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Q1: D

Q2: B

Q3: H

Q4: C

Q5: G

Q6: $A = l \cdot w$

$$\frac{dA}{dt} = w \left(\frac{dl}{dt} \right) + l \left(\frac{dw}{dt} \right)$$

$$\frac{dA}{dt} = 5(-3) + 2(12)$$

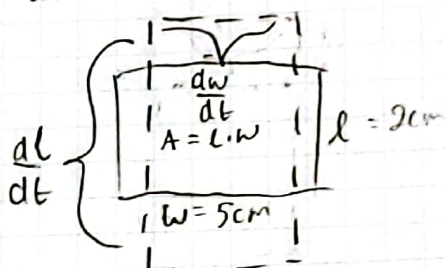
$$\frac{dA}{dt} = 9 \text{ cm}^2/\text{s}$$

$$\frac{dl}{dt} = -3 \text{ cm/s}$$

$$\frac{dw}{dt} = 12 \text{ cm/s}$$

$$l = 2 \text{ cm}$$

$$w = 5 \text{ cm}$$



Q7 $\int g''(x) = 2 \cos(x) + 3 \sin(x)$

$$g'(x) = 2 \sin(x) - 3 \cos(x)$$

$$g(x) = 2 \cos(x) + 3 \sin(x)$$

$$\int 2 \cos(x) + 3 \sin(x)$$

$$2 \int \cos(x) - 3 \int \sin(x)$$

$$2(5) - 3(4) = -2$$

Q8 a.) $\int t \cos(5t) dt$

$$u = 5t$$

$$du = 5 dt$$

$$dt = \frac{du}{5}$$

$$du = \frac{5}{t} dt$$

$$= \int t \cos(u) \frac{5}{t} dt$$

$$= \int \frac{5t}{t} \cos(u) dt$$

$$= \frac{5t}{t} \sin(u)$$

$$= \frac{5t}{t} \sin(5t) + C$$

b.)

$$\int_0^1 e^{-x} (3 + e^{-x})^4 dx$$

$$u = 3 + e^{-x}$$

$$du = -e^{-x} = \frac{1}{e^x} dx$$

$$dx = du(e^x)$$

$$x=1 \Rightarrow u = 3 + e^{-1}$$

$$x=0 \Rightarrow u = 3 + e^0 = 4$$

$$\int_0^1 e^{-x} (3 + e^{-x})^4 dx = \int_4^{3+e^{-1}} \frac{e^{-x}}{e^x} (u)^4 du$$

$$= e^{-2x} (u)^4 \Big|_4^{3+e^{-1}} = e^{-2(4)} (3 + e^{-4}) - e^{-2(3+e^{-1})} (3 + e^{3+e^{-1}})$$

$$= 1.01 \times 10^{-3} - 0.038$$

$$= -0.03697$$

$$Q8 \quad \int \left(\frac{1}{x^2+1} + \frac{1}{x^2} + \frac{1}{x} \right) dx$$

$$= \ln(x^2+1) + \ln(x^2) + \ln(x) + C$$