

THE UNIVERSITY OF AKRON
Theoretical and Applied Mathematics

Experiments in Creating
Backgrounds

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ACROTEX

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1. Short Quizzes

Quiz Answer each of the following. Passing is 100%.

1. In what year did Columbus sail the ocean blue?

1490

1491

1492

1493

2. Copy the expression $\sin^2(x^3) \cos^{x+1}(x)$ into the box below:

3. Copy the expression $3xy^2 \ln^3(xy) \cos^2(y)$ into the box below:

4. Name *one* of the two people recognized as a founder of Calculus.

5. $\frac{\partial}{\partial x} 4x^2y^3 =$

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2. Exercises

EXERCISE 1. Evaluate the integral $\int x^2 e^{2x} dx$.

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Solutions to Exercises

Exercise 1. We evaluate by integration by parts:

$$\begin{aligned}\int x^2 e^{2x} dx &= \frac{1}{2}x^2 e^{2x} - \int x e^{2x} dx \\ &= \frac{1}{2}x^2 e^{2x} - \left[\frac{1}{2}x e^{2x} - \int \frac{1}{2} e^{2x} dx \right] \\ &= \frac{1}{2}x^2 e^{2x} - \frac{1}{2}x e^{2x} + \frac{1}{2} \int e^{2x} dx \\ &= \frac{1}{2}x^2 e^{2x} - \frac{1}{2}x e^{2x} + \frac{1}{4} e^{2x} \\ &= \frac{1}{4}(2x^2 - 2x + 1)e^{2x}\end{aligned}$$

Exercise 1

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Solutions to Quizzes

Solution to Quiz:

In 1492,
Columbus sailed the ocean blue.
Profound was the logic in his quest,
to get to the east, he headed west.¹

End Quiz

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¹This poem was obtained by personal communication from Leonard A. Stefanski, Department of Statistics, North Carolina State University.



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Solution to Quiz:

$$\frac{\partial}{\partial x} 4x^2y^3 = 8xy^2$$

End Quiz

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