Dashboard / My courses / Measure Theory & Integration (MA51002) - Spring 2021 / Topic 1 / Quiz-2 / Preview

Started on	Monday, 1 March 2021, 11:55 AM
State	Finished
Completed on	Monday, 1 March 2021, 11:58 AM
Time taken	3 mins 30 secs

Question **1**
Complete
Marked out of 1.00

If φ is a simple function, then $|\varphi|$ is also a simple function

Select one:
- (selected) True
- False

Question **2**
Complete
Marked out of 1.00

Let A = [0, 1] U [2, 3]. Then $\int_A \chi_{[1, 2]}$ =
(write the numeric value)

Answer: 0

Question **3**
Complete
Marked out of 1.00

Let A, B $\subseteq$ **R** be subsets. Then $\chi_{A\cap(\mathbf{R}\setminus B)}$ =

- a. $\chi_{(\mathbf{R}\setminus A)\cap B}$
- b. $\chi_B - \chi_{A\cap B}$
- c. $\chi_A \chi_B$
- d. (selected) $\chi_A - \chi_{A\cap B}$

Question **4**

Complete

Marked out of 1.00

Let $E \subseteq \mathbf{R}$ be a measurable and dense subset. Then $m(E^c) = 0$

Select one:

- ○ True
- ◉ False

Question **5**

Complete

Marked out of 1.00

Let $f_n : E \to \mathbf{R}$ be measurable functions, for all $n \geq 1$, where E is a measurable set in $\mathbf{R}$. Suppose $\{ f_n \}$ converges pointwise to a function f on E. Then f is measurable.

Select one:

- ◉ True
- ○ False

Question **6**

Complete

Marked out of 1.00

Let $E \subseteq \mathbf{R}$ be a measurable set and $m(E) > 0$. Then for any $\alpha \in (0, 1)$, there exists a finite open interval $I \subseteq \mathbf{R}$ such that

$\alpha\, m(I) \leq m(E \cap I)$.

Select one:

- ◉ True
- ○ False

Question **7**

Complete

Marked out of 1.00

Let $g = \chi_{[0, 1]} + 3\, \chi_{[1, 4]} - 2\, \chi_{[2, 3]}$. Then $\int_{\mathbf{R}} |g| =$

(write the numeric value)

Answer: 8

Question **8**

Complete

Marked out of 1.00

Let $f_n = \chi_{[n, n+1]}$, for all $n \geq 1$. Then $\{ f_n \}$ converges pointwise.

Select one:

- [x] True
- [ ] False

Question **9**

Complete

Marked out of 1.00

Let $\{ f_n \}$ be a sequence of measurable functions defined on a measurable set $E \subseteq \mathbf{R}$. Then $\{ x \in E : \lim f_n(x)$ exists as $n \to \infty \}$ is a measurable set.

Select one:

- [x] True
- [ ] False

Question **10**

Complete

Marked out of 1.00

Let $E \subseteq \mathbf{R}$ be a measurable set and $f: E \to \mathbf{R}$ be a function. If f is not measurable, then there exists a rational number r such that

$\{ x \in E : f(x) < r\}$ is not measurable.

Select one:

- [x] True
- [ ] False

Question **11**

Complete

Marked out of 1.00

Let $f: \mathbf{R} \to \mathbf{R}$ be a non-negative measurable function. Then there exists an increasing sequence of non-negative simple functions that converges pointwise to f.

Select one:

- [x] True
- [ ] False

Question **12**

Complete

Marked out of 1.00

Every simple function is measurable.

Select one:

- (selected) True
- False

Question **13**

Complete

Marked out of 1.00

Let f= $\chi_{[-1,\,1]}-2\chi_{[0,\,2]}+5\chi_{[1,\,2]}$. Then $\int_{\mathbf{R}} f$ =

(write the numeric value)

Answer: 3

Question **14**

Complete

Marked out of 1.00

Let f: **R** $\rightarrow$ **R** be a function defined as f(x)= sin x, if x is rational and f(x)= cos x, if x is irrational. Then f is Lebesgue measurable but not Borel measurable.

Select one:

- True
- (selected) False

Question **15**

Complete

Marked out of 1.00

Let E $\subseteq$ **R** be a measurable set. Let f : E $\rightarrow$ **R,** be continuous almost everywhere (a.e) on E. Then f is a measurable function.

Select one:

- (selected) True
- False

◄ Quiz 1 (hidden)

Jump to...