8

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

$$\frac{1+1+1}{1-(-1)} = \frac{3}{2}$$

9

$$\lim_{x \to \frac{\pi}{4}} \frac{1-\tan}{\sin x - \cos x} = \frac{\cos^2_x + \sin^2_x - \frac{\sin x}{\cos_x}}{\sin_x - \cos_x}$$

$$\frac{\frac{\cos_x(\cancel{\cos^2 x + \sin^2 x})^{1} - \sin x}{\cos_x}}{\frac{\sin x - \cos_x}{1}} = \frac{\cancel{(-\sin_x + \cos_x)}}{\cancel{(-\sin + \cos)}(\cos_x)} = \frac{1}{\cos_x} \quad \underbrace{\frac{\pi}{4}}_{\frac{\sqrt{2}}{2}}$$

$$= \sqrt{2}$$

10

$$\lim \frac{\tan^2 x - 1}{\cos^2 x}$$

$$\frac{\frac{\sin^2 x}{\cos^2 x} - 1}{\cos^2 x} = \frac{\frac{\sin^2 x - \cos^2 x}{\cos^2 x}}{\cos^2 x - \sin^2 x} = \frac{-1}{\underbrace{\cos^2 x}_{-\frac{\sqrt{2}}{2}}} \; \frac{\pi}{4} = \sqrt{2}$$

7 28

3+2

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

$$\frac{\cancel{(1-x)}\,(2+\sqrt{5-x})}{\cancel{(4-5+x)}\,(1+\sqrt{x})} = -\frac{4}{2} = -2$$

$$-\cancel{(1-x)}$$

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

$$3\cancel{(x-4)}$$

$$\frac{(3x+4-16)\times 27}{(5x+7-27)\,(\sqrt{3x+4}+4)} = \frac{30}{40} = \frac{3}{4}$$

$$(5x-20)$$

$$5\cancel{(x-4)}$$

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

$$\frac{(3x+\sqrt{x}-4)(\sqrt[3]{x^2}+1+\sqrt[3]{x})}{(x-1)(\sqrt[3]{x^2}+1+\sqrt[3]{x})} \Rightarrow \lim_{x\to 1} \frac{3\left[(\sqrt{x}-1)(\sqrt{x}+\frac{4}{3})\right]}{4(\sqrt{x}-1)(\sqrt{x}+4)} = \frac{21}{8}$$

نسترن آل داود . ۱

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

$$\begin{array}{l|l} 4x^2-7x+3 & x-1 \\ \hline -4x^2+4x & 4x-3 \\ \hline -3x+3 & \\ 3x-3 & \\ \hline 0 & \end{array}
\qquad
\begin{array}{l|l} 5x^2-8x+3 & x-1 \\ \hline -5x^2+5x & 5x-3 \\ \hline -3x+3 & \\ 3x-3 & \\ \hline 0 & \end{array}$$

۳)

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

$$=\sqrt{x}+2=4$$

جابجا

۲)

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

$$x\to 0^+:\quad \frac{\cancel{1}-3x-3x-\cancel{1}}{x}=\frac{-6x}{x}=-6$$

$$x\to 0^-:\quad \frac{1-3x+3x+1}{x}=\infty$$

حد ندارد

۴)

$$\lim_{x\to 2}\frac{x-\sqrt{2x}}{2x^2-x-6}=\frac{x+\sqrt{2x}}{x+\sqrt{2x}}=\frac{\overbrace{x^2-2x}^{x\cancel{(x-2)}}}{(2x+3)\cancel{(x-2)}(x+\sqrt{2x})}$$

$$\begin{array}{l|l} 2x^2-x-6 & x-2 \\ 2x^2-x-6 & 2x+3 \\ \hline 0 & \end{array}$$

$$=\frac{\overset{2}{x}}{\underbrace{(2x+3)}_{7}\underbrace{(x+\sqrt{2x})}_{4}}=\frac{2}{28}=\frac{1}{14}$$