Started on	Friday, 20 October 2023, 8:55 AM
State	Finished
Completed on	Friday, 20 October 2023, 9:25 AM
Time taken	29 mins 59 secs
Grade	**5.00** out of 10.00 (**50**%)

Question 1

Incorrect

Mark 0.00 out of 1.00

Cardinality of power set of natural numbers is

- ☐ Uncountable
- ☑ Countable ❌
- ☐ Can't determine

The correct answer is:
Uncountable

Which of the following statements is correct?

○ $\sum_{n=1}^{\infty} \cos n$ is divergent and the series $\sum_{n=1}^{\infty} (\cos n)/n^2$ is divergent.

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The correct answer is:

$\sum_{n=1}^{\infty} \cos n$ is divergent and the series $\sum_{n=1}^{\infty} (\cos n)/n^2$ is convergent.

Let f : [a, b] → R be continuous on [a, b]. Choose the false statement.

☐ If a < 0 < b then there exists c ∈ (a, b) such that f(c) = 0.

☐ If f(a) < 0 < f(b) then there exists c ∈ (a, b) such that f(c) = 0.

☐ If f(a) > 0 > f(b) then there exists c ∈ (a, b) such that f(c) = 0.

☐ If f(a) < 0 < f(b) then there exists c ∈ (a, b) such that f(c) ≠ 0.

The correct answer is:

If a < 0 < b then there exists c ∈ (a, b) such that f(c) = 0.

Which one of the following function is continuous at $x = 3$?

☐

$$f(x) = \begin{cases} x+3 & x \le 3 \\ x-4 & x > 3 \end{cases}$$

☐

$$f(x) = \begin{cases} 4 & x = 3 \\ 8-x & x \ne 3 \end{cases}$$

☐

$$f(x) = \frac{1}{x^3 - 27} \quad x \ne 3$$

☑

$$f(x) = \begin{cases} 2 & x = 3 \\ x-1 & x > 3 \\ \frac{x+3}{3} & x < 3 \end{cases}$$

✔

The correct answer is:

$$f(x) = \begin{cases} 2 & x = 3 \\ x-1 & x > 3 \\ \frac{x+3}{3} & x < 3 \end{cases}$$

If $f'(x) = \frac{1}{2-x^2}$, then what would be sum of lower and upper bound of $f(1)$, if $f(0) = 1$ and $f(x)$ be defined for $[0, 1]$

Answer: ✗

The correct answer is: 3.5

Find $\lim (x^2 e^{-nx})$ for $x \in \mathbb{R}, x \geq 0$.

Answer: 0 ✔

The correct answer is: 0

Let A and B be bounded non-empty sets such that $\inf(A) \leq \sup(B)$. Which of the following statements must be true?

☐ For every $a \in A$ there exists a $b \in B$ such that $a \leq b$

☑ There exists $b \in B$ such that $a \leq b$ for all $a \in A$. ✗

☐ For every $\epsilon > 0$ there exists $a \in A$ and $b \in B$ such that $a < b + \epsilon$.

☑ There exists $a \in A$ such that $a \leq b$ for all $b \in B$. ✗

The correct answer is:
For every $\epsilon > 0$ there exists $a \in A$ and $b \in B$ such that $a < b + \epsilon$.

Find $\displaystyle\sum_{n=0}^{\infty} \frac{1}{(n+1)(n+2)}$,

Answer: 1 ✔

The correct answer is: 1

The value of $\lim\limits_{x \to \infty} \frac{x \ln x}{1+x^2}$ is

Answer: 0 ✔

The correct answer is: 0

Choose a function that is continuous at 0.

☑ \(✔

$$f(x) = \sin x$$

\)

☑ \(✔

$$f(x) = 10x$$

\)

☑ \(✔

$$f(x) = |x|$$

\)

☐ \(

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

\)

The correct answers are:
\(

$$f(x) = \sin x$$

\)

,

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$$f(x) = |x|$$
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,
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$$f(x) = 10x$$
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