Quiz 10

Please box or circle your final answers.

1. Approximate \( \int_0^8 (x^2 + 4x + 2) \, dx \) use a right Riemann sum with 100 rectangles.

\[
\text{Using Riemann approx} = 318.5152
\]

2. A farmer uses the demand equation \( p = 10 - 0.02x + \frac{1}{x} \) to determine how much he should charge when he sells bushels of beans, where \( x \) is the number of bushels and \( p \) is price. He estimates this year’s crop to be between 200 and 500 bushels. Find the average price he should charge.

\[
\frac{1}{500-200} \int_{200}^{500} 10 - 0.02x + \frac{1}{x} \, dx = \frac{1}{300} \cdot 900.9162907 = 3.00305
\]

using \( f_n(\int) \)

3. \( \int (x^2 e^{3x^3+10}) \, dx \quad u = 3x^3+10 \quad du = 9x^2 \, dx \quad \Rightarrow \quad \frac{1}{9} \, du = x^2 \, dx \\
\int \frac{u^2}{9} \, du = \frac{1}{9} \int e^u \, du = \frac{1}{9} e^u + C = \frac{1}{9} e^{3x^3+10} + C \)

4. \( \int \frac{12x}{(3-4x^2)^9} \, dx \quad u = 3-4x^2 \quad \Rightarrow \quad du = -8x \, dx \quad \Rightarrow \quad -\frac{du}{8} = x \, dx \\
12 \int \frac{x}{(3-4x^2)^9} \, dx = 12 \int \frac{x}{u^9} \, du = 12 \int -\frac{1}{8} \frac{1}{u^9} \, du = 12 \int -\frac{1}{8} u^{-9} \, du = -\frac{12}{8} \frac{u^{-8}}{-8} + C = \frac{12}{64} u^{-8} + C = \frac{12}{64} (3-4x^2)^8 + C \)