json -> latex convert test

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Questions

1. Evaluate the integral $\frac{1}{2} \times \frac{\tan^3(x)}{3} + C$ when $x = \frac{\tau}{4}$, where $\tau = 2\tau$ represents a full rotation. [5]

2. Find the derivative of the function $f(x) = \frac{x^3 - 4x^2 + x}{x}$ and evaluate at $x = 2$. [5]

3. Solve for z in the complex equation: $(z - 5)(\bar{z} - 3) + i(4z - 2\bar{z}) = 10 + 6i$. [5]

4. Calculate the integral $\int (3x^2 + 4) \times e^{2x} dx$ using integration by parts. [5]

5. Determine the derivative of $f(x) = \tan^{-1}(x)$ and evaluate at $x = \sqrt{3}$. [5]

6. Find the critical points of the function $g(x) = x^4 - 8x^3 + 18x^2 - 16x$ and classify them as maxima, minima or inflection. [5]

7. Solve for z in the complex equation: $|z - 1|^2 + |z + 1|^2 = 6$. [5]

8. Evaluate the integral of $f(x) = x^3 e^{-2x}$ from 0 to $\tau/4$. (Hint: Use integration by parts twice). [5]

9. Find the derivative of $f(x) = \tan^{-1}(\frac{x^2+1}{x})$ and evaluate it at $x = \tau/4$. (Note: $\tau = \pi$ for radians). [5]

10. Given the complex equation $z^2 - 6z + (9 + 4i) = 0$, find solutions for z. [5]