

Maths test 2

1907788 - ASAD NAQVI

Question 1. diff

a. $9x^4 - 2x^3 + 2x + 5 = \underline{\underline{36x^3 - 6x^2 + 2}}$

b. $(x+2)(x+5)$

$$= x^2 + 5x + 2x + 10 \rightarrow 2x + 5 + 2 = \underline{\underline{2x + 7}}$$

c. $2e^{2x} + 2\ln x = \underline{\underline{4e^{2x} + \frac{2}{x}}}$

d. $2 \sin 5x = \underline{\underline{10 \cos 5x}}$

e. $\frac{1}{x^3} = x^{-3} = \underline{\underline{-3x^{-4}}}$

f. $\underset{u}{x^3} \underset{v}{\sin x} = (\sin x)(3x^2) + (x^3)(\cos x)$

g. $\frac{x^5 + 2x + 1}{\sin x} \leftarrow \begin{matrix} u \\ v \end{matrix} \rightarrow \frac{\sin x (5x^4 + 2) - (x^5 + 2x + 1)(\cos x)}{(\sin x)^2}$

h. $(6x^3 + 2x^2 - 1)^5 \Rightarrow$
 $= 5(6x^3 + 2x^2 - 1)^4 \times (18x^2 + 4x)$

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Question 2. ^{complex}

$$\rightarrow z_1 = 6 + 2j \quad / \quad z_2 = 2 - 5j$$

i. $z_1 + z_2 \rightarrow \underline{8 - 3j}$

ii. $z_1 - z_2 \rightarrow \underline{4 + 7j}$

iii. $z_1 \times z_2 \rightarrow \underline{12 + 10j}$

$$\begin{aligned} (6 + 2j)(2 - 5j) &= 12 - 30j + 4j - 10j^2 \\ &= \cancel{12} + 36j \\ &= 12 + 36j \end{aligned}$$

$j^2 = -1$

c. Eulers Formula

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Question 3.

$$a. \int 8x^3 + 5x + 7 \rightarrow \frac{8x^4}{4} + \frac{5x^2}{2} + 7x + C$$

$$b. \int \frac{1}{x^7} \Rightarrow x^{-7} \rightarrow \frac{x^{-6}}{-6} + C$$

$$c. \int -\sin x \Rightarrow \underline{\underline{\cos x + C}}$$

$$d. \int (x+3)^2 \rightarrow (x+3)(x+3) \\ \rightarrow x^2 + 3x + 3x + 6 \\ \Rightarrow \int x^2 + 6x + 6 \Rightarrow \underline{\underline{\frac{x^3}{3} + \frac{6x^2}{2} + 6x + C}}$$

$$e. \int_0^3 x^2 + 3x + 2 \Rightarrow \frac{x^3}{3} + \frac{3x^2}{2} + 2x$$

$$= \frac{(3)^3}{3} + \frac{3(3)^2}{2} + 2(3) - 0 = \underline{\underline{28.5}}$$

$$f. \int_2^3 (x+4)(x+1) \rightarrow x^2 + x + 4x + 4 \\ \rightarrow x^2 + 5x + 4$$

$$\int x^2 + 5x + 4 = \frac{x^3}{3} + \frac{5x^2}{2} + 4x$$

$$\frac{(3)^3}{3} + \frac{5(3)^2}{2} + 4(3) - \frac{(2)^3}{3} - \frac{5(2)^2}{2} - 4(2) \\ = \underline{\underline{22.83}}$$

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Question 4.

a. $\tan x = 0.35$
 $\tan^{-1}(0.35) = \underline{19.29^\circ}$
 $180 - 19.29 = \underline{160.71^\circ}$

b. $\sin x = -0.68$
 $\rightarrow \sin^{-1}(-0.68) = \underline{42.84^\circ}$

$180^\circ - 42.84^\circ = \underline{137.16^\circ}$ S

