$$R = \frac{(\sec^2 t)^{3/2}}{\frac{\sec^2 t}{t\cos t}}$$

$$R = \sec^3 t \times \frac{t\cos t}{\sec 2t}$$

$\sec t \times t\cos t$

$\sec t \times 1/\cos t$

$1/\cos t \times t\cos t$

$R = \underline{t}$

iv). $h = x_1 - R\sin t$

$K = y_1 + R\cos t$

$h = \cos t + t\sin t - t\sin t$

$h = \cos t$

$k = \sin t - t\cos t + t\cos t$

$K = \sin t$

Umukoro Emmanuel. O.
Computer Engineering
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6. $\lim_{x\to\pi/2}\left(\frac{(x^2-\pi/4)\sin(\cos x)}{x-\pi/2}\right)$

$$= \frac{(\pi/2)^2 - \pi/4)\ \sin(\cos\pi/2).}{\pi/2 - \pi/2.}$$

$$= \left(\frac{\pi/2 - \pi/4 \quad \sin(\cos\pi/2)}{\pi/2 - \pi/2}\right).$$

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$$= \frac{(\pi^2/4 - \pi/4)\ \sin(\cos\pi/2)}{0}$$

~~matuniting~~ 1.

manat

using l'hospital's rule, $u\, du/dx + v\, dw/dx$

$\frac{dy}{dx}$ = Let $u = x^2 - \pi/4$.

and $v = \sin(\cos x)'$

$\frac{dy}{dx} = 2x \quad \frac{dy}{dx} = ?$

$\frac{d}{dx} = \sin(\cos x) =$ let $\cos x = w$.

$V = \sin w$.

$\frac{dv}{dw} = \cos w, \therefore \frac{dw}{dx} = -\sin x$.

$\frac{dv}{dx} = \frac{dv}{dw} \times \frac{dw}{dx} = -\sin x \cos(\cos x)$.

$$=(x^2 - \pi/4)\ x - \sin x \cos(\cos x) + \sin(\cos x)(2x).$$

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$= \frac{\pi^2}{2} - \frac{\pi}{4}\ x - \sin 90 \cos(\cos 90) + \sin\cos 90 \times 2\ (\pi/2)$

$\times -1 + 0 \times \pi$ ~~UMUKORO EMM~~

~~positioning~~ ~~classif~~. $= \left(\frac{\pi^2}{4} + \frac{\pi}{4}\right) \times$

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$$= -\frac{\pi^2}{4} + \frac{\pi}{4} = \frac{\pi}{4} - \frac{\pi^2}{4}$$

$$\lim_{x \to \pi/2} \left(\frac{(x^2 - \pi/4) \sin(\cos x)}{x - \pi/2} \right) = \frac{(1 - \pi)}{4}.$$

1b. $\lim_{x \to \pi/2} \ln \left(\frac{\exp(3x^2 + 2x - 1)}{x+1} \right)$

$= \lim \ln \left(\exp \left[\frac{(3x-1)(x+1)}{x+1^2} \right] \right)$

$= \lim_{x \to \pi/2} \ln (\exp(3x - 1)).$

$= 3/2 \pi - 1 = \frac{3\pi}{2} - \frac{1}{1}$

$\therefore \lim \ln \left[\exp \frac{(3x^2 + 2x - 1)}{x+1} \right] = \frac{3\pi - 2}{2}$ //.

1c. $\lim_{x \to 2 + \sqrt{3}} \cos \left(\frac{\sin^{-1}(x-2)}{(x - \sqrt{3})} \right)$

$= \cos \left[\sin^{-1} \left(\frac{\sqrt{3}}{2} \right) \right]$

$= \cos(\sin^{-1}(0.8660)).$

$= \cos 60^\circ$

$= 1/2.$

d. $\lim_{x \to 4} \left[\frac{x^2 - 8x + 16}{x^2 - 5x + 4} \right] = \lim_{x \to 4} \left[\frac{(x-4)(x-4)}{x-4 (x-1)} \right] = \lim_{x \to 4} \left[\frac{x-4}{x-1} \right]$

$= \frac{4-4}{4-1} = \frac{0}{3} = 0$ //.

2A $U_n = \cancel{1+2n^2}\ \dfrac{2}{(n+1)(n+2)}$

$U_{n+1} = \dfrac{2}{(n+2)(n+3)}$

ratio : $\dfrac{U_{n+1}}{U_n} = \dfrac{2}{(u+2)(n+3} \times \dfrac{(n+1)(n+2)}{2}$

$\dfrac{U_{n+1}}{U_n} = \dfrac{n+1}{n+3}$

$\lim\limits_{n \to \infty} \dfrac{U_{n+1}}{U_n} = \lim\limits_{n\to\infty} = \dfrac{n+1}{n+3}$

$= \dfrac{\frac{n}{n} + \frac{1}{n}}{\frac{n}{n} + 3/n} = \dfrac{1 + 1/n}{1 + 3/n} = \dfrac{1+0}{1+0} = \dfrac{1}{1} = 1.$

Since $\lim\limits_{n\to\infty} \dfrac{u_{n+1}}{u_n}$

The series is Inconclusive.

2b. Using the Comparison Test

Recall; $\left[\dfrac{1}{1^r} + \dfrac{1}{2^r} + \dfrac{1}{3^r} + \dfrac{1}{4^r} + \cdots \dfrac{1}{n^r}\right] = \sum\limits_{n=1}^{\infty} = 1/n^p$

$\left[\dfrac{2}{1^2} + \dfrac{2}{2^2} + \dfrac{2}{3^2} + \dfrac{2}{4^2} + \cdots \dfrac{2}{n^r}\right] = \sum\limits_{n=1}^{\infty} = \dfrac{2}{n^2}$

$P = 2$

Since $P > 1$, the series is Converge.

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