Date: Sub:

30 تمرین — اجرا شد

1. $\lim_{x\to 1} \frac{4x^2-7x+3}{5x^2-8x+3} = \frac{(4x-3)(x-1)}{(x-1)(5x-3)} = \frac{4x-3}{5x-3}$

$\frac{4-3}{5-3} = \frac{1}{2}$

2. $\lim_{x\to 0} \frac{|2x-1|-|2x+1|}{x} = \lim_{x\to 0} \frac{-2x+1-2x-1}{x} = \frac{-4x}{x} = -4$

3. $\lim_{x\to 4} \frac{x-4}{\sqrt{x}-2} \to \frac{(\sqrt{x}+2)(\sqrt{x}-2)}{(\sqrt{x}-2)} = \sqrt{x}+2 \to 2+2 = 4$

4. $\lim_{x\to 2} \frac{x-\sqrt{2x}}{2x^2-x-6}$ مزدوج $\to \frac{1-1/\sqrt{2x}}{4x-1}$ جایگذاری $\to \frac{1-1/2}{7} = \frac{1}{14}$

$2x^2-x-6 = (x-2)(2x+3)$

5. $\lim_{x\to 1} \frac{1-\sqrt{x}}{2-\sqrt{5-x}}$ مشتق $\to \frac{-1/2\sqrt{x}}{1/2\sqrt{5-x}} \Rightarrow \lim_{x\to 1} -\frac{\sqrt{5-x}}{\sqrt{x}} = -2$

6. $\lim_{x\to 4} \frac{\sqrt{3x+4}-4}{\sqrt[3]{5x+7}-3} \times \frac{\sqrt[3]{(5x+7)^2}+9+3\sqrt[3]{5x+7}}{\sqrt[3]{(5x+7)^2}+9+3\sqrt[3]{5x+7}} \times \frac{\sqrt{3x+4}+4}{\sqrt{3x+4}+4} =$

$\frac{27(3x+4-16)}{8(5x+7-27)} = \frac{27(3x-12)}{8(5x-20)} = \frac{81(x-4)}{40(x-4)} = \frac{81}{40} = 2,02$

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۷. $\lim_{x\to 1} \frac{\sqrt{x+\sqrt{x}-1}}{\sqrt[3]{x-1}} \times \frac{\sqrt[3]{x^2}+1+\sqrt[3]{x}}{\sqrt[3]{x^2}+1+\sqrt[3]{x}} \times \frac{\sqrt{x+\sqrt{x}+1}}{\sqrt{x+\sqrt{x}+1}}$

$\hookrightarrow \frac{x(x+\sqrt{x}-1)}{x-1} \xrightarrow{\text{مزدوج}} \frac{x(x+\frac{1}{2\sqrt{x}})}{1} = \frac{3}{2}$

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

$\hookrightarrow \frac{1-\cos x+\cos^2 x}{1-\cos x} = \frac{3}{2}$

۹. $\lim_{x\to\frac{\pi}{4}} \frac{1-\tan x}{\sin x-\cos x} \to \frac{\cos-\sin/\cos}{-\cos x+\sin x} = \frac{1}{-\cos}$

$\hookrightarrow \lim_{x\to\frac{\pi}{4}} \frac{1}{-\cos\pi} = \frac{1}{\frac{-\sqrt{2}}{2}} = -\sqrt{2}$

۱۰. $\lim_{x\to\frac{\pi}{4}} \frac{\tan^2 x-1}{\cos^2 x} \to \frac{-1+\tan^2 x/1}{1-\tan^2 x/1+\tan^2 x} = \frac{-1-\tan^2 x}{1}$

$\hookrightarrow \lim_{x\to\frac{\pi}{4}} \frac{-1-\tan^2 x}{1} = -2$