## CALCULUS: Graphical, Numerical, Algebraic by Finney, Demana, Watts and Kennedy Chapter 9: MaClaurin Series

What you'll Learn About How to write terms given a power series Identifying important types of power series

- Given the series  $\sum_{n=0}^{\infty} x^n$  answer the following questions.

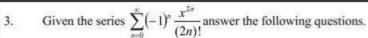
Determine the function (sum) of the series (f(x) = )

$$-17 \cdot (x) = \frac{1-x}{6} = \frac{1-x}{1-x}$$

- Substitute x<sup>3</sup> for x in the series you found in part a then simplify. C.
- Given the series  $\sum_{n=0}^{\infty} (-1)^n (x)^n$  answer the following questions.
- List the first 6 terms of the series and the general term

$$\sum_{n=0}^{\infty} (-1)^n (x)^n = |-x + x^2 - x^3 + x^4 - x^5|$$
 $x = -1$ 

- b. Determine the function (sum) of the series (f(x) = )
- Substitute x4 for x in the series you found in part a then simplify. C.



$$\sum_{n=0}^{\infty} (-1)^n \frac{x^{2n}}{(2n)!} = \frac{1}{0!} - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!}$$

- What function does it look like the series represents? That function is the sum of this series.
- What would happen to the graphs if the first 10 terms of the series are entered into y<sub>1</sub>.
- Substitute x<sup>3</sup> for x in the series you found in part a then simplify.

5. Given the series 
$$\sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{(2n+1)!}$$
 answer the following questions.

$$\sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{(2n+1)!} = \frac{x!}{1!} - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x}{7!} + \frac{x^9}{9!} - \frac{x^{11}}{11!}$$

$$= \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{(2n+1)!} = \frac{x!}{1!} - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x}{7!} + \frac{x^9}{9!} - \frac{x^{11}}{11!}$$

What function does it look like the series represents? That function is the sum of this series.

e. Substitute  $x^4$  for x in the series you found in part a then simplify.  $\frac{(x^4)^{2n+1}}{(2n+1)!} = \frac{x^4}{1!} - \frac{(x^4)^3}{3!} + \frac{(x^4)^5}{5!} - \frac{(x^4)^7}{7!} + \frac{(x^4)^9}{9!} - \frac{(x^4)^4}{1!}$ 

$$\frac{2|\text{Page}}{0.50} = \frac{10^{10} \times 10^{10}}{(20+1)!} = \frac{11}{1!} - \frac{11}{3!} + \frac{11}{5!} - \frac{11}{7!} + \frac{11}{9!} - \frac{11}{11!}$$

- 6. Given the series  $\sum_{n=0}^{\infty} \frac{x^n}{n!}$  answer the following questions.
- a. List the first 6 terms of the series and the general term

$$\sum_{n=0}^{\infty} \frac{x^n}{n!} =$$

- Enter the first 6 terms into y<sub>1</sub> of your calculator. Use X[-π,π]<sub>1</sub> and Y[-1,1] as your window.
- What function does it look like the series represents? That function is the sum of this series.
- What would happen to the graphs if the first 10 terms of the series are entered into y<sub>1</sub>.
- e. Substitute x<sup>2</sup> for x in the series you found in part a then simplify.
- 7. Given the series  $\sum_{n=1}^{\infty} (-1)^{n-1} \frac{x^n}{n}$  answer the following questions.
- a. List the first 6 terms of the series and the general term

$$\sum_{n=1}^{\infty} (-1)^{n-1} \frac{x^n}{n} =$$

- Enter the first 6 terms into y<sub>1</sub> of your calculator. Use X[-π,π]<sub>1</sub> and Y[-1,1] as your window.
- What function does it look like the series represents? That function is the sum of this series.
- What would happen to the graphs if the first 10 terms of the series are entered into y<sub>1</sub>.
- e. Substitute x<sup>3</sup> for x in the series you found in part a then simplify.

- 8. Given the series  $\sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{2n+1}$  answer the following questions.
- a. List the first 6 terms of the series and the general term

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

- b. Enter the first 6 terms into  $y_1$  of your calculator. Use  $X[-\pi,\pi]_1$  and Y[-1,1] as your window.
- What function does it look like the series represents? That function is the sum of this series.
- d. What would happen to the graphs if the first 10 terms of the series are entered into  $y_1$ .
- e. Substitute x3 for x in the series you found in part a then simplify.