NAME: Solutions

MATH 172 11/20/2019

Quiz 10

Show your work! You may not use calculators, notes or books.

(3)

1. Find the integral

$\int xe^{9x}\,dx.$

By Parts: $u = x$ $\quad dv = e^{9x}dx$ $\quad du = dx$ $\quad v = \frac{1}{9}e^{9x}$ } 1 pt.

$$\int xe^{9x}dx = \frac{x}{9}e^{9x} - \int \frac{1}{9}e^{9x}dx \qquad \text{1 pt.}$$

$$= \boxed{\frac{x}{9}e^{9x} - \frac{e^{9x}}{81} + C} \qquad \text{1 pt.}$$

(3)

2. Find the integral

$\int \sin^3\theta\cos^4\theta\,d\theta.$

$$= \int \sin\theta \cdot \sin^2\theta\cos^4\theta\,d\theta \qquad \text{1 pt.}$$

$$= \int \sin\theta\cdot(1-\cos^2\theta)\cos^4\theta\,d\theta$$

$u = \cos\theta$, $du = -\sin\theta\,d\theta$, $-du = \sin\theta\,d\theta$ } 1 pt.

$$= \int (1-u^2)u^4(-du)$$

$$= \int (u^6 - u^4)\,du$$

$$= \frac{u^7}{7} - \frac{u^5}{5} + C$$

$$= \boxed{\frac{\cos^7\theta}{7} - \frac{\cos^5\theta}{5} + C} \qquad \text{1 pt.}$$

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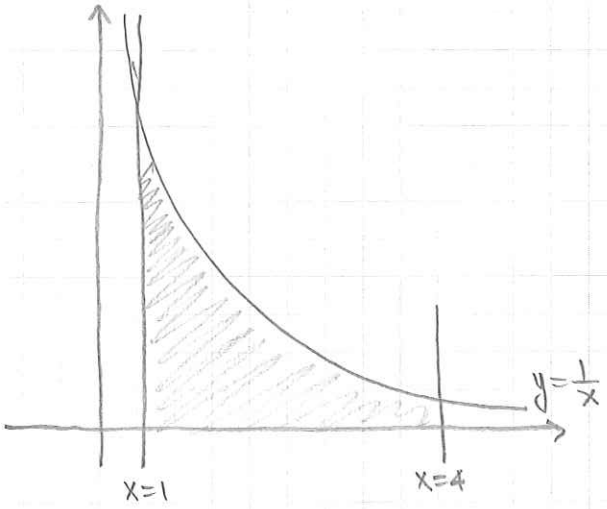
(4)

3. Consider the region R in the plane bounded by the curves

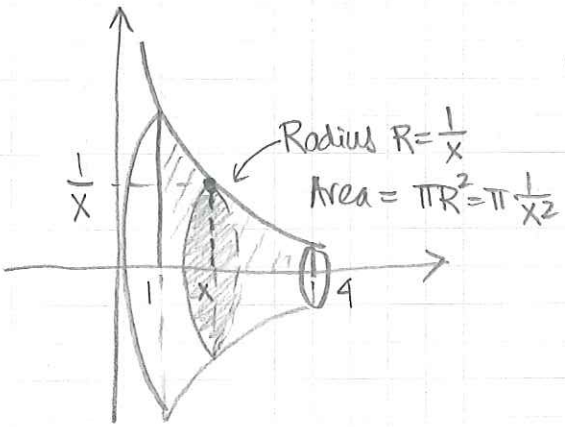
$$y = \frac{1}{x}; \quad y = 0; \quad x = 1; \quad x = 4.$$

a). Sketch the region R.



2 pts.

b). Find the volume of the solid obtained by revolving R about the x-axis.



$$V = \int_1^4 \frac{\pi}{x^2}\,dx = \frac{-\pi}{x}\Big|_1^4 = \frac{-\pi}{4} + \pi = \frac{3\pi}{4}$$

2 pts.