نام: کیمیا رجبی — شماره تکلیف: 30 — گروه یازدهم دهم A — 19,75

(1)

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

صدارد

(2)

$$\lim_{x\to 0} \frac{|3^x - 1| - |3^x + 1|}{x}$$

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

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

صدارد

(3)

$$\lim_{x\to 4} \frac{x-4}{\sqrt{x}-2} \times \frac{\sqrt{x}+2}{\sqrt{x}+2} = \frac{x-4}{x-4} \times \sqrt{x} + 2 = 4$$

صدارد

(4)

$$\lim_{x\to 2} \frac{x - \sqrt{2x}}{2x^2 - x - 6} \times \frac{x + \sqrt{2x}}{x + \sqrt{2x}} = \frac{x^2 - 2x}{(2x+3)(x-2)} \times \frac{1}{x + \sqrt{2x}} = \frac{x(x-2)}{(2x+3)(x-2)} \times \frac{1}{x+\sqrt{2x}}$$

$x^2 - x - 12 = (x+3)(x-4)$

$(2x+3)(x-2)$

$\Rightarrow \frac{2}{7 \times 4} = \frac{2}{28} = \frac{1}{14}$

صدارد

(5)

$$\lim_{x\to 1} \frac{1-\sqrt{x}}{2-\sqrt{5-x}} \times \frac{1+\sqrt{x}}{1+\sqrt{x}} \times \frac{2+\sqrt{5-x}}{2+\sqrt{5-x}} = \frac{1-x}{-(1-x)} \times \frac{4}{2} = -2$$

$5 - x = 4$

صدارد

⑥

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

$$\Rightarrow \frac{24}{8} \times \frac{3}{5} = \frac{18}{40}$$

درست است

⑦

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

$$= \frac{3x+\sqrt{x}-4}{x-1} \times \frac{\sqrt[3]{x^2}+\sqrt[3]{x}+1}{\sqrt{3x+\sqrt{x}}+2} = \frac{(3\sqrt{x}+4)(\sqrt{x}-1)}{(\sqrt{x}-1)(\sqrt{x}+1)} \times \frac{3}{4} = \frac{7}{2} \times \frac{3}{4} = \frac{21}{8}$$

$3x+\sqrt{x}-4 = (3\sqrt{x}+4)(\sqrt{x}-1)$

درست است

⑧

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

$\sin^2 x \to 1-\cos^2 x$

درست است

⑨

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

$\tan x \to \frac{\sin x}{\cos x}$

درست است

⑩

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

$\frac{\pi}{4} \to \frac{1}{\cos^2 x} \to -\frac{1}{2}$

$\frac{\pi}{4} \to \frac{1}{\cos 2x} \to -\frac{1}{2}$

درست است