




Started on

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State

 **Finished**

Completed on

 **Thursday, 14 March 2024, 2:58 PM**


Time taken

 **5 days 7 hours**

Marks

 **41.00/41.00**

Grade

 **10.00 out of 10.00 (100%)**

Question 1

Complete

Mark 1.00 out of 1.00

Write the first four elements of the sequence.

$\sin(n\pi)$

Select one:

- ☒ A. 0, 0, 0, 0
- ☐ B. 0, 1, 0, -1
- ☐ C. 1, 0, -1, 0
- ☐ D. 1, 1, 1, 1

Question 2

Complete

Mark 1.00 out of 1.00

A recursion formula and the initial term(s) of a sequence are given. Write out the first five terms of the sequence.

$$a_1 = 1, a_{n+1} = \frac{a_n}{n+3}$$

Select one:

☒ A. $1, \frac{1}{4}, \frac{1}{20}, \frac{1}{120}, \frac{1}{840}$

☐ B. $1, \frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7}$

☐ C. $1, \frac{1}{4}, \frac{4}{5}, \frac{5}{6}, \frac{6}{7}$

☐ D. $1, \frac{1}{4}, 20, \frac{1}{120}, 840$

Question 3

Complete

Mark 1.00 out of 1.00

Find a formula for the n th term of the sequence.

$0, \frac{2}{3}, 0, \frac{2}{3}, 0$ (alternating 0's and $\frac{2}{3}$'s)

Select one:

☐ A. $a_n = \frac{1 + (-1)^{n+1}}{2 + (-1)^{n+1}}$

☒ B. $a_n = \frac{1 + (-1)^n}{2 + (-1)^n}$

☐ C. $a_n = \frac{1 - (-1)^n}{2 + (-1)^n}$

☐ D. $a_n = \frac{1 + (-1)^{n+1}}{2 - (-1)^{n+1}}$

Question 4

Complete

Mark 1.00 out of 1.00

Find the limit of the sequence if it converges; otherwise indicate divergence.

$$a_n = (-1)^n \left(1 - \frac{9}{n} \right)$$

Select one:

☐ A. 9

☐ B. 1

☐ C. 0

☒ D. Diverges

Question 5

Complete

Mark 1.00 out of 1.00

Find the limit of the sequence if it converges; otherwise indicate divergence.

$$a_n = \ln(7n - 7) - \ln(3n + 6)$$

Select one:

- ☐ A. $\ln 4$
- ☐ B. $\ln \frac{3}{7}$
- ☒ C. $\ln \frac{7}{3}$
- ☐ D. Diverges

Question 6

Complete

Mark 1.00 out of 1.00

Find the limit of the sequence if it converges; otherwise indicate divergence.

$$a_n = \left(1 + \frac{7}{n}\right)^n$$

Select one:

- ☐ A. 1
- ☐ B. e
- ☒ C. e^7
- ☐ D. Diverges

Question 7

Complete

Mark 1.00 out of 1.00

Find the limit of the sequence if it converges; otherwise indicate divergence.

$$a_n = \frac{\tan^{-1} n}{\sqrt[6]{n}}$$

Select one:

- ☐ A. 1
- ☐ B. $\frac{\pi}{2}$
- ☒ C. 0
- ☐ D. Diverges

Question 8

Complete

Mark 1.00 out of 1.00

Find the sum of the series.

$$\sum_{n=0}^{\infty} (-1)^n \frac{8}{9^n}$$

Select one:

- ☒ A. $\frac{36}{5}$
- ☐ B. 1
- ☐ C. 9
- ☐ D. $\frac{4}{5}$

Question 9

Complete

Mark 1.00 out of 1.00

Find the sum of the series.

$$\sum_{n=1}^{\infty} (-1)^{n-1} \frac{2}{7^n}$$

Select one:

☐ A. $\frac{7}{4}$

☐ B. $\frac{1}{3}$

☒ C. $\frac{1}{4}$

☐ D. $\frac{7}{3}$

Question 10

Complete

Mark 1.00 out of 1.00

Use the n th-Term Test for divergence to show that the series is divergent, or state that the test is inconclusive.

$$\sum_{n=1}^{\infty} \cos \frac{9}{n}$$

Select one:

☐ A. inconclusive

☐ B. converges, 9

☐ C. converges, 1

☒ D. diverges

Question 11

Complete

Mark 1.00 out of 1.00

Determine if the series converges or diverges. If the series converges, find its sum.

$$\sum_{n=1}^{\infty} \frac{2}{n(n+3)}$$

Select one:

- ☐ A. converges; $\frac{5}{3}$
- ☐ B. converges; $\frac{7}{9}$
- ☒ C. converges; $\frac{11}{9}$
- ☐ D. diverges

Question 12

Complete

Mark 1.00 out of 1.00

Determine if the series converges or diverges. If the series converges, find its sum.

$$\sum_{n=1}^{\infty} \left(\frac{1}{\ln(n+1)} - \frac{1}{\ln(n+2)} \right)$$

Select one:

- ☐ A. converges; $\frac{1}{\ln 1}$
- ☒ B. converges; $\frac{1}{\ln 2}$
- ☐ C. converges; $\ln 2$
- ☐ D. diverges

Question 13

Complete

Mark 1.00 out of 1.00

Determine if the series converges or diverges; if the series converges, find its sum.

$$\sum_{n=1}^{\infty} (-1)^{n-1} \frac{7}{9^n}$$

Select one:

- ☒ A. Converges; $\frac{7}{10}$
- ☐ B. Converges; $\frac{1}{8}$
- ☐ C. Converges; $\frac{7}{8}$
- ☐ D. Diverges

Question 14

Complete

Mark 1.00 out of 1.00

Determine if the series converges or diverges; if the series converges, find its sum.

$$\sum_{n=0}^{\infty} e^{-6n}$$

Select one:

- ☐ A. Converges; $\frac{1}{e^{-6} - 1}$
- ☐ B. Converges; $\frac{e^{-6}}{e^{-6} - 1}$
- ☒ C. Converges; $\frac{e^6}{e^6 - 1}$
- ☐ D. Diverges

Question 15

Complete

Mark 1.00 out of 1.00

Determine if the series converges or diverges; if the series converges, find its sum.

$$\sum_{n=0}^{\infty} \left(1 + \frac{5}{n}\right)^{3n}$$

Select one:

- ☐ A. Converges; $\frac{1}{|5| + 1}$
- ☐ B. Converges; $\frac{1}{|5| - 1}$
- ☐ C. Converges; e^{-15}
- ☒ D. Diverges

D. Diverges

Question 16

Complete

Mark 1.00 out of 1.00

Determine if the series converges or diverges; if the series converges, find its sum.

$$\sum_{n=0}^{\infty} \frac{n!}{500^n}$$

Select one:

- ☐ A. Converges; 1
- ☐ B. converges; $\frac{1}{e}$
- ☐ C. Converges; e
- ☒ D. Diverges

Question 17

Complete

Mark 1.00 out of 1.00

Determine if the series converges or diverges; if the series converges, find its sum.

$$\sum_{n=1}^{\infty} \frac{2^{n+1}}{6^{n-1}}$$

Select one:

- ☐ A. Converges; 18
- ☐ B. Converges; 3
- ☒ C. Converges; 6
- ☐ D. Diverges

Question 18

Complete

Mark 1.00 out of 1.00

Determine if the series converges or diverges; if the series converges, find its sum.

$$\sum_{n=0}^{\infty} \frac{\cos n\pi}{7^n}$$

Select one:

- ☐ A. Converges; $\frac{1}{6}$
- ☒ B. Converges; $\frac{7}{8}$
- ☐ C. Converges; $\frac{7}{6}$
- ☐ D. Diverges

Question 19

Complete

Mark 1.00 out of 1.00

Use the integral test to determine whether the series converges.

$$\sum_{n=1}^{\infty} \frac{6n}{n^2 + 5}$$

Select one:

- ☐ A. converges
- ☒ B. diverges

Question 20

Complete

Mark 1.00 out of 1.00

Use the integral test to determine whether the series converges.

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

Select one:

- ☐ A. diverges
- ☒ B. converges

Question 21

Complete

Mark 1.00 out of 1.00

Use the Comparison Test to determine if the series converges or diverges.

$$\sum_{n=1}^{\infty} \frac{\sin n \cos n}{6^n}$$

Select one:

- ☒ A. converges
- ☐ B. diverges

Question 22

Complete

Mark 1.00 out of 1.00

Use the Comparison Test to determine if the series converges or diverges.

$$\sum_{n=1}^{\infty} \frac{1}{n^2 \ln n - 3}$$

Select one:

- ☒ A. converges
- ☐ B. diverges

Question 23

Complete

Mark 1.00 out of 1.00

Use the Comparison Test to determine if the series converges or diverges.

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

Select one:

- ☐ A. diverges
- ☒ B. converges

Question 24

Complete

Mark 1.00 out of 1.00

Determine if the series converges or diverges.

$$\sum_{n=1}^{\infty} \frac{8\sqrt{n}}{6n^{3/2} - 1n + 3}$$

Select one:

- ☐ A. Converges
- ☒ B. Diverges

Question 25

Complete

Mark 1.00 out of 1.00

Determine if the series converges or diverges.

$$\sum_{n=2}^{\infty} \frac{1}{7 + 9n \ln(\ln n)}$$

Select one:

- ☒ A. Diverges
- ☐ B. Converges

Question 26

Complete

Mark 1.00 out of 1.00

Use the Ratio Test to determine if the series converges or diverges.

$$\sum_{n=1}^{\infty} n! e^{-4n}$$

Select one:

- ☒ A. Diverges
- ☐ B. Converges

Question 27

Complete

Mark 1.00 out of 1.00

Use the Ratio Test to determine if the series converges or diverges.

$$\sum_{n=1}^{\infty} \frac{(2n)!}{3^n n!}$$

Select one:

- ☐ A. Converges
- ☒ B. Diverges

Question 28

Complete

Mark 1.00 out of 1.00

Use the Root Test to determine if the series converges or diverges.

$$\sum_{n=1}^{\infty} \left(\frac{\ln n}{3n+1} \right)^n$$

Select one:

- ☐ A. Diverges
- ☒ B. Converges

Question 29

Complete

Mark 1.00 out of 1.00

Determine convergence or divergence of the series.

$$\sum_{n=1}^{\infty} \frac{5n+6}{\sqrt{2n^4+5n+7}}$$

Select one:

- ☒ A. Diverges
- ☐ B. Converges

Question 30

Complete

Mark 1.00 out of 1.00

Determine convergence or divergence of the series.

$$\sum_{n=1}^{\infty} \sin\left(\frac{4n^2 + 2}{n^4 + 4}\right)$$

Select one:

- ☐ A. Diverges
- ☒ B. Converges

Question 31

Complete

Mark 1.00 out of 1.00

Determine convergence or divergence of the alternating series.

$$\sum_{n=1}^{\infty} \frac{(-1)^n}{6n^4 + 7}$$

Select one:

- ☒ A. Converges
- ☐ B. Diverges

Question 32

Complete

Mark 1.00 out of 1.00

Determine convergence or divergence of the alternating series.

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

Select one:

- ☐ A. Diverges
- ☒ B. Converges

Question 33

Complete

Mark 1.00 out of 1.00

Determine if the series converges absolutely, converges, or diverges.

$$\sum_{n=1}^{\infty} \frac{(-1)^n}{6n^{1/3} + 1}$$

Select one:

- ☒ A. Converges conditionally
- ☐ B. diverges
- ☐ C. Converges absolutely

Question 34

Complete

Mark 1.00 out of 1.00

Determine if the series converges absolutely, converges, or diverges.

$$\sum_{n=1}^{\infty} (-4)^{-n}$$

Select one:

- ☐ A. diverges
- ☒ B. converges absolutely
- ☐ C. converges conditionally

Question 35

Complete

Mark 1.00 out of 1.00

Estimate the magnitude of the error involved in using the sum of the first four terms to approximate the sum of the entire series.

$$\sum_{n=1}^{\infty} (-1)^{n+1} \frac{1}{3^n}$$

Select one:

- ☐ A. $|\text{Error}| < 1.37 \times 10^{-3}$
- ☒ B. $|\text{Error}| < 4.12 \times 10^{-3}$
- ☐ C. $|\text{Error}| < 1.23 \times 10^{-2}$
- ☐ D. $|\text{Error}| < \frac{1}{n}$

Question 36

Complete

Mark 1.00 out of 1.00

Find the series' radius of convergence.

$$\sum_{n=1}^{\infty} \frac{(x-1)^n}{\ln(n+5)}$$

Select one:

- ☐ A. 0
- ☒ B. 1
- ☐ C. 2
- ☐ D. ∞ for all x

Question 37

Complete

Mark 1.00 out of 1.00

Find the series' radius of convergence.

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

Select one:

- ☐ A. 2
- ☐ B. 1
- ☐ C. 0
- ☒ D. ∞ , for all x

Question 38

Complete

Mark 1.00 out of 1.00

Find the interval of convergence of the series.

$$\sum_{n=0}^{\infty} \frac{(x-6)^n}{n^5 3^n}$$

Select one:

- ☒ A. $3 \leq x \leq 9$
- ☐ B. $x < 9$
- ☐ C. $5 \leq x \leq 7$
- ☐ D. $-9 < x < 9$

Question 39

Complete

Mark 1.00 out of 1.00

Find the Maclaurin series for the given function.

$$e^{4x}$$

Select one:

- ☒ A. $\sum_{n=0}^{\infty} \frac{4^n x^n}{n!}$
- ☐ B. $\sum_{n=0}^{\infty} \frac{(-1)^n 4^n x^n}{n!}$
- ☐ C. $\sum_{n=1}^{\infty} \frac{(-1)^n 4^n x^n}{n!}$
- ☐ D. $\sum_{n=1}^{\infty} \frac{4^n x^n}{n!}$

Question 40

Complete

Mark 1.00 out of 1.00

Find the Maclaurin series for the given function.

$\sin 4x$

Select one:

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

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

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

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

Question 41

Complete

Mark 1.00 out of 1.00

Determine how many terms should be used to estimate the sum of the entire series with an error of less than 0.001.

$$\sum_{n=1}^{\infty} (-1)^n \frac{1}{5n^2 + 1}$$

Select one:

☐ A. $n \geq 31$

☒ B. $n \geq 14$

☐ C. $n \geq 15$

☐ D. $n \geq 13$

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