ستایش مرادزاد تکلیف ۳۰ یازدهم رشته A

1) $\lim\limits_{x\to 1} \dfrac{4x^2-7x+3}{5x^2-8x+3} = \dfrac{4-7+3}{5-8+3} = \dfrac{0}{0} \xrightarrow{hop} \dfrac{8x-7}{10x-8} = \dfrac{8-7}{10-8} = \boxed{\dfrac{1}{2}}$

2) $\lim\limits_{x\to 0} \dfrac{|3x-1| - |3x+1|}{x} = \dfrac{1-3x-3x-1}{x} = \dfrac{-6\cancel{x}}{\cancel{x}} = \boxed{-6}$

3) $\lim\limits_{x\to 4} \dfrac{x-4}{\sqrt{x}-2} = \dfrac{0}{0} \xrightarrow{hop} \lim \dfrac{1}{\frac{1}{2\sqrt{x}}} = 2\sqrt{x} = 4$

4) $\lim\limits_{x\to 2} \dfrac{x-\sqrt{2x}}{2x^2-x-6} = \dfrac{2-2}{8-8} = \dfrac{0}{0} \xrightarrow{hop} \dfrac{1-\frac{2}{2\sqrt{2x}}}{4x-1} = \dfrac{1-\frac{1}{2}}{7} = \dfrac{1}{14}$

$= \dfrac{\overset{x\cancel{(x-2)}}{x^2-2x}}{2\cancel{(x-2)}(x+\frac{3}{2}) \times 4} = \dfrac{1}{\frac{7}{2}\times 4} = \dfrac{1}{14}$

5) $\lim\limits_{x\to 1} \dfrac{1-\sqrt{x}}{2-\sqrt{5-x}} = \dfrac{0}{2-2} = \dfrac{0}{0} \xrightarrow{hop} \dfrac{-\frac{1}{\cancel{2}\sqrt{x}}}{+\frac{1}{\cancel{2}\sqrt{5-x}}} = \dfrac{-1}{\frac{1}{4}} = \boxed{-2}$

6) $\lim\limits_{x\to 4} \dfrac{\sqrt{3x+4}-4}{\sqrt[3]{5x+7}-3} = \dfrac{3}{5} \times \dfrac{27}{8} = \dfrac{81}{40}$

$= \dfrac{\overset{3x-12}{3x+4-16}}{\underset{5x-20}{5x+7-27}} \times \dfrac{27}{8} = \dfrac{3}{5} \times \dfrac{27}{8} = \dfrac{81}{40}$

7) $\lim\limits_{x\to 1} \dfrac{\sqrt{3x+\sqrt{x}}-2}{\sqrt[3]{x}-1} = \dfrac{0}{0} = \dfrac{3+\frac{1}{2\sqrt{x}}}{1} \times \dfrac{3}{4} = \dfrac{7}{2} \times \dfrac{3}{4} = \dfrac{21}{8}$

$= \dfrac{\overset{3\times\cancel{(\sqrt{x}-1)}(\sqrt{x}+\frac{4}{3})}{3x+\sqrt{x}-4}}{\underset{(\sqrt{x}+1)}{\cancel{x-1}}} \times \dfrac{3}{4} = \dfrac{3\times\frac{7}{\cancel{3}}}{2} \times \dfrac{\cancel{3}}{4} = \dfrac{21}{8}$

8) $\lim\limits_{x\to \pi} \dfrac{1+\cos^3 x}{\sin^2 x} = \dfrac{1+(-1)}{0} = \dfrac{0}{0} = \dfrac{\cancel{(1+\cos x)}(1-\cos x+\cos^2 x)}{\underset{(1-\cos x)}{(1-\cos^2 x)}} = \dfrac{1+1+1}{2} = \dfrac{3}{2}$

۹) $\lim\limits_{x \to \frac{\pi}{4}} \dfrac{1-\tan x}{\sin x - \cos x} = \dfrac{1-1}{\frac{\sqrt{2}}{2}-\frac{\sqrt{2}}{2}} = \dfrac{0}{0} = \dfrac{\frac{\cancel{\cos x - \sin x}^{\,-1}}{\cos x}}{\cancel{\sin x - \cos x}} = \dfrac{-1}{\cos x} = \dfrac{-1}{\frac{\sqrt{2}}{2}} = \boxed{-\sqrt{2}}$

۱۰) $\lim\limits_{x \to \frac{3\pi}{4}} \dfrac{\tan^2 x - 1}{\cos^2 x} = \dfrac{1-1}{0} = \dfrac{0}{0} = \dfrac{\frac{\cancel{\sin^2 x - \cos^2 x}}{\cos^2 x}}{\cos^2 x \cancel{- \sin^2 x}} = \dfrac{-1}{\cos^2 x} = \dfrac{-1}{\left(-\frac{\sqrt{2}}{2}\right)^2} = \dfrac{-1}{\frac{1}{2}} = \boxed{-2}$