WeBWorK assignment number Exercises_8

This is an exercise assignment, treated differently from ordinary WeBWork assignments. The WeBWork due date is the same as the opening date, so that answers are available to students immediately. Students are to print the assignment and work the problems on paper. That work will be collected periodically and graded for effort. Exercises are worth 20 points (4% of the overall grade).

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1. **(1 pt) Library/maCalcDB/setSeries8Power/eva8_5a_2.pg**

Find all the values of x such that the given series would converge.

$$\sum_{n=1}^{\infty} \frac{(11x)^n}{n^{10}}$$

The series is convergent
from $x =$ ___, left end included (enter Y or N): ___
to $x =$ ___, right end included (enter Y or N): ___

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2. **(1 pt) Library/maCalcDB/setSeries8Power/eva8_5a_3.pg**

Find all the values of x such that the given series would converge.

$$\sum_{n=1}^{\infty} \frac{(x-8)^n}{8^n}$$

The series is convergent
from $x =$ ___, left end included (enter Y or N): ___
to $x =$ ___, right end included (enter Y or N): ___

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3. **(1 pt) Library/ma123DB/set12/s11_8_28.pg**

Match each of the power series with its interval of convergence.

___1. $\sum_{n=1}^{\infty} \frac{n!(11x-9)^n}{9^n}$
___2. $\sum_{n=1}^{\infty} \frac{(x-9)^n}{9^n}$
___3. $\sum_{n=1}^{\infty} \frac{(x-9)^n}{(n!)(9)^n}$
___4. $\sum_{n=1}^{\infty} \frac{(11x)^n}{n^9}$

A. $[\frac{-1}{11}, \frac{1}{11}]$
B. $(0, 18)$
C. $\{9/11\}$
D. $(-\infty, \infty)$

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4. **(1 pt) Library/ma123DB/set12/s11_8_7.pg**

Find all the values of x such that the given series would converge.

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

Answer: ________

Note: Give your answer in **interval notation**.

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5. **(1 pt) Library/Utah/Calculus_II/set9_Infinite_Series/set9_pr13.pg**

Suppose that $f(x)$ and $g(x)$ are given by the power series
$f(x) = 2 + 4x + 6x^2 + 3x^3 + \cdots$
and
$g(x) = 3 + 2x + 5x^2 + 3x^3 + \cdots$.

By multiplying power series, find the first few terms of the series for the product
$h(x) = f(x) \cdot g(x) = c_0 + c_1 x + c_2 x^2 + c_3 x^3 + \cdots$.

$c_0 =$ ________

$c_1 =$ ________

$c_2 =$ ________

$c_3 =$ ________

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6. **(1 pt) Library/Utah/Calculus_II/set9_Infinite_Series/set9_pr9.pg**

Find the sum of
$\sum_{n=1}^{\infty} n(n+1)x^n =$ ________________
for ___ $< x <$ ___.

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7. **(1 pt) Library/ma123DB/set12/s11_9_5.pg**

Suppose that

$$\frac{2}{(1-x^3)} = \sum_{n=0}^{\infty} c_n x^n$$

Find the following coefficients of the power series.
$c_0 =$ ________

$c_1 =$ ________

$c_2 =$ ________

$c_3 =$ ________

$c_4 =$ ________

Find the radius of convergence R of the power series.
$R =$ ________

8. **(1 pt) Library/ma123DB/set12/s11_9_6.pg**
The function $f(x) = \frac{3}{1+16x^2}$ is represented as a power series:

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

Find the first few coefficients in the power series.

$c_0 =$ ________

$c_1 =$ ________

$c_2 =$ ________

$c_3 =$ ________

$c_4 =$ ________

Find the radius of convergence R of the series.
$R =$ ________ .

9. **(1 pt) Library/maCalcDB/setSeries9Taylor/e8_7_10.pg**
Find $T_5(x)$, the Taylor polynomial of degree 5 of the function $f(x) = \cos(x)$ at $a = 0$.

$T_5(x) =$ ____________

Find all values of x for which this approximation is within 0.000848 of the right answer. Assume for simplicity that we limit ourselves to $|x| \le 1$.

$|x| \le$ ____________

10. **(1 pt) Library/ma123DB/set13/s11_10_10.pg**
The Taylor series for $f(x) = x^3$ at $a = 2$ is $\sum_{n=0}^{\infty} c_n (x-2)^n$.

Find the first few coefficients.
$c_0 =$ ________

$c_1 =$ ________

$c_2 =$ ________

$c_3 =$ ________

$c_4 =$ ________

11. **(1 pt) Library/ma123DB/set13/s11_10_12.pg**
The Taylor series of function $f(x) = \ln(x)$ at $a = 10$ is given by:

$$f(x) = \sum_{n=0}^{\infty} c_n (x-10)^n$$

Find the following coefficients:
$c_0 =$ ________

$c_1 =$ ________

$c_2 =$ ________

$c_3 =$ ________

$c_4 =$ ________

Determine the interval of convergence: ________

Note: Give your answer in **interval notation**