

Quiz #1

Directions: Carefully read each question below and answer to the best of your ability in the space provided. Your answer to problem # 2 should be written in a clear and concise manner. You **MUST** show your work to receive full credit!

1. (5 points) Which of the following formulas correspond to the average value of the function $f(x) = e^x(x^2 - x + 1)$ on the interval $[-2, 1]$?

- A. $\int_{-2}^1 e^x(x^2 - x + 1) dx$
 B. $\frac{1}{3} \int_{-2}^1 e^x(2x - 1) dx$
 C. $\int_1^{-2} e^x(x^2 - x + 1) dx$
 D. $\frac{1}{3} \int_{-2}^1 e^x(x^2 - x + 1) dx$
 E. None of the above

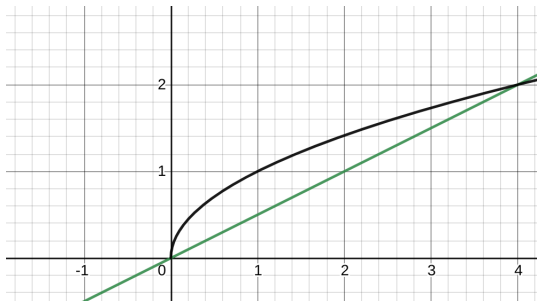
2. (5 points) Find the area of the region enclosed by two functions: $y = \sqrt{x}$ and $y = \frac{x}{2}$.

Solution: First, let's find where $y = \sqrt{x}$ and $y = \frac{x}{2}$ intersect. That is

$$\sqrt{x} = \frac{x}{2} \quad \longrightarrow \quad x = \frac{x^2}{4} \quad \longrightarrow \quad x^2 - 4x = 0 \quad \longrightarrow \quad x(x - 4) = 0 \quad \longrightarrow \quad \boxed{x = 0} \text{ or } \boxed{x = 4}.$$

Thus, the area can be computed as following:

$$\begin{aligned} \text{Area} &= \int_0^4 \left(\sqrt{x} - \frac{x}{2} \right) dx \\ &= \left(\frac{2}{3}x^{\frac{3}{2}} - \frac{1}{4}x^2 \right) \Big|_{x=0}^{x=4} \\ &= \left(\frac{2}{3} \cdot 8 - \frac{1}{4} \cdot 16 \right) - (0 - 0) \\ &= \frac{16}{3} - 4 \\ &= \boxed{\frac{4}{3}}. \end{aligned}$$



Name: _____

Section (circle one): 001 002

Question:	1	2	Total
Points:	5	5	10
Score:			