Chap 11 HW 2 of 2 More Series (11708645)

Due:	Fri, May 31, 2019 12:00 PM MST
Question	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

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1.   Question Details   SCalcET8 11.8.JIT.001.MI. [3799547]

Solve the inequality. Express the answer using interval notation.

$$|x - 5| \le 10$$

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2.   Question Details   SCalcET8 11.8.JIT.002. [3798084]

Solve the inequality. Express the answer using interval notation.

$$|x + 1| \ge 9$$

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3.   Question Details   SCalcET8 11.8.007.MI.SA. [3799092]

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Find the radius of convergence and interval of convergence of the series.

$$\sum_{n=1}^{\infty} \frac{x^{n+6}}{6n!}$$

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4.   Question Details   SCalcET8 11.8.015.MI.SA. [3799553]

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Find the radius of convergence, R, and interval of convergence, I, of the series.

$$\sum_{n=0}^{\infty} \frac{(x - 15)^n}{n^2 + 1}$$

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5.   Question Details   SCalcET8 11.8.506.XP.MI.SA. [3799455]

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Find the radius of convergence R and interval of convergence I of the series.

$$\sum_{n=1}^{\infty} \frac{9^n(x + 10)^n}{\sqrt{n}}$$

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6.   Question Details   SCalcET8 11.8.508.XP.MI.SA. [3798882]   _

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Find the radius of convergence, R, and interval, I, of convergence of the series.

$$\sum_{n=1}^{\infty} \frac{x^{n+7}}{\sqrt{n}}$$

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7.   Question Details   SCalcET8 11.8.AE.001. [3799347]   _

Video Example ◀))

EXAMPLE 1   For what values of x is the series $\sum_{n=0}^{\infty} n!x^{4n}$ convergent?

SOLUTION   We use the Ratio Test. If we let a_n, as usual, denote the nth term of the series, then $a_n = n!x^{4n}$. If $x \neq 0$, we have

$$\lim_{n\to\infty} \left| \frac{a_{n+1}}{a_n} \right| = \lim_{n\to\infty} \left| \frac{\boxed{}}{n!x^{4n}} \right|$$

$$= \lim_{n\to\infty} \boxed{} = \boxed{}.$$

By the Ratio Test, the series diverges when $x \neq 0$. Thus the given series converges only when

$x = \boxed{}$.

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8.   Question Details   SCalcET8 11.8.005. [3799180]   _

Find the radius of convergence, R, of the series.

$$\sum_{n=1}^{\infty} \frac{x^n}{4n-1}$$

$R = \boxed{}$

Find the interval, I, of convergence of the series. (Enter your answer using interval notation.)

$I = \boxed{}$

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9.   Question Details   SCalcET8 11.8.006. [3798316]   _

Find the radius of convergence, R, of the series.

$$\sum_{n=1}^{\infty} \frac{(-1)^n x^n}{n^9}$$

$R = \boxed{}$

Find the interval, I, of convergence of the series. (Enter your answer using interval notation.)

$I = \boxed{}$

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10.   Question Details   SCalcET8 11.8.007.MI. [3798135]   _

Find the radius of convergence, R, of the series.

$$\sum_{n=2}^{\infty} \frac{x^{n+2}}{2n!}$$

$R = \boxed{}$

Find the interval, I, of convergence of the series. (Enter your answer using interval notation.)

$I = \boxed{}$

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11.   Question Details   SCalcET8 11.8.010. [3798637]   -

Find the radius of convergence, R, of the series.

$$\sum_{n=1}^{\infty} 5^n n^2 x^n$$

$R =$ [   ]

Find the interval, I, of convergence of the series. (Enter your answer using interval notation.)

$I =$ [   ]

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12.   Question Details   SCalcET8 11.8.015.MI. [3798332]   -

Find the radius of convergence, R, of the series.

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

$R =$ [   ]

Find the interval of convergence, I, of the series. (Enter your answer using interval notation.)

$I =$ [   ]

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13.   Question Details   SCalcET8 11.8.009. [3798129]   -

Find the radius of convergence, R, of the series.

$$\sum_{n=1}^{\infty} \frac{x^n}{n^4 2^n}$$

$R =$ [   ]

Find the interval, I, of convergence of the series. (Enter your answer using interval notation.)

$I =$ [   ]

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14.   Question Details   SCalcET8 11.9.003.MI.SA. [3798522]   -

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Find a power series representation for the function. Determine the interval of convergence. (Give your power series representation centered at x = 0.)

$$f(x) = \frac{1}{6+x}$$

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15.   Question Details   SCalcET8 11.9.005.MI.SA. [3799242]   -

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Find a power series representation for the function. Determine the interval of convergence. (Give your power series representation centered at x = 0.)

$$f(x) = \frac{3}{8-x}$$

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16.   Question Details   SCalcET8 11.9.015.MI.SA. [3798502]   ‑

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Find a power series representation for the function. Determine the radius of convergence, R. (Give your power series representation centered at $x = 0$.)

$$f(x) = \ln(10 - x)$$

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17.   Question Details   SCalcET8 11.9.039. [3799508]   ‑

Let

$$f(x) = \sum_{n=1}^{\infty} \frac{x^n}{n^2}.$$

Find the intervals of convergence for f. (Enter your answers using interval notation.)

[   ]

Find the intervals of convergence for f'.

[   ]

Find the intervals of convergence for f''.

[   ]

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18.   Question Details   SCalcET8 11.9.AE.005. [3798821]   ‑

Video Example ◄))

EXAMPLE 5   Express $1/(1 - x)^2$ as a power series by differentiating the equation below. What is the radius of convergence?

$$\frac{1}{1 - x} = 1 + x + x^2 + x^3 + \cdots = \sum_{n=0}^{\infty} x^n \quad |x| < 1$$

SOLUTION   Differentiating each side of the equation, we get

$$\frac{1}{(1 - x)^2} = 1 + \boxed{} + 3x^2 + \cdots = \sum_{n=1}^{\infty} \boxed{}.$$

If we wish, we can replace n by $n + 1$ and write the answer as

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

According to this theorem, the radius of convergence of the differentiated series is the same as the radius of convergence of the original series, namely, $R = \boxed{}$.

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19.   Question Details   SCalcET8 11.9.003.MI. [3798554]   ‑

Find a power series representation for the function. (Center your power series representation at $x = 0$.)

$$f(x) = \frac{1}{9 + x}$$

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

Determine the interval of convergence. (Enter your answer using interval notation.)

[   ]

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20.   Question Details   SCalcET8 11.9.005.MI. [3798838]   _

Find a power series representation for the function. (Give your power series representation centered at x = 0.)

$$f(x) = \frac{2}{9 - x}$$

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

Determine the interval of convergence. (Enter your answer using interval notation.)

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21.   Question Details   SCalcET8 11.9.015.MI. [3798397]   _

Find a power series representation for the function. (Give your power series representation centered at x = 0.)

$$f(x) = \ln(3 - x)$$

$$f(x) = \ln(3) - \sum_{n=1}^{\infty} \left(\right)$$

Determine the radius of convergence, R.

R = _____

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22.   Question Details   SCalcET8 11.9.JIT.002. [3799292]   _

Find the partial fraction decomposition of the rational function.

$$\frac{x + 14}{x^2 - 2x - 8}$$

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23.   Question Details   SCalcET8 11.10.011.MI.SA. [3799461]   _

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Find the Maclaurin series for $f(x)$ using the definition of a Maclaurin series. [Assume that f has a power series expansion. Do not show that $R_n(x) \to 0$.] Find the associated radius of convergence R.

$$f(x) = 6(1 - x)^{-2}$$

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24.   Question Details   SCalcET8 11.10.022.MI.SA. [3799160]   _

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Find the Taylor series for $f(x)$ centered at the given value of a. [Assume that f has a power series expansion. Do not show that $R_n(x) \to 0$.] Find the associated radius of convergence R.

$$f(x) = 9/x, \quad a = -3$$

25.   Question Details   SCalcET8 11.10.AE.001. [3799167]

Video Example ◀))

EXAMPLE 1   Find the Maclaurin series of the function $f(x) = e^{4x}$ and its radius of convergence.

SOLUTION   If $f(x) = e^{4x}$, then $f^{(n)}(x) = $ [_____] , so

$f^{(n)}(0) = 4^n e^0 = $ [_____] for all n. Therefore the Taylor series for f at 0 (that is, the Maclaurin series) is

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

$$= 1 + \frac{4x}{1!} + \boxed{} + \frac{64x^3}{3!} + \cdots$$

To find the radius of convergence we let $a_n = 4^n x^n / n!$. Then

$$\left| \frac{a_{n+1}}{a_n} \right| = \left| \frac{\boxed{}}{(n+1)!} \cdot \frac{n!}{4^n x^n} \right|$$

$$= \frac{4|x|}{n+1} \rightarrow \boxed{} < 1$$

so, by the Ratio Test, the series converges for all x and the radius of convergence is $R = \infty$.

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26.   Question Details   SCalcET8 11.10.014. [3799215]

Find the Maclaurin series for $f(x)$ using the definition of a Maclaurin series. [Assume that f has a power series expansion. Do not show that $R_n(x) \rightarrow 0$.]

$$f(x) = e^{-3x}$$

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

Find the associated radius of convergence R.

$R = $ [_____]

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27.   Question Details   SCalcET8 11.10.021. [3798579]

Find the Taylor series for $f(x)$ centered at the given value of a. [Assume that f has a power series expansion. Do not show that $R_n(x) \rightarrow 0$.]

$$f(x) = \ln(x), \quad a = 5$$

$$f(x) = \ln(5) + \sum_{n=1}^{\infty} \left(\boxed{} \right)$$

Find the associated radius of convergence R.

$R = $ [_____]

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28.   Question Details   SCalcET8 11.10.023. [3799416]

Find the Taylor series for $f(x)$ centered at the given value of a. [Assume that f has a power series expansion. Do not show that $R_n(x) \rightarrow 0$.]

$$f(x) = e^{2x}, \quad a = 4$$

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

Find the associated radius of convergence R.

$R = $ [_____]

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29.   Question Details   SCalcET8 11.10.025. [3798511]

Find the Taylor series for $f(x)$ centered at the given value of a. [Assume that f has a power series expansion. Do not show that $R_n(x) \to 0$.]

$$f(x) = \sin(x), \quad a = \pi$$

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

Find the associated radius of convergence R.

$R = \boxed{}$

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30.   Question Details   SCalcET8 11.10.045. [3799286]

A graphing calculator is recommended.
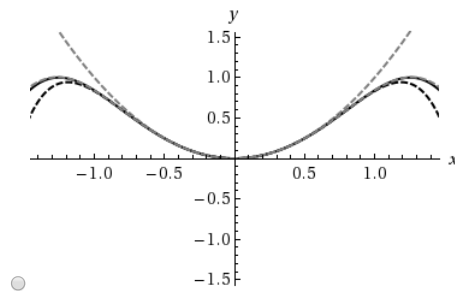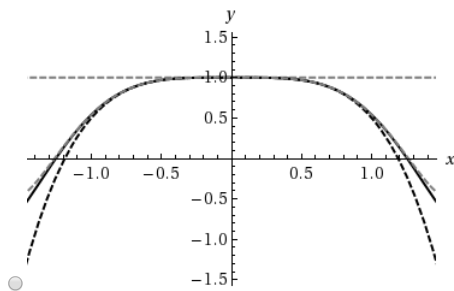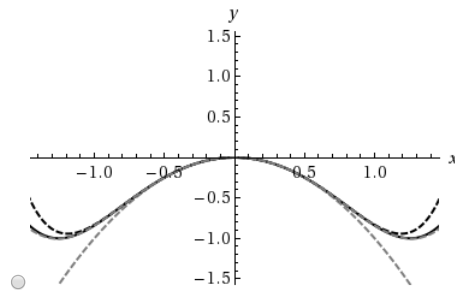
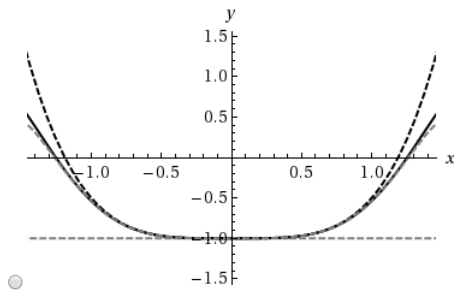Find the Maclaurin series of f (by any method).

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

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

Find its radius of convergence R.

$R = \boxed{}$

Graph f and its first few Taylor polynomials on the same screen.

What do you notice about the relationship between these polynomials and f?

As n ---Select--- ▼ , $T_n(x)$ becomes a better approximation to $f(x)$.

31.   Question Details   SCalcET8 11.10.046. [3799412]

A graphing calculator is recommended.
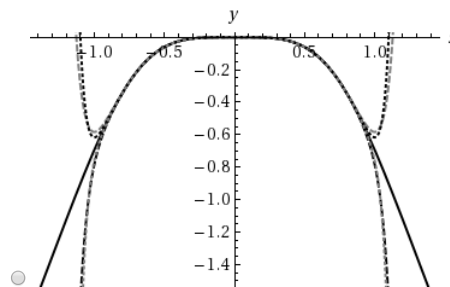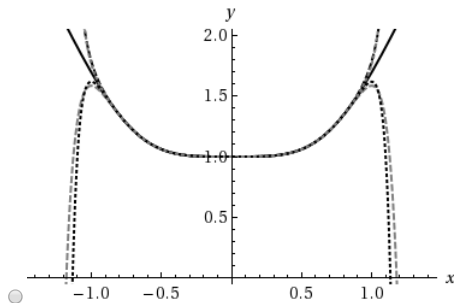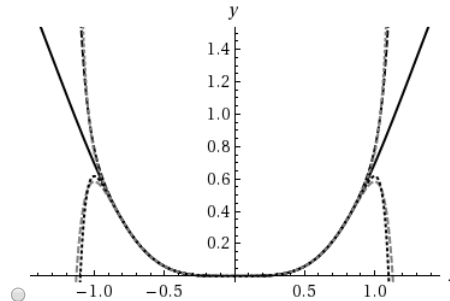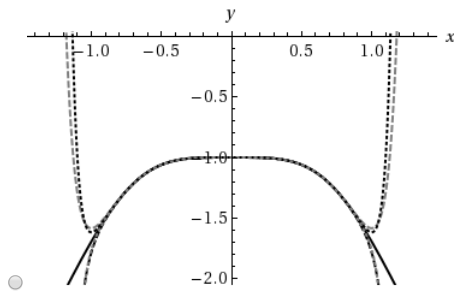
Find the Maclaurin series of f (by any method).

$$f(x) = \ln(1 + x^4)$$

$$f(x) = \sum_{n=1}^{\infty} \left(\boxed{} \right)$$

Find its radius of convergence R.

$R = \boxed{}$

Graph f and its first few Taylor polynomials on the same screen.

What do you notice about the relationship between these polynomials and f?

As n ⎵---Select---⎵▾ , $T_n(x)$ becomes a better approximation to $f(x)$.

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32.   Question Details   SCalcET8 11.10.504.XP.MI.SA. [3799573]

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Find the Taylor series for $f(x)$ centered at the given value of a. [Assume that f has a power series expansion. Do not show that $R_n(x) \to 0$.] Find the associated radius of convergence R.

$$f(x) = 7\cos(x), \quad a = 11\pi$$

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33.   Question Details   SCalcET8 11.10.504.XP.MI. [3798353]

Find the Taylor series for $f(x)$ centered at the given value of a. [Assume that f has a power series expansion. Do not show that $R_n(x) \to 0$.]

$$f(x) = 4\cos(x), \quad a = 5\pi$$

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

Find the associated radius of convergence R.

$R = \boxed{}$

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34.   Question Details   SCalcET8 11.10.517.XP. [3799569]   ▪

Use the Maclaurin series for e^x to compute $e^{-0.16}$ correct to five decimal places.

$e^{-0.16} =$ [   ]

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35.   Question Details   SCalcET8 11.10.522.XP. [3799447]   ▪

Use the Maclaurin series for $\sin(x)$ to compute $3 \sin(2°)$ correct to five decimal places.

$3 \sin(2°) =$ [   ]

Assignment Details

Name (AID): **Chap 11 HW 2 of 2 More Series (11708645)**   **Feedback Settings**
Submissions Allowed: **10**   Before due date
Category: **Homework**   Question Score
Code: Assignment Score
Locked: **Yes**   Publish Essay Scores
Author: **Bird, Brian (** brian.bird@gccaz.edu **)**   Question Part Score
Last Saved: **Dec 9, 2017 10:44 AM MST**   Mark
Permission: **Protected**   Add Practice Button
Randomization: **Person**   Help/Hints
Which graded: **Last**   Response
                                                                 Save Work
                                                                 After due date
                                                                 Question Score
                                                                 Assignment Score
                                                                 Publish Essay Scores
                                                                 Key
                                                                 Question Part Score
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