HSC Mathematics Extension 2 2003
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) $\dfrac{e-1}{2(e+1)}$

(b) $\frac{1}{4}x^4 \ln x - \frac{1}{16}x^4 + c$.

(c) $\ln\left[x-1+\sqrt{x^2-2x+5}\right]+c$.

(d) (i) $a=3, b=2$.

(ii) $3\ln|x-1|+\ln\left(x^2+4\right)-\frac{1}{2}\tan^{-1}\left(\frac{x}{2}\right)+c$.

(e) $\dfrac{1}{9}$.

Question 2

(a) (i) $1+3i$

(ii) $\dfrac{8}{5}-\dfrac{4}{5}i$.

(b) (i) $\sqrt{2}\left[\cos\left(\dfrac{3\pi}{4}\right)+i\sin\left(\dfrac{3\pi}{4}\right)\right]$

(iii) $z^2 \pm 2z + 2$.

(d) $16\cos^5\theta - 20\cos^3\theta + 5\cos\theta$.

Question 3

(b) $e=\dfrac{\sqrt{5}}{3}$, foci at $\left(\pm\sqrt{5},0\right)$,

directrices are $x=\pm\dfrac{9\sqrt{5}}{5}$.

(c) (ii) $\dfrac{8\pi}{3}$ units^3.

Question 4

(b) (i) $\dfrac{x\sec\theta}{a}-\dfrac{y\tan\theta}{b}=1$.

(c) (i) n^n.

(ii) $\dfrac{n^n-n!}{n^n}$.

Question 5

(b) (iii) $t=\dfrac{1}{k}\ln\left(\dfrac{ku\sin\alpha+g}{g}\right)$.

(iv) $\dfrac{u\cos\alpha}{k}$.

Question 6

(a) (ii) $\dfrac{1}{10}\sin 5x+\dfrac{1}{2}\sin x+c$.

(b) (i) $s_3=4$ and $s_4=10$.

Question 7

(a) $\dfrac{12\sqrt{3}\pi}{5}$ units^3.

Question 8

(a) (i) 0 and 3.

(ii) $(1+\omega)^n=\sum_{k=0}^{n} {}^nC_k\,\omega^k$

$\left(1+\omega^2\right)^n=\sum_{k=0}^{n} {}^nC_k\,\omega^{2k}$.

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