

Quiz 1

$$1. \int (t+1) \sin t \, dt = -(t+1) \cos t + \int \cos t \, dt = \sin t - (t+1) \cos t + C$$

1.5

$$u = t+1 \quad dv = \sin t \, dt$$

$$du = dt \quad v = -\cos t$$

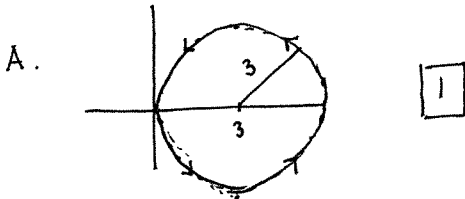
$$2. \int_0^2 \frac{y}{(y^2+4)^{3/2}} \, dy = \frac{1}{2} \int_4^8 u^{-3/2} \, du = \frac{1}{2} (-2) u^{-1/2} \Big|_4^8 = - \left(8^{-1/2} - 4^{-1/2} \right)$$

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$$\begin{array}{l} \text{let } u = y^2 + 4 \\ du = 2y \, dy \end{array} \quad \begin{array}{c} \frac{y}{0} \longrightarrow \frac{u}{4} \\ \frac{2}{2} \qquad \qquad \frac{8}{8} \end{array}$$

$$= \frac{1}{2} - \frac{1}{2\sqrt{2}} = \frac{\sqrt{2}-1}{2\sqrt{2}}$$

$$3. \mathbf{c}(t) = (3 \cos t + 3, 3 \sin t)$$



$$B. \left. \frac{dy}{dx} \right|_{t=\pi/3} = \frac{3 \cos t}{-3 \sin t} \Big|_{t=\pi/3} = \frac{1/2}{-\sqrt{3}/2} = -\frac{1}{\sqrt{3}}$$

1/2

$$C. \begin{array}{l} x = \frac{9}{2} - \sqrt{3}t \\ y = \frac{3\sqrt{3}}{2} + t \end{array}$$

1

$$D. \frac{ds}{dt} = \sqrt{(3 \sin t)^2 + (3 \cos t)^2} = 3 \quad (\text{for all } t)$$

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$$E. s = \int_0^{\pi/3} 3 \, dt = \pi$$

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$$4. A. (x-2)^2 + y^2 = 4$$

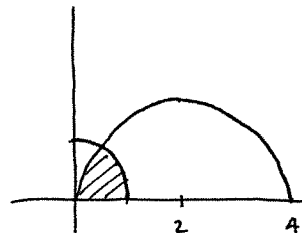
$$x^2 - 4x + 4 + y^2 = 4$$

$$x^2 + y^2 = 4x$$

$$r^2 = 4r \cos \theta$$

$$\text{so } r = 4 \cos \theta$$

B.



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