Started on	Tuesday, 2 February 2021, 4:45 PM
State	Finished
Completed on	Tuesday, 2 February 2021, 4:51 PM
Time taken	6 mins 3 secs

Question **1**

Complete

Marked out of 2.00

Pick the correct statements:

(a) Countable intersection of measurable sets is measurable

(b) If $m^*(E)$ is finite for a set E in **R**, then E is measurable

(c) There exists a non-measurable set in [5, 7]

(d) Suppose $A \subset E \subset B \subseteq$ **R,** where A, B are measurable subsets of finite measure. If m(A)=m(B), then E is measurable

- 1. all (a), (b), (c), (d) are true
- 2. only (a), (c), (d) are true and (b) is false
- 3. only (a), (d) are true and (b), (c) are false
- 4. only (a), (c) are true and (b), (d) are false

Question **2**

Complete

Marked out of 2.00

Pick the correct statements from the below statements:

(a) there exists an uncountable measurable set whose measure is zero

(b) $A \subset$ **R** is measurable if and only if for $\epsilon \geq 0$, there exists a closed set $F \subseteq A$ such that $m^*(A \backslash F) \leq \epsilon$

(c) Every differentiable function defined on a measurable set is measurable

(d) Let E be a measurable set in **R**. If $f : E \to$ **R** be a function such that $|f|$ is measurable, then f is measurable

- 1. only (a), (b), (c) are true and (d) is false
- 2. only (b), (c) are true and (a), (d) are false
- 3. only (a), (b) are true and (c), (d) are false
- 4. all (a), (b), (c), (d) are true

Question **3**

Complete

Marked out of 1.00

Let A be the subset of [0, 1] consists of all numbers which do not have the digit 4 appearing in their decimal expansion. Then $m^*(A)=$

Answer: 0

Question **4**

Complete

Marked out of 1.00

Let f:[0,1] → **R**, be a function defined as f(x)=sin x, if $x \in (0, 1]$ and f(0) =1. Then $m^*(\{ x \in [0, 1] : f(x) \geq 0 \}) =$

Answer: 1

Question **5**

Complete

Marked out of 2.00

Let F be a measurable set in **R**. Then there exists a non-measurable set G in **R** such that $m^*(F \Delta G) = 0$

Select one:

- True
- False

Question **6**

Complete

Marked out of 1.00

Every measurable set is a Borel set in **R**

Select one:

- True
- False

Question **7**

Complete

Marked out of 1.00

Let V $\subset$ [0, 1] be the non-measurable set as we discussed in the class. Suppose A $\subset$ V is a measurable set. Then $m^*(A)$ =

Answer: 0

Question **8**

Complete

Marked out of 1.00

Let A be a non-empty open set in **R**. Then there exists disjoint open intervals $\{ I_n \}$ such that $A= U_{n\geq 1} I_n$

Select one:

- True
- False

Question **9**

Complete

Marked out of 1.00

Suppose A, B are measurable sets in **R**. Then the set A+B = {a+b : a $\in$ A and b $\in$ B} is measurable

Select one:

- True
- False

Question **10**

Complete

Marked out of 2.00

Let f : **R** $\rightarrow$ **R**, be any function. Then { A $\subseteq$ **R :** $f^{-1}(A)$ is a measurable set } is a σ-algebra

Select one:

- True
- False

Question **11**

Complete

Marked out of 1.00

Let P be the Cantor set. Then m(P U [3,5]) =

Answer: 2

Question **12**

Complete

Marked out of 1.00

Let A, B be two disjoint subsets of **R**. Then $m^*(A \cup B) = m^*(A)+m^*(B)$.

Select one:

- True
- False

Question **13**

Complete

Marked out of 1.00

There exists a set of measure zero but not a Borel set

Select one:

- True
- False

Question **14**

Complete

Marked out of 1.00

Let $f_n : E \to \mathbf{R}$ be a sequence of measurable functions defined on a measurable set E. Then $\sup f_n$ is measurable

Select one:

- True
- False

Question **15**

Complete

Marked out of 1.00

Let E be a measurable set and f : E $\rightarrow$ **R** be a function. Then f is measurable if and only if f^{-1} (U) is measurable for any open set U in **R**

Select one:

- True
- False

Question **16**

Complete

Marked out of 2.00

Let f : [0,1] $\rightarrow$ [0,1] be a measurable function. Let g : [0, 1] $\rightarrow$ **R** be a function defined as g(x) = f(x) if x is an irrational number in [0, 1] and g(x)=-1 if x is a rational number in [0, 1]. Then g is measurable

Select one:

- True
- False

Question **17**

Complete

Marked out of 1.00

Every subset of a measurable set is measurable

Select one:

- True
- False

Question **18**

Complete

Marked out of 2.00

Let A $\subseteq$ **R** any set. Then there exists a measurable set E in **R** such that $m^*(A) = m(E)$

Select one:

- True
- False

Question **19**

Complete

Marked out of 1.00

The set $\{x \in [0, 1] : e^x \geq 1/2\}$ is measurable

Select one:

- True
- False

◄ Announcements (hidden)

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