

1552 Quiz 2: Sample Questions

May 11, 2023

1 Question 1: Extension to the Fundamental Theorem of Calculus

Find $F'(x)$ for the function

1. $F(x) = \int_{\frac{5}{x}}^{x^3} \left(\frac{t}{1-\sqrt{t}} \right) dt.$

2. $F(x) = \int_{\frac{3}{x}}^{(2x)^3} \left(\frac{t}{1-\sqrt{t}} \right) dt.$

3. $F(x) = \int_{\frac{7}{x}}^{(3x)^3} \left(\frac{t}{1-\sqrt{t}} \right) dt.$

4. $F(x) = \int_{\frac{2}{x}}^{(2x)^2} \left(\frac{t^2}{1-\sin t} \right) dt.$

2 Question 2: Integration by substitution

Use the method of substitution to calculate the integral:

A correct answer without work will not receive full credit.

1. $\int e^x \sec(2e^x) \tan(2e^x) dx$

2. $\int x \csc^2(x^2) dx$

3. $\int \frac{\sin 5x - \cos 5x}{\sin 5x + \cos 5x} dx$

4. $\int \frac{1}{\ln(x^{2x})} dx$

3 Question 3: Area between curves

Set up the integral (DO NOT SOLVE) to find the area enclosed by the curves:

1. $y + x - x^3 = 0$ and $y - x + x^2 = 0$
2. $y + 3x - x^3 = 0$ and $y - 3x + x^2 = 0$
3. $y + 2x - 2x^3 = 0$ and $y - 2x + 2x^2 = 0$
4. $x + 3y - y^3 = 0$ and $x - 3y + y^2 = 0$