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Time taken	30 mins 1 sec
Grade	**6.50** out of 10.00 (**65**%)

Question 1

Correct

Mark 1.00 out of 1.00

Which of the following statements is correct?

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

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

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

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

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.

Question 2

Correct

Mark 1.00 out of 1.00

. Evaluate $\lim_{x \to 0} \frac{\log x}{\cot x}$

Answer: 0 ✔

The correct answer is: 0

Question 3

Correct

Mark 1.00 out of 1.00

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

Answer: 0

The correct answer is: 0

Question 4

Correct

Mark 1.00 out of 1.00

Find $\lim (nx/(1+n^2x^2))$ for all $x \in \mathbb{R}$.

Answer: 0

The correct answer is: 0

Question 5

Partially correct

Mark 0.50 out of 1.00

Let s_n be a sequence of real numbers on a bounded set S, where $\liminf s_n \neq \limsup s_n$. Which of the following is [illegible] true?

- [ ] $\lim s_n$ does not exist.
- [ ] s_n has an infinite number of dominant terms.
- [x] $\liminf s_n < \limsup s_n$ ✔
- [ ] s_n is not Cauchy.
- [x] There exists a convergent subsequence. ✔

The correct answers are:

$\lim s_n$ does not exist. ,

s_n is not Cauchy. ,

$\liminf s_n < \limsup s_n$,

There exists a convergent subsequence.

Question 6

Not answered

Marked out of 1.00

Let a, b ∈ R and a < b. Which of the following statement(s) is/are true?

- [ ] There exists a continuous function f:(a,b)→[a,b] such that f is onto.
- [ ] There exists a continuous function f:[a,b]→(a,b) such that f is onto.
- [ ] There exists a continuous function f:(a,b)→[a,b] such that f is one-one.
- [ ] There exists a continuous function f:[a,b]→(a,b) such that f is one-one.

The correct answers are:

There exists a continuous function f:[a,b]→(a,b) such that f is one-one.,

There exists a continuous function f:(a,b)→[a,b] such that f is one-one.,

There exists a continuous function f:(a,b)→[a,b] such that f is onto.

Question 7

Incorrect

Mark 0.00 out of 1.00

Let A and B be bounded non-empty sets. Which of the following statements would be equivalent to saying that $\sup(A) = \inf(B)$

- a. There exists $a \in A$ and $b \in B$ such that $a \leq b$. However, for any $\epsilon > 0$, there does not exist $a \in A$ and $b \in B$ for which $a + \epsilon \leq b$.
- b. For every $a \in A$ and every $b \in B$, we have $a \leq b$. Also, for every $\epsilon > 0$, there exists $a \in A$ and $b \in B$ such that $b - a < \epsilon$.
- c. For every $a \in A$ there exists a $b \in B$ such that $a + \epsilon < b$. Also, for every $b \in B$ there exists an $a \in A$ such that $b + \epsilon < a$.
- d. For every $a \in A$ there exists a $b \in B$ such that $a + \epsilon < b$. ✗

The correct answer is:
For every $a \in A$ and every $b \in B$, we have $a \leq b$. Also, for every $\epsilon > 0$, there exists $a \in A$ and $b \in B$ such that $b - a < \epsilon$.

Question 8

Correct

Mark 1.00 out of 1.00

What is the cardinality of the set of real numbers in the closed interval [0, 1]?

- Countable
- Finite
- Uncountable ✓
- Countably infinite

The correct answer is:
Uncountable

Question 9

Correct

Mark 1.00 out of 1.00

The value of $\lim_{x \to \infty} \left(1 + \frac{1}{x}\right)^x$

Answer: 2.71 ✓

The correct answer is: 2.72

Question 10

Incorrect

Mark 0.00 out of 1.00

Let A and B be bounded non-empty sets. Which of the following statements would be equivalent to saying that $\inf(A) \leq \inf(B)$?

a. For every $a \in A$ and every $b \in B$, we have $a \leq b$.

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

c. There exists $a \in A$ and $b \in B$ such that $a < b$

d. For every $a \in A$ there exists a $b \in B$ such that $a \leq b$ ✖

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