WebAssign
Hw 29 (11.10)(2): Taylor and Maclaurin Series (Homework)

Yinglai Wang
MA 162 Spring 2012, section 321, Spring 2012
Instructor: Jonathan Montano

Current Score : 20 / 20 **Due :** Thursday, April 5 2012 11:55 PM EDT

---

1. 2.85/2.85 points | Previous Answers SCalcET7 11.10.030.

Use a Maclaurin series in the table below to obtain the Maclaurin series for the given function.

$$f(x) = 5\cos\left(\frac{\pi x}{7}\right)$$

$$f(x) = \sum_{n=0}^{\infty}$$

$$\frac{1}{1-x} = \sum_{n=0}^{\infty} x^n = 1 + x + x^2 + x^3 + \cdots \qquad R = 1$$

$$e^x = \sum_{n=0}^{\infty} \frac{x^n}{n!} = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots \qquad R = \infty$$

$$\sin x = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{(2n+1)!} = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \cdots \qquad R = \infty$$

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

$$\tan^{-1} x = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{2n+1} = x - \frac{x^3}{3} + \frac{x^5}{5} - \frac{x^7}{7} + \cdots \qquad R = 1$$

$$(1+x)^k = \sum_{n=0}^{\infty} \binom{k}{n} x^n = 1 + kx + \frac{k(k-1)}{2!}x^2 + \frac{k(k-1)(k-2)}{3!}x^3 + \cdots \qquad R = 1$$

Need Help? Read It Chat About It

---

2. 2.85/2.85 points | Previous Answers SCalcET7 11.10.031.MI.

Use a Maclaurin series in the table below to obtain the Maclaurin series for the given function.

$$f(x) = 4e^x + e^{4x}$$

$$\sum_{n=0}^{\infty}$$

$$\frac{1}{1-x} = \sum_{n=0}^{\infty} x^n = 1 + x + x^2 + x^3 + \cdots \qquad R = 1$$

$$e^x = \sum_{n=0}^{\infty} \frac{x^n}{n!} = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots \qquad R = \infty$$

$$\sin x = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{(2n+1)!} = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \cdots \qquad R = \infty$$

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

$$\tan^{-1} x = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{2n+1} = x - \frac{x^3}{3} + \frac{x^5}{5} - \frac{x^7}{7} + \cdots \qquad R = 1$$

$$(1+x)^k = \sum_{n=0}^{\infty} \binom{k}{n} x^n = 1 + kx + \frac{k(k-1)}{2!}x^2 + \frac{k(k-1)(k-2)}{3!}x^3 + \cdots \qquad R = 1$$

Need Help? Read It Master It Chat About It

---

3. 2.85/2.85 points | Previous Answers SCalcET7 11.10.033.MI.

Use a Maclaurin series in this table to obtain the Maclaurin series for the given function.

$$f(x) = 3x \cos\left(\frac{1}{4}x^2\right)$$

$$\sum_{n=0}^{\infty}$$ ✓

Need Help? Read It Master It Chat About It

---

4. 2.85/2.85 points | Previous Answers SCalcET7 11.10.037.

Use a Maclaurin series in this table to obtain the Maclaurin series for the given function.

$$f(x) = 3 \sin^2 \frac{x}{5}$$

$$\sum_{n=1}^{\infty}$$ ✓

Need Help? Read It Watch It Chat About It

---

5. 2.85/2.85 points | Previous Answers SCalcET7 11.10.048.MI.

Evaluate the indefinite integral as an infinite series.

$$2\int \frac{e^x - 1}{7x}\,dx$$

$$\sum_{n=1}^{\infty} \quad + C$$

Need Help? Read It Master It Chat About It

---

6. 2.85/2.85 points | Previous Answers SCalcET7 11.10.049.

Evaluate the indefinite integral as an infinite series.

$$\int \frac{\cos x - 1}{x}\,dx$$

$$\sum_{n=1}^{\infty} \quad + C$$

Need Help? Read It Chat About It

---

7. 2.9/2.9 points | Previous Answers SCalcET7 11.10.056.

Use series to evaluate the limit.

$$\lim_{x \to 0} \frac{1 - \cos 3x}{1 + 3x - e^{3x}}$$

Need Help? Read It Chat About It