* حنانه موسوی — ۲۰ — * تکلیف شماره ۳۰ — * یازدهم دفتر B

① $$\lim_{x\to 1}\frac{4x^2-7x+3}{5x^2-8x+3}=\frac{4-7+3}{5-8+3}=\frac{0}{0}\longrightarrow\frac{(x-1)(4x-3)}{(x-1)(5x-3)}=\frac{4-3}{5-3}=\frac{1}{2}$$

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

③ $$\lim_{x\to 4}\frac{x-4}{\sqrt{x}-2}=\frac{0}{0}=\frac{(\sqrt{x}-2)(\sqrt{x}+2)}{\sqrt{x}-2}=\sqrt{x}+2=2+2=4$$

④ $$\lim_{x\to 2}\frac{x-\sqrt{2x}}{2x^2-x-6}=\frac{0}{0}=\frac{x-\sqrt{2x}}{(x-2)(2x+3)}\times\frac{\sqrt{2x}+x}{x+\sqrt{2x}}=\frac{\overset{x(x-2)}{\cancel{x^2-2x}}}{(x-2)(2x+3)(x+\sqrt{2x})}=\frac{2}{28}=\frac{1}{14}$$

⑤ $$\lim_{x\to 1}\frac{1-\sqrt{x}}{2-\sqrt{5-x}}=\frac{0}{0}=\frac{1-\sqrt{x}}{2-\sqrt{5-x}}\times\frac{1+\sqrt{x}}{1+\sqrt{x}}\times\frac{2+\sqrt{5-x}}{2+\sqrt{5-x}}=\frac{\cancel{(1-x)}(2+\sqrt{5-x})}{-\cancel{(1-x)}(1+\sqrt{x})}=\frac{4}{-2}=-2$$

⑥ $$\lim_{x\to 4}\frac{\sqrt{3x+4}-4}{\sqrt[3]{5x+7}-3}\times\frac{\text{مص}}{\text{مص}}\times\frac{\text{مف}}{\text{مف}}=\frac{3(x-4)\left(\sqrt[3]{(5x+7)^2}+3\sqrt[3]{5x+7}+9\right)}{5(x-4)\left(\sqrt{3x+4}+4\right)}=\frac{81}{40}$$

⑦ $$\lim_{x\to 1}\frac{\sqrt{3x+\sqrt{x}}-2}{\sqrt[3]{x}-1}\times\frac{\text{مص}}{\text{مص}}\times\frac{\text{مف}}{\text{مف}}=\frac{\overset{(\sqrt{x}-1)(3\sqrt{x}+4)}{\cancel{(3x+\sqrt{x}-4)}}\left(\sqrt[3]{x^2}+\sqrt[3]{x}+1\right)}{\underset{(\sqrt{x}-1)(\sqrt{x}+1)}{\cancel{(x-1)}}\left(\sqrt{3x+\sqrt{x}}+2\right)}=\frac{21}{8}$$

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

⑨ $$\lim_{x\to \pi/4}\frac{1-\tan x}{\sin x-\cos x}=\frac{0}{0}=\frac{\frac{\cos x-\sin x}{\cos x}}{\sin x-\cos x}=\frac{\overset{-1}{\cancel{\cos x-\sin x}}}{(\cos x)\cancel{(\sin x-\cos x)}}=\frac{1}{-\cos x}=\frac{-2}{\sqrt{2}}=-\sqrt{2}$$

⑩ $$\lim_{x\to 3\pi/4}\frac{\tan^2x-1}{\cos 2x}=\frac{0}{0}=\frac{(\tan x-1)(\tan x+1)}{(\cos x-\sin x)(\cos x+\sin x)}=\frac{-(\sin x+\cos x)(\cos x-\sin x)}{\cos^2x(\cos x-\sin x)(\cos x+\sin x)}$$

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