

Quiz 12 Solution

November 8, 2017

1. (2 points) Evaluate $\int 3e^x - 4 \csc^2(x) + \frac{2x^4 - 7}{x} dx$

Solution:

$$\begin{aligned}\int 3e^x - 4 \csc^2(x) + \frac{2x^4 - 7}{x} dx &= \int 3e^x - 4 \csc^2(x) + 2x^3 - 7x^{-1} dx \\&= \int 3e^x dx - \int 4 \csc^2(x) dx + \int 2x^3 dx - \int 7x^{-1} dx \\&= 3 \int e^x dx - 4 \int \csc^2(x) dx + 2 \int x^3 dx - 7 \int x^{-1} dx \\&= 3e^x - 4(-\cot(x)) + 2\left(\frac{1}{4}x^4\right) - 7 \ln |x| + C\end{aligned}$$

Answer: $3e^x + 4 \cot(x) + \frac{1}{2}x^4 - 7 \ln |x| + C$

2. (2 points) Find $f(x)$ if $f''(x) = 2$, $f'(1) = 2$, and $f(-1) = -5$.

Solution:

$$\begin{aligned}f'(x) &= \int 2 dx \\f'(x) &= 2x + C \\2 &= 2(1) + C \text{ since } f'(1) = 2 \\C &= 1 \\f'(x) &= 2x\end{aligned}$$

$$\begin{aligned}f(x) &= \int 2x dx \\f(x) &= x^2 + C \\-5 &= (-1)^2 + C \text{ since } f(-1) = -5 \\C &= -6 \\f(x) &= x^2 - 6\end{aligned}$$

Answer: $f(x) = x^2 - 6$

3. (1 point) What do you need to review most for Exam 3?

Answer: Answers will vary.