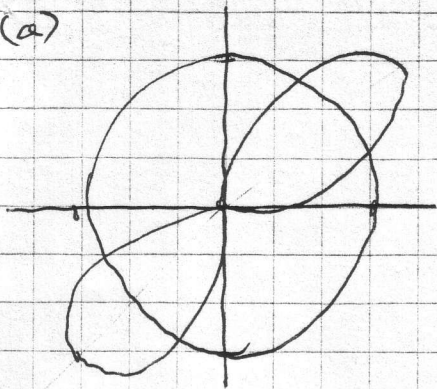


6. (a)



$$(b) \quad (2, \pi/12); (2, 5\pi/12); (2, 13\pi/12); (2, 17\pi/12)$$

$$(c) \quad A = 4 \int_{\pi/12}^{\pi/4} \frac{1}{2} [8 \sin(2\theta) - 4] d\theta$$

$$\underline{\underline{8 \int_{\pi/12}^{\pi/4} (2 \sin 2\theta - 1) d\theta}}$$

7. (a) circular helix about y-axis.

$$(b)(i) \quad v(t) = \langle -2 \sin t, 3, 2 \cos t \rangle$$

$$a(t) = \langle -2 \cos t, 0, -2 \sin t \rangle$$

$$\text{speed} = \sqrt{13}$$

$$(ii) \quad T(t) = \frac{1}{\sqrt{13}} \langle -2 \sin t, 3, 2 \cos t \rangle$$

$$N(t) = \langle -\cos t, 0, -\sin t \rangle$$

$$(iii) \quad r: \begin{cases} x = 1 - \sqrt{3}t \\ y = \pi + 3t \\ z = \sqrt{3} + t \end{cases}$$

$$(iv) \quad K = \frac{2}{13}$$

$$8. (a) \quad \frac{\partial^2 z}{\partial y \partial x} = 18xy^3 e^{3xy^2} + 6y e^{3xy^2} - \frac{3y^2}{x}$$

$$(b) \quad \frac{\partial z}{\partial y} = - \frac{2xyz + e^{x^2}}{xy^2 - \sqrt{x} \cos z}$$

$$9. (i) \quad \frac{\partial z}{\partial r} = \frac{\partial z}{\partial x} \cos \theta + \frac{\partial z}{\partial y} \sin \theta$$

$$\frac{\partial z}{\partial \theta} = \frac{\partial z}{\partial x} (-r \sin \theta) + \frac{\partial z}{\partial y} (r \cos \theta)$$