

Further mathematics exam

Differentiate the Following

i) $y = 7x^3 - 2x^2 + x + 2$

$$\frac{dy}{dx} = 21x^2 - 4x + 1$$

ii) $y = (x+3)(x+2)$

$$y = x^2 + 2x + 3x + 6 \rightarrow x^2 + 5x + 6$$

$$\frac{dy}{dx} = 2x + 5$$

iii) $y = \frac{1}{x^3} + \sin 3x$

$$y = x^{-3} + \sin 3x$$

$$\frac{dy}{dx} = -3x^{-4} + 3 \cos 3x$$

iv) $y = x^4 \tan 2x$

$$\frac{dy}{dx} = 2x^4 \sec^2 2x$$

v) $y = \frac{e^{2x}}{\cos 2x}$

$$\frac{dy}{dx} = \frac{2e^{2x}}{2 \sin 2x} \rightarrow \frac{2e^{2x}}{2 \sin 2x}$$

vi) $y = (5x^2 + 2x + 1)^5 \rightarrow 5x^7 + 2x^5 + 1$

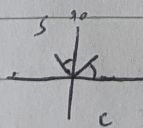
$$\frac{dy}{dx} = 35x^6 + 10x^4$$

Solve the Following trigonometric Equations

2) i) $\sin x = 0.65$

$$x = \sin^{-1}(0.65)$$

$$x = 40.54^\circ$$



$$x = 90^\circ + 40.54^\circ = 130.54^\circ \times \text{'sin } 130 \neq 0.65 \text{'}$$

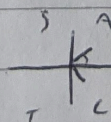
$$x = 180^\circ - 40.54^\circ = 139.46^\circ$$

ii) $7 \cos x = 4$

$$\cos x = \frac{4}{7}$$

$$x = \cos^{-1}(\frac{4}{7})$$

$$x = 55.15^\circ$$



$$x = 360 - 55.15 = 304.85^\circ$$

$$\cos 304.85 = 0.57 \checkmark$$