MIDTERM

MATH1321 (CALCULAS2)

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Question **1**

Correct

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The series $\sum_{n=1}^{\infty} (-1)^{n-1} \frac{1.3.5...(2n-1)}{(2n-1)!}$,

Select one:

- ⦿ a. converges absolutely ✔
- ○ b. diverges
- ○ c. converges conditionally

The correct answer is: converges absolutely

Question **2**

Correct

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The sum of the series $\sum_{n=1}^{\infty} \frac{1}{n(n+2)}$ is

Select one:

- ○ a. $\frac{1}{2}$
- ○ b. The series diverges
- ⦿ c. $\frac{3}{4}$ ✔
- ○ d. 1

The correct answer is: $\frac{3}{4}$

The integral $\int\limits_{1}^{\infty} \dfrac{dx}{\sqrt{x^2+3}}$

Select one:

- a. diverges by limit comparison test with $\int\limits_{1}^{\infty} \dfrac{dx}{x}$

- b. converges by limit comparison test with $\int\limits_{1}^{\infty} \dfrac{dx}{x}$

- c. converges by direct comparison test with $\int\limits_{1}^{\infty} \dfrac{dx}{x}$

- ⦿ d. diverges by direct comparison test with $\int\limits_{1}^{\infty} \dfrac{dx}{x}$ ✖

The correct answer is: diverges by limit comparison test with $\int\limits_{1}^{\infty} \dfrac{dx}{x}$

The sum of the series $\sum\limits_{n=1}^{\infty} \dfrac{1}{n(n+1)}$ is

Select one:

- a. $\dfrac{1}{2}$

- ⦿ b. 1 ✔

- c. The series diverges

- d. 2

The correct answer is: 1

The series $\sum\limits_{n=1}^{\infty} n \tan^{-1}\left(\frac{2}{n}\right)$,

Select one:

○ a. converges

◉ b. diverges ✓

The correct answer is: diverges

The sequence $\left\{a_n = \left(\frac{n-4}{n}\right)^n\right\}$

Select one:

○ a. converges to e^4

○ b. diverges

◉ c. converges to e^{-4} ✓

○ d. converges to $-\ln 4$

The correct answer is: converges to e^{-4}

The series $\sum_{n=1}^{\infty} \frac{1}{n3^n}$

Select one:

a. converges by direct comparison test with $\sum_{n=1}^{\infty} \frac{1}{3^n}$ ✔

b. diverges by direct comparison test with $\sum_{n=1}^{\infty} \frac{1}{n}$

c. converges by direct comparison test with $\sum_{n=1}^{\infty} \frac{1}{n}$

d. diverges by direct comparison test with $\sum_{n=1}^{\infty} \frac{1}{n}$

The correct answer is: converges by direct comparison test with $\sum_{n=1}^{\infty} \frac{1}{3^n}$

The sequence $\{a_n = \frac{8+(-1)^n}{n}\}$

Select one:

a. converges to $\frac{9}{8}$

b. converges to 0 ✔

c. converges to $\frac{7}{8}$

d. diverges

The correct answer is: converges to 0

The sum of the series $\sum_{n=1}^{\infty}(-1)^{n+1}\frac{3}{2^n}$ is

Select one:

- a. -3
- b. **1** ✔
- c. The series diverges
- d. -2

The correct answer is: **1**

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

Select one:

- a. converges absolutely
- b. converges conditionally ✔
- c. diverges

The correct answer is: converges conditionally

Correct

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🏳 Flag question

The series $\sum_{n=1}^{\infty} a_n$, where $a_1 = 4, a_{n+1} = \sqrt[n]{n}\, a_n$

Select one:

○ a.   converges

◉ b.   diverges   ✔

The correct answer is: diverges

Correct

Mark 1 out of 1

🏳 Flag question

The interval of convergence I of the series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}(x-2)^{n+1}}{n4^n}$

is

Select one:

◉ a. $I = (-2, -6]$ ✔

○ b. $I = [-2, 6)$

○ c. $I = (-2, 6)$

○ d. $I = [-2, 6]$

The correct answers are: $I = (-2, -6]$
, $I = [-2, 6)$
, $I = [-2, 6]$
, $I = (-2, 6)$

The sequence $\{a_n = \frac{2n+1}{6n+1}\}$ is

Select one:

- a. nondecreasing and not bounded
- b. nondecreasing and bounded
- ● c. nonincreasing and not bounded ✖
- d. nonincreasing and bounded

The correct answer is: nonincreasing and bounded

The series $\sum\limits_{n=1}^{\infty} e^{-n}$

Select one:

- ● a. converges and sum= $\frac{1}{e-1}$ ✔
- b. diverges
- c. converges and sum= $\frac{e}{e-1}$
- d. converges and sum= $\frac{1}{1-e}$

The correct answer is: converges and sum= $\frac{1}{e-1}$

The integral $\int\limits_{-2}^{1} \frac{dx}{x^2}$

Select one:

a. converges to $\frac{-2}{3}$

b. converges to $\frac{-3}{2}$

c. converges to 0.

◉ d. diverges ✔

The correct answer is: diverges

$\lim\limits_{n \to \infty} \frac{n}{2^n} =$

Select one:

◉ a. 0 ✔

b. $\frac{1}{2}$

c. 1

d. ∞

The correct answer is: 0

The series $\sum\limits_{n=1}^{\infty} \frac{\tan^{-1} n}{1+n^2}$,

Select one:

○ a. diverges

◉ b. converges ✔

The correct answer is: converges

The integral $\int\limits_{1}^{\infty} \frac{dx}{\sqrt{e^x}}$

Select one:

◉ a. converges to $\frac{2}{\sqrt{e}}$ ✔

○ b. converges to 0

○ c. converges to e

○ d. diverges

The correct answer is: converges to $\frac{2}{\sqrt{e}}$

If the first 3 terms of the series $\sum_{n=1}^{\infty} \frac{(-1)^n}{2^{n+1}}$ are used to estimate its sum, then the error E satisfies

Select one:

    ◉ a. $0 \leq E \leq \frac{1}{32}$ ✔

    ○ b. $\frac{-1}{32} \leq E \leq 0$

    ○ c. $\frac{-1}{16} \leq E \leq 0$

    ○ d. $0 \leq E \leq \frac{1}{16}$

The correct answer is: $0 \leq E \leq \frac{1}{32}$

If $a_n > 0, b_n > 0$, for all $n \geq 1$ and $\lim_{n \to \infty} \frac{b_n}{a_n} = 0$. One of the following statements is true

Select one:

    ◉ a. If $\sum b_n$ diverges, then $\sum a_n$ diverges   ✔

    ○ b. The series $\sum a_n$ and $\sum b_n$ both converges of both diverges

    ○ c. If $\sum b_n$ converges, then $\sum a_n$ converges

    ○ d. If $\sum a_n$ diverges, then $\sum b_n$ diverges

The correct answer is: If $\sum b_n$ diverges, then $\sum a_n$ diverges

The radius of convergence R of the series $\sum\limits_{n=1}^{\infty} \frac{(3x+1)^{n+1}}{2n+2}$ is

Select one:

- a. 3
- b. $R = 0$
- ⦿ c. $R = \frac{1}{3}$ ✔
- d. $R = \infty$

The correct answer is: $R = \frac{1}{3}$

True or false: The integral $\int\limits_{1}^{\infty} \frac{\sqrt{x+1}\, dx}{x^2}$ converges by direct comparison test with $\int\limits_{1}^{\infty} \frac{dx}{x^{\frac{3}{2}}}$

Select one:

- a. False
- ⦿ b. True ✘

The correct answer is: False