Calculus 2 Workbook

Integration by parts

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INTEGRATION BY PARTS

1. Use integration by parts to evaluate the integral.

$$\int 9x \sin x \ dx$$

2. Use integration by parts to evaluate the integral.

$$\int 5xe^x \ dx$$

3. Use integration by parts to evaluate the integral.

$$\int 7x \ln x \ dx$$

4. Use integration by parts to evaluate the integral.

$$\int 2x \cos x \ dx$$

5. Use integration by parts to evaluate the integral.

$$\int 3\sqrt{x} \ln x \ dx$$

INTEGRATION BY PARTS TWO TIMES

1. Apply integration by parts two times to evaluate the integral.

$$\int 3x^2 e^x \, dx$$

2. Use integration by parts to evaluate the integral.

$$\int e^{3x} \cos(5x) \, dx$$

INTEGRATION BY PARTS THREE TIMES

1. Apply integration by parts three times to evaluate the integral.

$$\int 7x^3 e^x \, dx$$

2. Apply integration by parts three times to evaluate the integral.

$$\int \left(2x^3 + x^2\right) e^x \, dx$$

3. Use integration by parts three times to evaluate the integral.

$$\int (\ln x)^3 \, dx$$

INTEGRATION BY PARTS WITH U-SUBSTITUTION

■ 1. Use integration by parts and substitution to evaluate the integral.

$$\int \tan^{-1} x \; dx$$

■ 2. Use integration by parts and substitution to evaluate the integral.

$$\int 7x \cos(9x) \; dx$$

■ 3. Use integration by parts and substitution to evaluate the integral.

$$\int \ln(3x + 5) \; dx$$

PROVE THE REDUCTION FORMULA

■ 1. Use integration by parts, and $n = 8$, to prove the reduction formula for the integral.

$$\int x^n \sin x \ dx = -x^n \cos x + n \int x^{n-1} \cos x \ dx$$

■ 2. Use integration by parts, and $n = 11$, to prove the reduction formula for the integral.

$$\int x^n \cos x \ dx = x^n \sin x - n \int x^{n-1} \sin x \ dx$$

■ 3. Use integration by parts, $a = 5$, and $n = 9$, to prove the reduction formula for the integral.

$$\int x^n a^x \ dx = \frac{x^n a^x}{\ln a} - \frac{n}{\ln a} \int x^{n-1} a^x \ dx$$

TABULAR INTEGRATION

1. Use tabular integration to evaluate the integral.

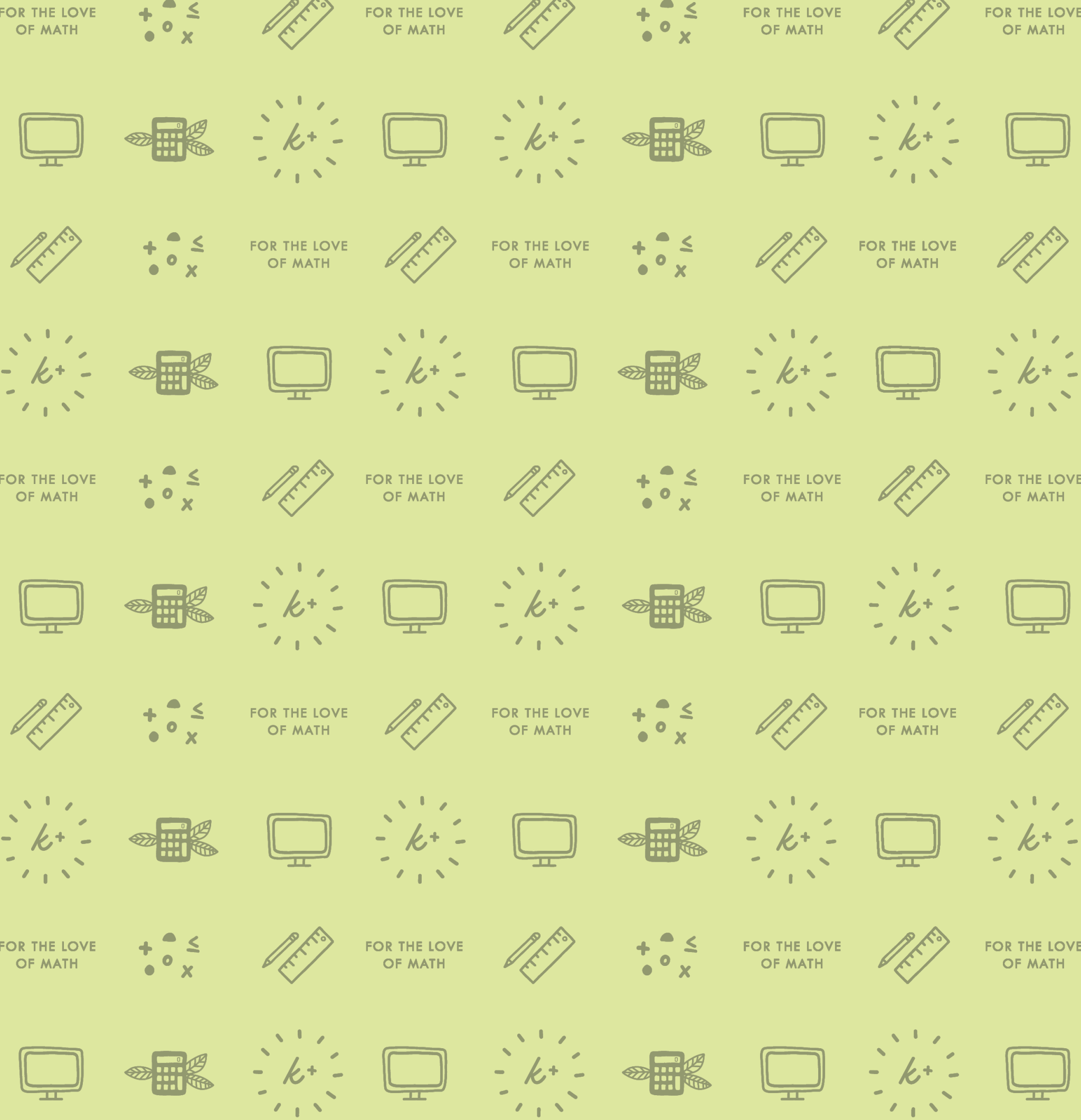
$$\int \left(5x^2 + 4x - 3\right) e^{2x}\, dx$$

2. Use tabular integration to evaluate the integral.

$$\int x^3 \cos(3x)\, dx$$

3. Use tabular integration to evaluate the integral.

$$\int \frac{x^4 e^x}{6}\, dx$$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