مجموع ضرایب صفر

$$\lim_{x\to 1}\frac{15x^2-7x+2}{5x^2-8x+3}=\frac{4(x-\frac{2}{3})(x-1)}{5(x-\frac{3}{5})(x-1)}=\frac{4(1-\frac{2}{3})}{5(1-\frac{3}{5})}=\frac{\frac{4}{3}}{\frac{10}{5}}=\frac{1}{2}$$

۱) با تجزیه یا روش دوم حذف β

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

۲) لیف قدرمطلق، مشتق بگیرم

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

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

۳)

$$\lim_{x\to 2}\frac{x-\sqrt{2x}}{2x^2-x-6}\times\frac{x+\sqrt{2x}}{x+\sqrt{2x}}=\frac{x^2-2x}{2(x-2)(x+\frac{3}{2})(x+\sqrt{2x})}=\frac{1}{14}$$

۴)

$$\lim_{x\to 16}\frac{1-\sqrt{x}}{32-\sqrt{5-x}}\times\frac{1+\sqrt{x}}{4+\sqrt{x}}\times\frac{32+\sqrt{5-x}}{32+\sqrt{5-x}}=\frac{-1(x-1)}{(x-5x+4)}\times\frac{2}{2}=-2$$

۵)

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

$$\frac{27}{8}\times\frac{3x+4-16}{5x+7-27}=\frac{27}{8}\times\frac{3(x-4)}{5(x-4)}=\frac{11}{40}$$

۶)

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

۷)

$$=\frac{3}{4}\times\frac{3x+\sqrt{x}-4}{x-1}\times\frac{(3x-4)-\sqrt{x}}{(3x-4)-\sqrt{x}}=-\frac{3}{4}\times\frac{1}{2}\times\frac{1}{(x-1)}\times\frac{(3x-4)^2-x}{}$$

$$-\frac{3}{8}\times\frac{9x^2+16-24x-x}{(x-1)}=-\frac{3}{8}\times\frac{9(x-\frac{16}{9})(x-1)}{(x-1)}=\frac{21}{8}$$

۸)

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

$$\lim_{x \to \frac{\pi}{4}} \frac{1 - \tan x}{\sin x - \cos x} \times \frac{\cos x}{\cos x} = \frac{\cos x - \sin x - 1}{\cos x (\sin x - \cos x)} = -\sqrt{2} \quad (9)$$

$$\lim_{x \to \frac{5\pi}{4}} \frac{\tan^2 x - 1}{\cos(2x)} \times \frac{\cos^2 x}{\cos^2 x} = \frac{-1}{\sin^2 x - \cos^2 x} = \frac{-1}{\cos^2 x (\cos^2 x - \sin^2 x)} = -2 \quad (10)$$

$$\left(-\frac{\sqrt{2}}{2}\right)^2$$