"به نام خدا"

۱۷,۲۵

تکلیف سری ۳ "هشتاین صفر"

...ایزدمهر دختری

۱) $\lim_{x\to 1} \frac{4x^2-7x+3}{5x^2-8x+3} = \frac{4-7+3}{5-8+3} = \frac{0}{0} \xrightarrow{hop} \frac{8x-7}{10x-8} \Rightarrow \frac{8-7}{10-8} = \frac{1}{2}$ ۵

۲) $\lim_{x\to 0} \frac{|3x-1|-|3x+1|}{x} = \frac{0}{0}$ ... $x \to 0 \Rightarrow -\frac{1}{3} < x < \frac{1}{3} \Rightarrow f(x) = \frac{6x}{x} = 6$ ۱,۷۵

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

۳) $\lim_{x\to 4} \frac{x-4}{\sqrt{x}-2} = \frac{0}{0} \to \frac{1}{\frac{1}{2\sqrt{x}}} = 2\sqrt{x} \to 4$ ۲

۴) $\lim_{x\to 2} \frac{x-\sqrt{2x}}{2x^2-x-6} = \frac{0}{0} \xrightarrow{hop} \frac{1-\frac{2}{2\sqrt{2x}}}{4x-1} = \frac{1-\frac{2}{4}}{8-1} = \frac{\frac{1}{2}}{\frac{7}{1}} = \frac{1}{14}$ ۲

۵) $\lim_{x\to 1} \frac{1-\sqrt{x}}{2-\sqrt{5-x}} = \frac{0}{0} \xrightarrow{hop} \frac{-\frac{1}{2\sqrt{x}}}{-\frac{-1}{2\sqrt{5-x}}} = \frac{-\frac{1}{2}}{-\frac{-1}{4}} = -\frac{4}{2} = -2$ ۲

۶) $\lim_{x\to 4} \frac{\sqrt{3x+4}-4}{\sqrt[3]{5x+7}-3} = \frac{0}{0} \xrightarrow{hop} \frac{\frac{3}{2\sqrt{3x+4}}-0}{\frac{5}{3\sqrt[3]{(5x+7)^2}}-0} = \frac{\frac{3}{8}}{\frac{5}{27}} = \frac{3\times27}{8\times5} = \frac{81}{40}$ ۲

۷) $\lim_{x\to 1} \frac{\sqrt{3x+\sqrt{x}}-2}{\sqrt[3]{x}-1} = \frac{0}{0} \xrightarrow{hop} \frac{\frac{3}{2\sqrt{3x+\sqrt{x}}}}{\frac{1}{3\sqrt[3]{x^2}}} = \frac{\frac{3}{4}}{\frac{1}{3}} = \frac{9}{4}$ ۵

۷) پاسخ ۳ → $\lim_{x\to 1} \frac{\sqrt{3x+\sqrt{x}}-2}{\sqrt[3]{x}-1} \times \frac{\sqrt{3x+\sqrt{x}}+2}{\sqrt[3]{x^2}+1+\sqrt[3]{x}} \times \frac{3}{4}$

$\xrightarrow{HOP} \frac{3}{4} \times \frac{3+\frac{1}{2\sqrt{x}}}{1} = \frac{3}{4} \times \frac{7}{2} = \frac{21}{8}$

$\lim_{x\to \pi} \frac{1+\cos^3 x}{\sin^2 x} = \frac{0}{0} \to \frac{\frac{\cos x - \sin x}{\cos x}}{\sin x - \cos x} = \frac{\cos x - \sin x}{\cos x(\sin x - \cos x)} = \frac{-1}{\cos x}$

$\Rightarrow$

$\lim_{x\to \pi} \frac{1+\cos^3 x}{\sin^2 x} \Rightarrow \frac{0}{0} \to \frac{(1+\cos x)(\cos^2 x - \cos x + 1)}{(1-\cos x)(1+\cos x)} =$

$\frac{\cos^2 x - \cos x + 1}{1-\cos x} \Rightarrow \frac{\cos^2 \pi - \cos \pi + 1}{1-\cos \pi} = \frac{1+1+1}{1-(-1)} = \frac{3}{2}$ ۲

$\lim \frac{1-\tan x}{\sin x - \cos x} \to \frac{1-\tan\frac{\pi}{4}}{\sin\frac{\pi}{4}-\cos\frac{\pi}{4}} = \frac{0}{0} \xrightarrow{\text{ابهام}}{\text{رفع}} \frac{\frac{\cos x - \sin x}{\cos x}}{\sin x - \cos x} =$ ۱,۷۵

$\frac{\cos x - \sin x}{\cos x(\sin x - \cos x)} = \frac{-1}{\cos x} = -\sqrt{2}$

$\lim_{x\to \frac{3\pi}{4}} \frac{\tan^2 x - 1}{\cos 2x} \to \frac{\tan^2\frac{3\pi}{4}-1}{\cos 2(\frac{3\pi}{4})} = \frac{0}{0} \xrightarrow{\text{رفع}}{\text{ابهام}} \frac{\frac{\sin^2 x - \cos^2 x}{\cos^2 x}}{\cos^2 x - \sin^2 x} =$

۱,۷۵

$\frac{\sin^2 x - \cos^2 x}{\cos^2 x(\cos^2 x - \sin^2 x)} = \frac{-1}{\cos^2 x} = -2$