HSC Mathematics Extension 2 2001
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) $\frac{1}{4}$.

(b) $\ln\left[x-2+\sqrt{(x-2)^2-3}\right]+c$.

(c) $\frac{2}{e}-\frac{1}{4}(1+\ln 4)$.

(d) $\frac{2}{3}\left(8\sqrt{2}-7\right)$.

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

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

Question 2

(a) (i) $-1+5i$

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

(b) (i) $2\left[\cos\left(\frac{\pi}{3}\right)+i\sin\left(\frac{\pi}{3}\right)\right]$.

(ii) $-512-512\sqrt{3}i$.

(d) $\cos\left(\pm\frac{\pi}{4}\right)+i\sin\left(\pm\frac{\pi}{4}\right)$, $\cos\left(\pm\frac{3\pi}{4}\right)+i\sin\left(\pm\frac{3\pi}{4}\right)$.

(e) (ii) $z_1-z_2+z_3$.

Question 3

(a) (i) x-intercets: $(\pm 3,0)$, $e=\frac{5}{3}$,
foci: $(\pm 5,0)$.

(ii) directrices: $x=\pm\frac{9}{5}$,
asymptotes: $y=\pm\frac{4}{3}x$.

Question 3 (continued)

(b) (i) $\alpha\beta+\beta\gamma+\gamma\alpha=4$, $\alpha\beta\gamma=2$.

(ii) $1,\ 1+i,\ 1-i$.

(c) $2\pi^2$ units^3.

Question 4

(a) (i) Maximum when $x=-1$,
Minimums when $x=1$ and $x=3$.

(b) (ii) $\frac{4}{3}\pi b^3$ units^3.

(c) Constant is $\frac{\pi}{4}$.

Question 5

(c) (i) $\frac{22!}{4!\,5!\,6!\,7!}$.

(ii) $3!\,4!\,5!\,6!\,7!$.

Question 6

(a) (i) $F\cos\alpha=\frac{mv^2}{r}-N\sin\alpha$,
$F\sin\alpha=N\cos\alpha-mg$.

(iii) 21°29'.

Question 7

(a) (i) 1.

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

Question 8

Only "show" and "prove" questions.

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