

$$(1) \lim_{x \rightarrow 1} \frac{5x^2 - 4x + 3}{2x^2 - 1x + 3}$$

$$\Delta A = (2x)^2 - 1(2x) + 3 - (2x - 1)(2x - 0)$$

$$A = 5x^2 - 4x + 3$$

$$\Delta A = (5x)^2 - 4x \times 5x + 3 - (5x - 1)(5x - 1)$$

$$\lim_{x \rightarrow 1} \frac{(5x - 1)(x - 1)}{(2x - 1)(x - 1)} = \frac{1}{2}$$

$$(2) \lim_{x \rightarrow 0^+} \frac{|\sqrt{x-1}| - |\sqrt{x+1}|}{x} = \frac{-\sqrt{x+1} - \sqrt{x-1}}{x}$$

$$\lim_{x \rightarrow 0^-} \frac{|\sqrt{x-1}| - |\sqrt{x+1}|}{x} = \frac{\sqrt{x+1} - \sqrt{x-1}}{x}$$

$\boxed{-4}$  ←

$$(3) \lim_{x \rightarrow \infty} \frac{(\sqrt{x-2})(\sqrt{x+2})}{\sqrt{x-2}} = \lim_{x \rightarrow \infty} \sqrt{x+2} = \infty$$



## سوال کا جواب

$$\textcircled{1} \lim_{x \rightarrow \pi} \frac{1 + \cos^2 x}{\sin^2 x} = \frac{0}{0} = \frac{(1 + \cos x)(1 - \cos x + \cos^2 x)}{(1 - \cos x)(1 + \cos x)} = \frac{1 - \cos x + \cos^2 x}{1 - \cos x} \quad x = \pi$$

$$\left. \begin{array}{l} \cos \pi = -1 \\ 1 + (-1)^2 = 0 \\ \sin^2 \pi = 0 \end{array} \right\} \frac{0}{0}$$

مخرج  $= 1 - (-1) = 2$       صورت  $= 1 - (-1) + (-1)^2 = 1 + 1 + 1 = 3$

$\lim_{x \rightarrow \pi} \frac{3}{2}$

$$\textcircled{2} \lim_{x \rightarrow \frac{\pi}{2}} \frac{1 - \tan x}{\sin x - \cos x} = \frac{0}{0} \Rightarrow \frac{1 - \frac{\sin x}{\cos x}}{\sin x - \cos x} = \frac{\cos x - \sin x}{\cos x (\sin x - \cos x)} = \frac{\cos x - \sin x}{\sin x - \cos x} = -1$$

$\tan \frac{\pi}{2}$  is not defined

$$\lim_{x \rightarrow \frac{\pi}{2}} \frac{1}{\cos x} = \frac{1}{\frac{0}{\infty}} = \frac{\infty}{0} = \infty$$

$$\textcircled{3} \lim_{x \rightarrow \frac{\pi}{2}} \frac{\tan^2 x - 1}{\cos^2 x}$$

$$\sin^2 x = \left(\frac{\sqrt{x}}{x}\right)^2 = \frac{1}{x}$$

$$\cos^2 x = \left(-\frac{\sqrt{x}}{x}\right)^2 = \left(\frac{1}{x}\right)^2 = \frac{1}{x^2}$$

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

$$1 - \cos^2 x = \sin^2 x$$

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

$$\frac{\tan^2 x - 1}{\cos^2 x} = \frac{\tan^2 x}{\cos^2 x} = \frac{\sin^2 x}{\cos^4 x}$$

$$\sin^2 \frac{\pi}{2} = \frac{\sqrt{x}}{x}$$

$$\cos^2 \frac{\pi}{2} = \frac{\sqrt{x}}{x}$$