پاسخ تمرین سری دوم حدود فصل ۳

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

② $\lim_{x\to 0} \frac{|3x-1|-|1+3x|}{x} = \frac{1-3x-1-3x}{x} = \frac{-6x}{x} = -6$

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

④ $\lim_{x\to 2} \frac{x-\sqrt{3x-2}}{3x^2-x-14} = \frac{1-\frac{3}{2\sqrt{3x-2}}}{12x-1} = \frac{1-\frac{3}{4}}{7} = \frac{1}{28}$

⑤ $\lim_{x\to 1} \frac{1-\sqrt{x}}{x-5\sqrt{x}+4}$ تغییر متغیر $\alpha \frac{\text{مخرج}}{\text{صورت}} \alpha \frac{④}{③} \alpha \frac{x-1}{x+6-3} = \frac{x-1}{x+3} = \frac{-(1-x)}{4(1-x)} = -\frac{1}{4}$

⑥ $\lim_{x\to 3} \frac{\sqrt{x^2+7x+6}-6}{\sqrt[3]{5x+1}-4} \alpha \frac{\text{مخرج}}{①} \alpha \frac{④}{④} = \frac{x^2+7x-18}{5x-63} \times \frac{1}{x-3} = \frac{(x+9)(x-2)}{5(x-3)} \times \frac{1}{64} = \frac{15}{64}$

⑦ $\lim_{x\to 1} \frac{\sqrt{x+\sqrt{3x+1}}-2}{\sqrt[3]{x}-1} \alpha \frac{\text{مخرج}}{③} \alpha \frac{\text{مخرج}}{⑤} = \frac{x-3\sqrt{x}+2}{x-1} \alpha \frac{1}{2} = \frac{(\sqrt{x}-1)(\sqrt{x}-2)}{(\sqrt{x}-1)(\sqrt{x}+1)} \alpha \frac{1}{2} = \frac{7}{12}$

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

⑨ $\lim_{x\to \frac{\pi}{4}} \frac{1-\tan x}{\sin x-\cos x} = \frac{\frac{-\sin x+\cos x}{\cos x}}{\sin x-\cos x} = -\frac{1}{\cos x} = -\frac{1}{\frac{\sqrt{2}}{2}} = -\sqrt{2}$

⑩ $\lim_{x\to \frac{\pi}{4}} \frac{\tan^2 x-1}{\cos^2 x} = \frac{\frac{\sin^2 x-\cos^2 x}{\cos^2 x}}{\cos^2 x-\sin^2 x} = \frac{-1}{\cos^2 x} = \frac{-1}{\frac{1}{2}} = -2$