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

۲) $\lim_{n\to 0} \frac{|3n-1|-|3n+1|}{n}$ $\xrightarrow{n\to 0^+}$ $\frac{-3n+1-3n-1}{n} = \frac{-6}{n} = -6$

$\xrightarrow{n\to 0^-}$ $\frac{-3n+1-3n-1}{n} = \frac{-6}{n} = -6$

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

۴) $\lim_{n\to 2} \frac{n-\sqrt{4n}}{2n^2-n-6} \times \frac{n+\sqrt{4n}}{n+\sqrt{4n}} = \frac{n^2-4n}{(2n^2-n-6)(n+\sqrt{4n})} = \frac{n(n-4)}{(n-2)(2n+3)(4)} = \frac{2}{7\times 4} = \frac{1}{14}$

۵) $\lim_{n\to 1} \frac{1-\sqrt{n}}{2-\sqrt{5-n}} \times \frac{1+\sqrt{n}}{1+\sqrt{n}} \times \frac{2+\sqrt{5-n}}{2+\sqrt{5-n}} = \frac{-1(1-n)(2+\sqrt{5-n})}{(\underbrace{n-5+4}_{n-1})(1+\sqrt{n})} = \frac{(-1)(4)}{2} = -2$

۶) $\lim_{n\to 4} \frac{\sqrt{2n+4}-6}{\sqrt[3]{5n+7}-3} \times \frac{\sqrt{2n+4}+4}{\sqrt{2n+4}+4} \times \frac{\sqrt[3]{(5n+7)^2}+9+3\sqrt[3]{5n+7}}{\sqrt[3]{(5n+7)^2}+9+3\sqrt[3]{5n+7}} = \frac{(2n-16)(27)}{(\underbrace{5n+7-27}_{5n-20})(8)} = \frac{3(n-8)(27)}{5(n-4)(8)}$

$= \frac{81}{40}$

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

$= \frac{(3)((3n-4)+\sqrt{n})}{4(n-1)} \times \frac{((3n-4)-\sqrt{n})}{((3n-4)-\sqrt{n})} = \frac{(3)(9n^2+16-24n-n)}{4(n-1)(-2)} = \frac{3(9n^2-25n+16)}{4(n-1)(-2)} = \frac{3(n-1)(9n-16)}{4(n-1)(-2)} = \frac{3(-7)}{4(-2)}$

$= \frac{21}{8}$

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

۹) $\lim_{n\to \frac{\pi}{4}} \frac{1-\tan n}{\sin n-\cos n} = \frac{1-\frac{\sin n}{\cos n}}{\sin n-\cos n} = \frac{\frac{\cos n-\sin n}{\cos n}}{-(\cos n-\sin n)} = -\frac{1}{\cos n} = -\frac{1}{\frac{\sqrt{2}}{2}} = -\sqrt{2}$

۱۰) $\lim_{n\to \frac{\pi}{4}} \frac{\tan^2 n-1}{\cos 2n} = \frac{\frac{\sin^2 n}{\cos^2 n}-1}{\cos^2 n-\sin^2 n} = \frac{\frac{\sin^2 n-\cos^2 n}{\cos^2 n}}{\cos^2 n-\sin^2 n} = \frac{-1}{\cos^2 n} = \frac{-1}{\cos^2 \frac{\pi}{4}} = \frac{-1}{\frac{2}{4}} = -2$