Quiz 11

Student

Colin Cano

Total Points

8.5 / 10 pts

Question 1

Q1 🚩 **2 / 2 pts**

✔ **– 0 pts** Correct: $g'(x) = -xe^x$

    – 0.5 pts Partial credit: Did not change the variable to x (answer in terms of t)

    – 0.5 pts Partial credit: Did not pick a negative sign from $\int_x^1 f(t)\,dt = -\int_1^x f(t)\,dt$

    – 1 pt Partial credit: Did not use the correct form of the Fundamental Theorem of Calculus $\frac{d}{dx}\int_a^x f(t)\,dt = f(x)$

    – 0.5 pts Partially correct in applying the fundamental theorem of calculus.

    – 2 pts No correct work

💬 Be careful with the meaning of dt

① Two negatives cancel out

② You have it right, but the dt shouldn't be here. We use dt when integrating to indicate that is the variable we are integrating. Or we use it when doing implicit differentiation, but derivatives are of the form $f'(x) = \frac{df}{dx}$ and don't have any dt or dx inside the formula
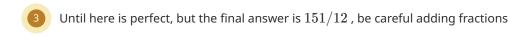
Question 2

Q2

🚩 **3** / 3 pts

✔ **– 0 pts** Correct answer: $\frac{151}{12}$ obtained by finding antiderivative $F(x) = \frac{3}{4}x^4 + \frac{1}{3}x^3 - x$ and evaluating $F(2) - F(1)$

Finding antiderivative

– 0.5 pts Does not obtain $\frac{3}{4}x^4$ for the antiderivative of $3x^3$

– 0.5 pts Does not obtain $\frac{1}{3}x^3$ for the antiderivative of x^2

– 0.5 pts Does not obtain $-x$ for the antiderivative of -1

– 1.5 pts Does not evaluate $F(2) - F(1)$ for the antiderivative $F(x)$ they found

– 1 pt Evaluated one of the boundary in $F(x)$ and didn't compute $F(2) - F(1)$.

– 0.5 pts Algebra mistake

– 3 pts No correct work

③ Until here is perfect, but the final answer is $151/12$, be careful adding fractions

Question 3

Q3

🚩 **2** / 3 pts

– 0 pts Correct answer: $\frac{9}{2}$ obtained by finding antiderivative $F(t) = \frac{3}{2}t^{2/3}$ and evaluating $F(8) - F(1)$

Finding antiderivative

✔ **– 1 pt** Incorrect exponent $2/3$ in the antiderivative $\frac{3}{2}t^{2/3}$ of $t^{-1/3}$

④ The coefficient you used is appropriate for the exponent you used, but the exponent is incorrect

– 0.5 pts Incorrect coefficient $\frac{3}{2}$ in the antiderivative $\frac{3}{2}t^{2/3}$ of $t^{-1/3}$

– 1.5 pts Does not evaluate $F(8) - F(1)$ for the antiderivative $F(t)$ they found

– 2 pts Rewrites $\frac{1}{t^{1/3}} = t^{-1/3}$ but no further correct work

– 1 pt Evaluated one of the boundary in $F(x)$ and didn't compute $F(8) - F(1)$.

– 0.5 pts Algebra mistake

– 3 pts No correct work

⑤ You can definitely compute this by hand!

Question 4

Q4 **1.5** / 2 pts

- **0 pts** Correct: $e^x + \ln|x| + C$

- **1 pt** Does not find e^x for the antiderivative of e^x

- **0.5 pts** Misses absolute value in $\ln|x|$ for antiderivative of $\frac{1}{x}$

- **1 pt** Does not find $\ln|x|$ (or $\ln(x)$) for antiderivative of $\frac{1}{x}$

✔ - **0.5 pts** Does not include integration constant $+C$

- **2 pts** No correct work

Name: Colin Cano   Student ID: _____

1. Use the Fundamental Theorem of Calculus to find the derivative $g'(x)$ of the function g if

$$g(x) = \int_x^1 te^t\, dt = \int_1^x -te^t\, dt$$

$$g'(x) = -xe^x\, dt$$

2. Evaluate the definite integral: $\int_1^2 (3x^3 + x^2 - 1)\, dx = \frac{3x^4}{4} + \frac{x^3}{3} - x + c \Big|_1^2 =$

$\frac{9}{12} + \frac{4}{12} - \frac{12}{12}$

$\frac{3}{4} + \frac{1}{3} - 1$

$|44 + 24$

$$\left(\frac{3(2)^4}{4} + \frac{(2)^3}{3} - 2\right) - \left(\frac{3(1)^4}{4} + \frac{1^3}{3} - 1\right) = 14 - \frac{-1}{12} = \frac{167}{12}$$

3. Evaluate the definite integral: $\int_1^8 \frac{1}{t^{1/3}}\, dt = \int_1^8 t^{-1/3} = \frac{3}{4} t^{4/3} \Big|_1^8 = \left(\frac{3}{4}(8)\right)^{4/3} - \frac{3}{4}(1)^{4/3} =$

$$= \frac{3}{4}(8)^{4/3} - \frac{3}{4}(1)^{4/3}$$

4. Find the general indefinite integral: $\int \left(e^x + \frac{1}{x}\right) dx = e^x + \ln|x|$

SCRATCH PAPER