}}=\dfrac{4(1-x)}{2(\underbrace{4-5+x}_{x-1})}$ د

$=\dfrac{2(1-x)}{-(1-x)}=\boxed{-2}$

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۶ ← $\lim_{x\to4}\dfrac{\sqrt{3x+4}-4}{\sqrt[3]{5x+7}-3}=\dfrac{0}{0}\xrightarrow{\text{رفع ابهام}}\dfrac{\sqrt{3x+4}-4}{\sqrt[3]{5x+7}-3}\times\dfrac{\text{مز}}{\text{مز}}\times\dfrac{\text{ق}}{\text{ق}}$ د

$$\longrightarrow \frac{(\overset{۳x-۱۲}{۳x+۴-۱۶})\,۳\times۳^{۲}}{(\underset{۵x-۲۰}{۵x+۷-۲۷})\,۴\times۲} = \frac{۳(\cancel{x-۴})\,۳\times۳\times۳}{۵(\cancel{x-۴})\,۲\times۴} = \boxed{\frac{۸۱}{۴۰}}$$

← ۷ ۴

$$\lim_{x\to۱} \frac{\sqrt{۳x+\sqrt{x}}-۲}{\sqrt[۳]{x}-۱} = \frac{۰}{۰} \xrightarrow{\text{رفع ابهام}} \frac{\sqrt{۳x+\sqrt{x}}-۲}{\sqrt[۳]{x}-۱} \times \frac{\text{مزدوج}}{\text{مزدوج}} \times \frac{\lceil}{\lceil}$$

$$\longrightarrow \frac{۳(۳x+\sqrt{x}-۴)}{۴(x-۱)} \longrightarrow \frac{۳(\cancel{\sqrt{x}-۱})(۳\sqrt{x}+۴)}{(\cancel{\sqrt{x}-۱})(\sqrt{x}+۱)\,۴} = \frac{۳\times۷}{۸} = \boxed{\frac{۲۱}{۸}}$$

← ۸ ۴

$$\lim_{x\to\pi} \frac{۱+\cos^{۳}x}{\underset{(۱-\cos^{۲}x)}{\sin^{۲}x}} = \frac{۰}{۰} \xrightarrow{\text{رفع ابهام}} \frac{\cancel{(۱+\cos x)}(\cos^{۲}x+۱-\cos x)}{(۱-\cos x)\cancel{(۱+\cos x)}}$$

$$= \frac{۱+۱+۱}{۲} = \boxed{\frac{۳}{۲}}$$

← ۹ ۴

$$\lim_{x\to\pi/۴} \frac{۱-\overset{\frac{\sin x}{\cos x}}{\tan x}}{\sin x-\cos x} = \frac{۰}{۰} \xrightarrow{\text{رفع ابهام}} \frac{\frac{\cos x-\sin x}{\cos x}}{\sin x-\cos x} \longrightarrow$$

$$\frac{\cancel{\cos x-\sin x}}{-\cos x\,\cancel{(\cos x-\sin x)}} = \frac{-۱}{\underset{\frac{\sqrt{۲}}{۲}}{\cos x}} = \frac{-۲}{\sqrt{۲}} = \boxed{-\sqrt{۲}}$$

← ۱۵ ۴

$$\lim_{x\to\frac{۳\pi}{۴}} \frac{\overset{\frac{\sin^{۲}x}{\cos^{۲}x}}{\tan^{۲}x}-۱}{\underset{\cos^{۲}x-\sin^{۲}x}{\cos ۲x}} = \frac{۰}{۰} \xrightarrow{\text{رفع ابهام}} \frac{\frac{\sin^{۲}x-\cos^{۲}x}{\cos^{۲}x}}{\cos^{۲}x-\sin^{۲}x} = \frac{\cancel{\sin^{۲}x-\cos^{۲}x}}{-\cos^{۲}x\,\cancel{(\sin^{۲}x-\cos^{۲}x)}}$$

$$= \frac{-۱}{\cos^{۲}x} = \frac{-۱}{-\frac{\sqrt{۲}}{۲}\times-\frac{\sqrt{۲}}{۲}} = \boxed{-۲}$$