HSC Mathematics Extension 2 2002
Quick Answers

Disclaimer

These answers are intended as a quick guide only. To save space there are no proofs or diagrams. For greater detail please refer to fully worked solutions.

Question 1

(a) $\frac{1}{3}\sec^3 x + c$.

(b) $\tan^{-1}(x+1) + c$.

(c) $\frac{3}{4}\ln|x+3| + \frac{1}{4}\ln|x-1| + c$.

(d) $\frac{1}{2}\left(e^{\frac{\pi}{2}} - 1\right)$.

(e) $\frac{\pi}{3\sqrt{3}}$.

Question 2

(a) (i) $3+i$

(ii) $\frac{1}{2} - \frac{1}{2}i$.

(c) (i) Complex roots of Real polynomials occur in conjugate pairs.

(ii) $(z+4)(z^2 - 4z + 5)$.

(e) (i) $1 - 2\cos\theta + 2i\sin\theta$.

(iii) $\frac{2\sin\theta}{5 - 4\cos\theta}$.

Question 3

(b) (iii) $e = \sqrt{2}$.

Question 4

(a) (i) 1.

(ii) $V = 2\pi\int_{-1}^{1}(x+1)(3 - x - 2x^2)\,dx$.

(iii) 8π.

(c) (i) $\frac{2}{3}$.

(ii) $\frac{1}{6}$.

Question 5

(a) ± 27.

(b) (i) $x^3 - 2x^2 - 7x + 1 = 0$.

(ii) $x^3 - 25x^2 + 50x - 25 = 0$.

(iii) 110.

Question 6

(a) (iii) $\omega = \sqrt{\frac{g}{l\sin\alpha}}$.

Question 7

(a) (iii) $10\left(2 + \sqrt{2}\right)$ seconds.

Question 8

(b) (i) Area = $(a-x)(a+x)$ units^2.

(ii) Volume = $\frac{4a^3}{3}$ units^3.

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