

MATHS 104 Assignment

Integrate the following function

1) $\sin^6 x$

$$\frac{d}{dx} (\sin x^6)$$

Use differentiation rules

$$\frac{d}{dx} \left(\sin u \times \frac{d}{dx} x^6 \right)$$

Calculate the derivatives

$$\cos(u) \times 6x^5$$

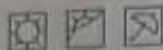
Substitute back

$$\cos(x^6) \times 6x^5$$

Rearrange the terms

$$6x^5 \times \cos x^6$$

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$$2) \cos^4 x \sin^3 x$$

$$\frac{d}{dx} \cos^4 x \sin^3 x$$

Use differentiation rules

$$\frac{d}{dx} \cos^4 x \times \sin^3 x + \cos^4 x \times \frac{d}{dx} \sin^3 x$$

Calculate the derivatives

$$- \sin^3 x \times 4x^3 \times \sin x^3 + \cos^4 x \times 3x^2$$

simplify the expression

$$- 4x^3 \times \sin^4 x \sin x^3 + 3x^2 \times \cos^4 x \cos x^3$$



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$$3) \cos x \sin^3 x$$

$$\frac{d}{dx} (\cos x \sin^3 x)$$

Use differentiation rules

$$\frac{d}{dx} \left(\cos x \times \sin^3 x + \cos x \times \frac{d}{dx} \sin^3 x \right)$$

Calculate the derivatives

$$- \sin x \sin^3 x + \cos x \cos x^3 \times 3x^2$$

Reorder the terms

$$- \sin x \sin^3 x + 3x^2 \times \cos x \cos x^3$$

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