

$$7. \vec{F}(x, y, z) = \left( \frac{-y}{x^2+y^2}, \frac{x}{x^2+y^2}, z \right)$$

$$C_1(t) = (-\sin t, \cos t, 0)$$

$$C_1'(t) = (-\cos t, -\sin t, 0)$$

$$C_2(t) = (0, 2 - \cos t, -\sin t)$$

$$C_2'(t) = (0, \sin t, -\cos t)$$

$$(a) \int_{C_1} \vec{F} \cdot d\vec{s} = \int_0^{2\pi} (-\cos t, -\sin t, \cos t) \cdot (-\cos t, -\sin t, 0) dt \quad \left. \vphantom{\int_0^{2\pi}} \right] \text{ 5점}$$

$$= \int_0^{2\pi} 1 dt = 2\pi \quad \left. \vphantom{\int_0^{2\pi}} \right] \begin{array}{l} \text{여기까지} \\ \text{10점} \end{array}$$

$$(b) \int_{C_2} \vec{F} \cdot d\vec{s} = \int_{2\pi}^{4\pi} \left( \frac{-1}{2 - \cos t}, 0, 2 - \cos t \right) \cdot (0, \sin t, -\cos t) dt \quad \left. \vphantom{\int_{2\pi}^{4\pi}} \right] \text{ 5점}$$

$$= \int_{2\pi}^{4\pi} (-2 \cos t + \cos^2 t) dt$$

$$= \int_{2\pi}^{4\pi} \left( -2 \cos t + \frac{1}{2} (1 + \cos 2t) \right) dt$$

$$= \left[ -2 \sin t + \frac{1}{2} t + \frac{1}{4} \sin 2t \right]_{2\pi}^{4\pi}$$

$$= \pi \quad \left. \vphantom{\int_{2\pi}^{4\pi}} \right] \begin{array}{l} \text{여기까지} \\ \text{10점} \end{array}$$

$$\text{일} = 2\pi + \pi = 3\pi.$$

(a), (b) 가 각각 10점.  $\left. \vphantom{\int_{2\pi}^{4\pi}} \right] \begin{array}{l} \text{(a), (b)} \\ \text{다루 채점함} \end{array}$