Contest Report: **Autumn Integration Bee Contest**

Integration Bee

2024-10-18 15:46:30

Participants (25 max):

- **admin admin** None
- **test test** None

preliminary

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Integral 1

(difficulty 5)

$$I = \int_1^2 xe^x \, dx$$

Solution:

Step 1: Apply the formula for integration by parts

$$\int u \, dv = uv - \int v \, du$$

Step 2: Choose u and dv

$$u = x \quad \text{and} \quad dv = e^x \, dx$$

Step 3: Differentiate u and integrate dv

$$du = dx \quad \text{and} \quad v = e^x$$

Step 4: Apply the formula for integration by parts

$$I = \int_1^2 xe^x \, dx = [xe^x]_1^2 - \int_1^2 e^x \, dx$$

Step 5: Compute the remaining integral

$$I = [xe^x]_1^2 - [e^x]_1^2$$

Step 6: Substitute the limits of integration

$$I = \left(2e^2 - e^1\right) - \left(e^2 - e^1\right)$$

Step 7: Simplify the expression

$$I = 2e^2 - e - e^2 + e$$

Step 8: Final result

$$I = e^2$$

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height 0.5pt

Integral 2

(difficulty 5)

$$I = \int_1^2 xe^x \, dx$$

Solution:

Step 1: Apply the formula for integration by parts

$$\int u \, dv = uv - \int v \, du$$

Step 2: Choose u and dv

$$u = x \quad \text{and} \quad dv = e^x \, dx$$

Step 3: Differentiate u and integrate dv

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Step 7: Simplify the expression

$$I = 2e^2 - e - e^2 + e$$

Step 8: Final result

$$I = e^2$$

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height 0.5pt

Integral 3

(difficulty 5)

$$I = \int_1^2 xe^x \, dx$$

Solution:

Step 1: Apply the formula for integration by parts

$$\int u \, dv = uv - \int v \, du$$

Step 2: Choose u and dv

$$u = x \quad \text{and} \quad dv = e^x \, dx$$

Step 3: Differentiate u and integrate dv

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Step 7: Simplify the expression

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Step 8: Final result

$$I = e^2$$

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height 0.5pt

semifinals

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Step 8: Final result

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height 0.5pt

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(difficulty 5)

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(difficulty 5)

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height 0.5pt

finals

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Integral 1

(difficulty 5)

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(difficulty 5)

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Step 4: Apply the formula for integration by parts

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Step 5: Compute the remaining integral

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