HCMC UNIVERSITY OF TECHNOLOGY AND EDUCATION

HIGH QUALITY TRAINING FACULTY

SOLUTION OF CALCULUS 2- HK2 2022-2023

	Content	Score
1	Area=$\frac{1}{2}\int_0^{2\pi}(5-3cos\theta)^2 d\theta.$ $=\frac{59\pi}{2}.$	0.5 0.5
2	$\int_2^{\infty}\frac{t}{(t^2-1)^3}dt=\lim_{N\to\infty}(\int_2^N\frac{t}{(t^2-1)^3}dt)$ Let $u=t^2-1$. Then $\lim_{N\to\infty}(\int_2^N\frac{t}{(t^2-1)^3}dt)=\lim_{N\to\infty}(\int_1^{N^2-1}\frac{du}{2u^3})$ $=\lim_{N\to\infty}(1/4-1/4(N^2-1)^2)$ =1/4	0.25 0.5 0.25
3	Volume=$2\pi\int_0^4(x+1)(4x-x^2)dx.$ $=64\pi$	0.5 0.5
4	Root test: $\lim_{k\to\infty}(k-2/k)^k=e^{-2}\neq 0$ The series diverges.	0.5 0.25 0.25
5	$\sum_{k=0}^{\infty}\frac{2023^k}{10^{4k-1}}=10(\sum_{k=0}^{\infty}\left(\frac{2023}{10000}\right)^k)$ $=\frac{10}{1-2023/10000}$	0.5 0.5
6	$\lim_{k\to\infty}\sqrt[k]{\lvert\frac{(k^2+20k)}{23^k}(x+3)^k\rvert}=\frac{\lvert x+3\rvert}{23}$	0.5

	The radius of convergence is 1/23 If x+3=23 or x+3=-23 then the series diverges	0.5 0.5
7	The Maclurin series for sin(2x) is $2x-\frac{(2x)^3}{3!}+\frac{(2x)^5}{5!}-....$ The Maclurin series for xsin(2x) is $2x^2-\frac{(2x)^3x}{3!}+\frac{(2x)^5x}{5!}-....$ coefficient of $x^4$is: 8/6	0.5 0.5
8	The equation is equivalent to $\frac{dy}{dx}+2y=e^{-x}$ We have P=2,Q=e^(-2x) General solution: $y=e^{-x}+Ce^{-2x}$ Specific solution: $y=e^{-x}$	0.5 0.5 0.5
9	Area= $\frac{1}{2}\left\|OA\times OB\right\|=\frac{1}{2}\left\|(1,2,1)\times(-3,1,0)\right\|=\frac{\sqrt{59}}{3}$	1