نام و نام خانوادگی: بهار پیشه‌وریان — تکلیف ۳۰

$$\lim_{x\to1}\frac{4x^2-7x+3}{5x^2-8x+3}=\frac{0}{0}\ \text{مبهم}\ \xrightarrow{}\ \frac{\cancel{(x-1)}(4x-3)}{\cancel{(x-1)}(5x-3)}=\lim_{x\to1}\frac{4x-3}{5x-3}=\boxed{\frac{1}{2}}$$

جواب ۱

$$\lim_{x\to0}\frac{|3x-1|-|3x+1|}{x}=\frac{0}{0}\ \text{مبهم}$$

$$\frac{-(3x-1)-(3x+1)}{x}=\frac{-3x+1-3x-1}{x}=\frac{-6x}{x}=\boxed{-6}$$

جواب ۲

$$\lim_{x\to4}\frac{x-4}{\sqrt{x}-2}=\frac{0}{0}\ \text{مبهم}\ \to\frac{\cancel{(\sqrt{x}-2)}(\sqrt{x}+2)}{\cancel{(\sqrt{x}-2)}}\Rightarrow\lim_{x\to4}\sqrt{x}+2=\boxed{4}$$

جواب ۳

$$\lim_{x\to2}\frac{x-\sqrt{2x}}{\underbrace{2x^2-x-6}_{(x-2)(2x+3)}}=\frac{0}{0}\Rightarrow\times\frac{x+\sqrt{2x}}{x+\sqrt{2x}}=\frac{x^2-2x}{(x-2)(2x+3)(x+\sqrt{2x})}$$

$$\to\frac{x\cancel{(x-2)}}{\cancel{(x-2)}(2x+3)(x+\sqrt{2x})}=\frac{2}{7\times4}=\boxed{\frac{2}{14}}$$

جواب ۴

$$\lim_{x\to1}\frac{1-\sqrt{x}}{2-\sqrt{5-x}}=\frac{0}{0}\times\frac{1+\sqrt{x}}{1+\sqrt{x}}\times\frac{2+\sqrt{5-x}}{2+\sqrt{5-x}}=\lim\frac{(1-x)(2+\sqrt{5-x})}{\underbrace{4-5+x}_{-(1-x)}(1+\sqrt{x})}$$

$$\lim_{x\to1}\frac{2+\sqrt{5-x}}{-(1+\sqrt{x})}=\frac{2+2}{-2}=\boxed{-2}$$

جواب ۵

$$\lim_{x\to 4} \frac{\sqrt{3x+4}-4}{\sqrt[3]{5x+7}-3} = \frac{0}{0} \to \times \frac{\text{مزدوج}}{\text{مزدوج}} \times \frac{\text{ت}}{\text{ت}} = \frac{(3x+4-16)\,(\quad \text{ت})}{(5x+7-27)\,(\text{مزدوج})}$$

$$= \lim \frac{\overset{3(x-4)}{3x-12}\cdot\left(\sqrt[3]{(5x+7)^2}+9+3\sqrt[3]{5x+7}\right)}{\underset{5(x-4)}{5x-20}\cdot\left(\sqrt{3x+4}+4\right)} \to \lim_{x\to 4} \frac{3(\overset{27}{9+9+9})}{5(8)} = \boxed{\frac{81}{40}}$$ ← جواب 6

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

$$= \lim_{x\to 1} \frac{3\left(3(\sqrt{x}-1)(\sqrt{x}+\tfrac{4}{3})\right)}{4\left((\sqrt{x}-1)(\sqrt{x}+1)\right)} = \boxed{\frac{21}{8}}$$ ← جواب 7

$$\lim_{x\to \pi} \frac{1+\cos^3 x}{\sin^2 x} = \frac{(1+\cos)(1+\cos^2 x-\cos x)}{1-\cos^2} = \frac{\cancel{(1+\cos x)}(1+\cos^2 x-\cos x)}{(1-\cos x)\cancel{(1+\cos x)}} = \frac{1+1+1}{1+1} = \boxed{\frac{3}{2}}$$ 8

جواب

$$\lim_{x\to \frac{\pi}{4}} \frac{1-\cot x}{\sin x-\cos x} = \frac{\frac{\cos x-\sin x}{\sin x}}{(\sin x-\cos x)} = \frac{(\cos x-\sin x)}{\sin(-(\cos x-\sin))} = \frac{1}{-\sin x} = \frac{1}{-\frac{\sqrt{2}}{2}} = \boxed{-\frac{2}{\sqrt{2}}}$$ 9

جواب

$$\lim_{x\to \frac{3\pi}{4}} \frac{\tan^2 x-1}{\cos 2x} = \frac{(\tan x-1)(\tan x+1)}{(\cos x-\sin x)(\cos x+\sin x)} = \frac{-\cancel{(\sin x+\cos x)}\cancel{(\cos x-\sin x)}}{\cos^2 x\cancel{(\cos x-\sin x)}\cancel{(\cos x+\sin x)}} = \frac{-1}{\cos^2 x} = \frac{-1}{\frac{1}{2}} = \boxed{-2}$$ 10

جواب