10.2 Calculus with Parametric Curves

單選題

1. Find the equation of the tangent to the curve $x = cos\, t + cos\, 2t,\ y = \sin t + \sin 2t,$ at $\mathrm{t} = \frac{\pi}{2}$.

(A) $y = 2x + 3;$ (B) $y = 2x - 1;$
(C) $y = -2x - 1;$ (D) $y = -2x + 3$.

Ans: A [102 學年度]

2. The area enclosed by the curve $x(t) = 1 + e^t,\ y(t) = t - t^2$ and the x-axis is

(A) $3 + e;$ (B)$e - 1;$ (C) $3 - e;$ (D) $e - 2.$

Ans: C [104 學年度]

3. The **length of** the curve $x(t) = e^t \cos(t), y(t) = e^t \sin(t),\ 0 \le \mathrm{t} \le 1,$ **is**

(A) $(e - 1);$ (B) $\sqrt{2}(e - 1);$ (C) $e^{\pi};$ (D) $\sqrt{2}e^{\pi}.$

Ans: B [104 學年度]

4. Find the surface area generated by rotating the parametric curve C about the x-axis, where C is

$$\begin{cases} x = e^t - t\ , \\ y = 4e^{\frac{t}{2}}\ , \end{cases} \quad 0 \le t \le 2.$$

(A) $16\pi(\frac{1}{3}\mathrm{e}^3 + \mathrm{e} - \frac{4}{3})$**;** **(B)** $8\pi(\frac{1}{3}\mathrm{e}^3 + \mathrm{e} - \frac{4}{3})$**;**

(C) $2\pi(\mathrm{e}^4 - 9)$**;** **(D)** $\pi(\mathrm{e}^4 - 9)$**.**

Ans: A [102 學年度]

5. The **tangent** to the astroid $x(t) = 2\cos^3(t), y(t) = 2\sin^3(t)$ at $t = \pi/4$ is

(A)$y = -x + \frac{\sqrt{2}}{2}$; (B) $= -x + \sqrt{2}$; (C) $y = x + \frac{\sqrt{2}}{2}$; (D) $y = x + \sqrt{2}$.

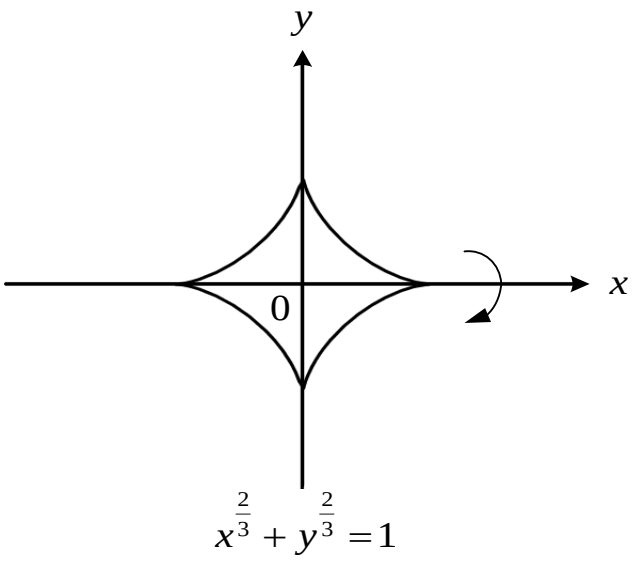
Ans: B [103 學年度]

填充題

1. The **tangent line** equation of the parametric equation $x=\cos\theta+\sin 2\theta$, $y=\sin\theta+\cos 2\theta$ at the point when $\theta=0$ in the Cartesian coordinate system is _____ .

Ans: $y-1=\frac{1}{2}(x-1)$ or $y=\frac{1}{2}x+\frac{1}{2}$ [100 學年度]

2. [100]Find the **area** of the surface obtained by rotating the curve $x^{\frac{2}{3}}+y^{\frac{2}{3}}=1$ (parametrized by $x=\cos^3\theta, y=\sin^3\theta$) about the x-axis . _____



Ans: $\frac{12}{5}\pi$ [100 學年度]

3. The equation of the **tangent** to the curve $\begin{cases} x(t)=e^{\sqrt{t}} \\ y(t)=t-\ln(t^2) \end{cases}$ through the point $\big(x(1),y(1)\big)$ is _____.

Ans: $y-1=-\frac{2}{e}(x-e)$ or $\frac{2}{e}x+y-3=0$ [104 學年度]

4. The length of the parametric curve C:

$$\begin{cases} x=\cos t+t\sin t, \\ y=\sin t-t\cos t, \end{cases}$$

from $t=0$ to $t=\pi$ is_____.

Ans: $\frac{\pi^2}{2}$ [101 學年度]