Calculus 2 Workbook

Maclaurin series

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MACLAURIN SERIES

■ 1. Write the first four non-zero terms of the Maclaurin series and use it to estimate $f(\pi/9)$.

$$f(x) = \cos(3x)$$

■ 2. Write the first three non-zero terms of the Maclaurin series and use it to estimate $f(2\pi/3)$.

$$f(x) = \cos^2 x$$

■ 3. Write the first four non-zero terms of the Maclaurin series and use it to estimate $f(2)$.

$$f(x) = (x+4)^{\frac{3}{2}}$$

SUM OF THE MACLAURIN SERIES

1. Find the sum of the Maclaurin series.

$$\sum_{n=0}^{\infty} \frac{7(x+4)^n}{n!}$$

2. Find the sum of the Maclaurin series.

$$\sum_{n=0}^{\infty} \frac{6(-1)^n(x-\pi)^{2n+1}}{7(2n+1)!}$$

3. Find the sum of the Maclaurin series.

$$4 + \sum_{n=0}^{\infty} \frac{e(-1)^n(x+\pi)^{2n}}{3(2n)!}$$

RADIUS AND INTERVAL OF CONVERGENCE OF A MACLAURIN SERIES

1. Find the radius of convergence of the Maclaurin series.

$$f(x) = \frac{5}{1 - x^3}$$

2. Find the radius of convergence of the Maclaurin series.

$$f(x) = 4\cos(x^2)$$

3. Find the radius of convergence of the Maclaurin series.

$$\sum_{n=1}^{\infty} \frac{x^n \cdot 3^n}{n}$$

INDEFINITE INTEGRAL AS AN INFINITE SERIES

1. Use an infinite series to evaluate the indefinite integral.

$$\int x^2 \cos(x^3)\, dx$$

2. Use an infinite series to evaluate the indefinite integral.

$$\int 4x^3 \sin(x^4)\, dx$$

3. Use an infinite series to evaluate the indefinite integral.

$$\int 2x \ln(1 + x^2)\, dx$$

MACLAURIN SERIES TO ESTIMATE AN INDEFINITE INTEGRAL

1. Use a Maclaurin series to estimate the indefinite integral.

$$\int \frac{\sin(2x)}{4x}\,dx$$

2. Use a Maclaurin series to estimate the indefinite integral.

$$\int \frac{\cos x}{x^2}\,dx$$

3. Use a Maclaurin series to estimate the indefinite integral.

$$\int \frac{\arctan x}{x^2}\,dx$$

MACLAURIN SERIES TO ESTIMATE A DEFINITE INTEGRAL

1. Use a Maclaurin series to estimate the value of the definite integral.

$$\int_0^3 3xe^{\frac{1}{2}x^2}\,dx$$

2. Use a Maclaurin series to estimate the value of the definite integral.

$$\int_0^{\sqrt{\pi/2}} 12\cos(x^2)\,dx$$

3. Use a Maclaurin series to estimate the value of the definite integral.

$$\int_0^{\sqrt[3]{\pi}} 15\sin(x^3)\,dx$$

MACLAURIN SERIES TO EVALUATE A LIMIT

1. Use a Maclaurin series to evaluate the limit.

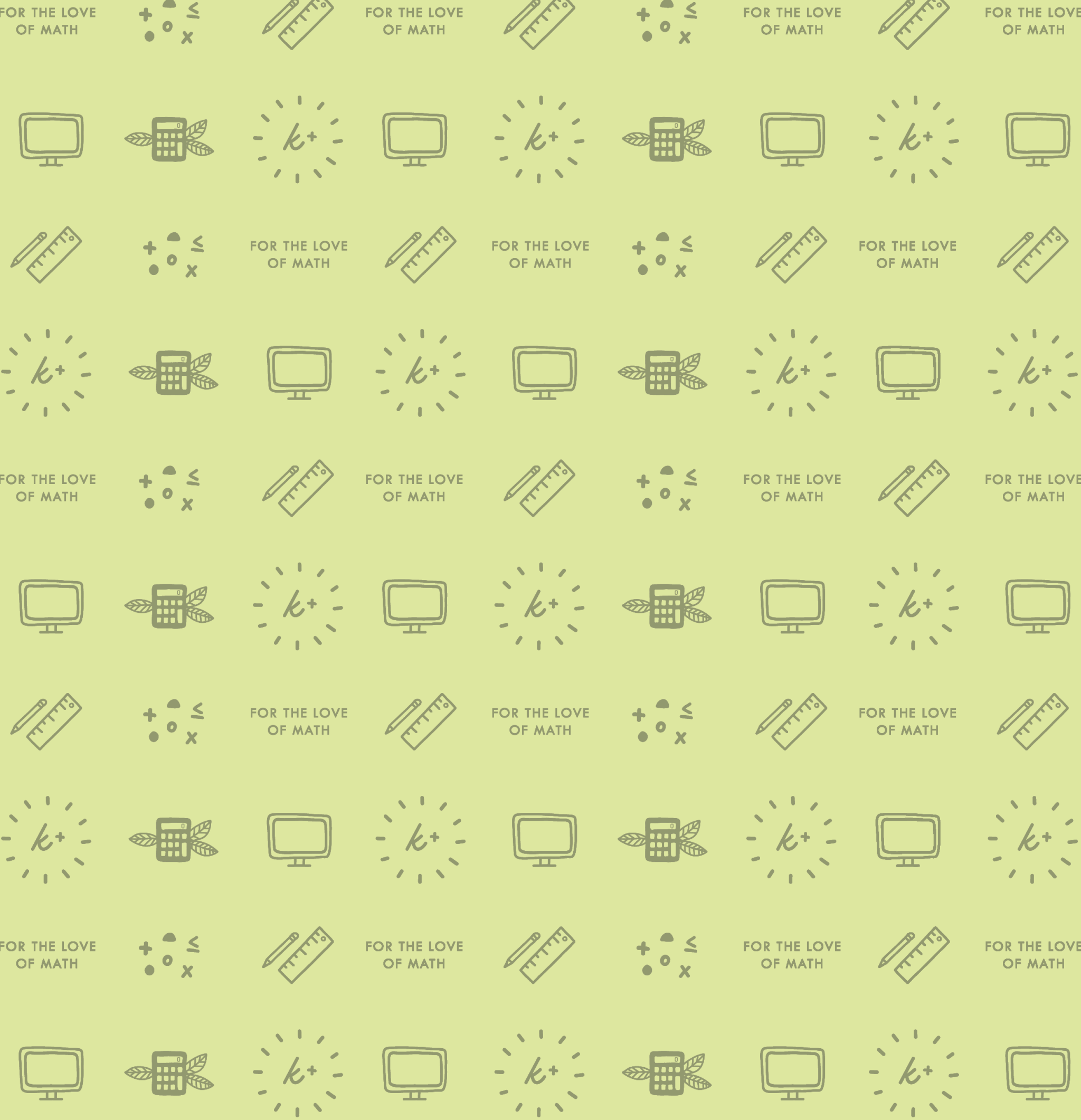
$$\lim_{x\to 0} \frac{e^{2x} - 1 - 2x}{x^2}$$

2. Use a Maclaurin series to evaluate the limit.

$$\lim_{x\to 0} \frac{\arctan x - x}{x^3}$$

3. Use a Maclaurin series to evaluate the limit.

$$\lim_{x\to 0} \frac{\cos(3x) + \frac{9}{2}x^2 - 1}{x^4}$$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