تمرین ۵

(۱) $\lim_{x\to 1} \frac{(x-1)(2x-3)}{(x-1)(5x-3)} = \frac{1}{2}$

(۲) $\lim_{x\to 0} \frac{-3x+1-3x-1}{x} = \frac{-6x}{x} = -6$

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

(۴) $\lim_{x\to 2} \frac{x-\sqrt{12x}}{(12x+3)(x-2)} \times \frac{x+\sqrt{12x}}{x+\sqrt{12x}} = \frac{x(x-12)}{(12x+3)(x-2)(x+\sqrt{12x})} = \frac{1}{14}$

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

(۶) $\lim_{x\to 4} \frac{\sqrt{3x+4}-4}{\sqrt[3]{5x+1}-3} \times \frac{\sqrt{3x+4}+4}{\sqrt{3x+4}+4} \times \frac{\sqrt[3]{(5x+1)^2}+9+3\sqrt[3]{5x+1}}{\sqrt[3]{(5x+1)^2}+9+3\sqrt[3]{5x+1}} = \frac{3}{5} \times \frac{24}{8} = \frac{18}{40}$

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

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

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

(۱۰) $\lim \frac{\frac{1-\cos^2 x-\cos^2 x}{\cos^2 x}}{\cos^2 x-\sin^2 x} = \frac{-\cos^2 x+\sin^2 x}{\cos^2 x \times -(-\cos^2 x+\sin^2 x)} = -2$