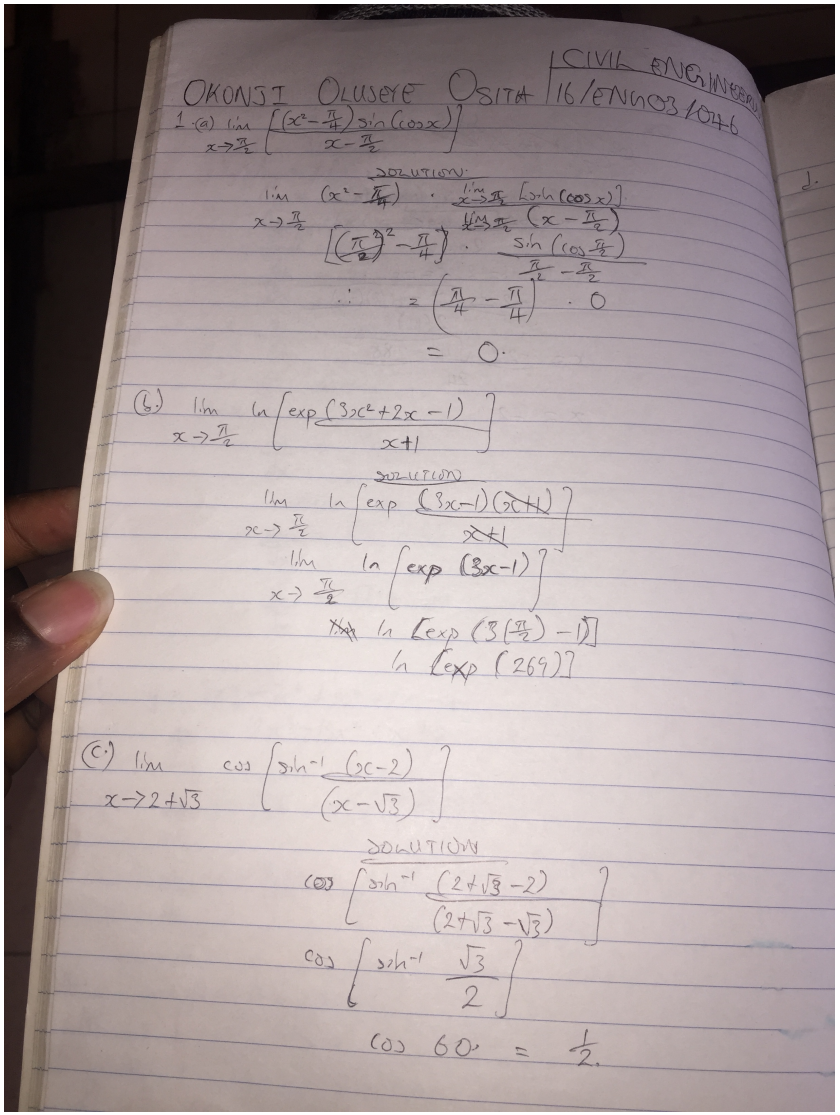

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16/ENG03/1046

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

SOLUTION:

$\lim_{x \to \frac{\pi}{2}} (x^2 - \frac{\pi}{4}) \cdot \frac{\lim_{x \to \frac{\pi}{2}} [\sin(\cos x)]}{\lim_{x \to \frac{\pi}{2}} (x - \frac{\pi}{2})}$

$\left[(\frac{\pi}{2})^2 - \frac{\pi}{4} \right] \cdot \frac{\sin(\cos \frac{\pi}{2})}{\frac{\pi}{2} - \frac{\pi}{2}}$

$\therefore = (\frac{\pi}{4} - \frac{\pi}{4}) \cdot 0$

$= 0.$

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

SOLUTION

$\lim_{x \to \frac{\pi}{2}} \ln \left[\exp \frac{(3x - 1)(x + 1)}{x + 1} \right]$

$\lim_{x \to \frac{\pi}{2}} \ln \left[\exp (3x - 1) \right]$

$\ln [\exp (3(\frac{\pi}{2}) - 1)]$

$\ln [\exp (2.64)]$

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

SOLUTION

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

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

$\cos 60^\circ = \frac{1}{2}.$