Page: Date:

May 2018

1- A measurable space (X, A) is a set X and a σ-algebra A on X. True Defination

2- if f is bounded on $[a,b]$ & if the points of discontinuity of f on $[a,b]$ form a null set then $f \in L'[a,b]$ Def

True Theorem

3- A series of real numbers is absolutely convergent if and only if it can be expressed as the difference of two convergent series of positive real numbers. True Theorem Propsition

$|a_n| = a_n^+ + a_n^-$ $\sum a_n^+ - \sum a_n^-$ are convergent

4- Any countable set on the real line is null and so the rational numbers form a null set True Theorem

5- Any step function may be expressed as a finite linear combination of characterstic function of disjoint intervals

True Theorem

6- if S is a null set on R then there is an increasing squence $\{\varphi_n\}$ of step function for which the sequence $\{\varphi_n\}$ converges and such that $\{\varphi(x)\}$ diverges for every x in S. false

Almost every where $\sum \{\varphi_n\}$ converge and the point fail to converge $\{\varphi_n\}$ in $X \in S$

7- Any increasing sequence $\{S_n\}$ of real numbers is convergent if and only if, it is bounded above. True

Axiom of Completness theorem

8- A compact subset of R^k has finite measure True (Propsition Theorem)

9- Any countable set on the real line is null True Propsition Theorem

10- A ring is closed under taking the set operations $\cup . \cap . \setminus$.

True Defintion R let S, T be measurable sets, then so one $S \cup T$ $\cap$ $\setminus$ Δ

Mostafa Abdelkarem

2022

Page: Date:

May 2017

1- The lebesgue integral is a linear, Positive absolute operator on the linear space L'. True Definition

2- if f is Monotone an $[a,b]$ then f is integrable an $[a,b]$
True Theorem Corollary

3- All Continuous & all integrable functions are measurable
True Theorem

4- مكرر

5- If S is a measurable set and $M(S)=0$ if and only if S' is null false $M(S)=0$ iff S is a null set

6- fatou's Lemma states that let f_n be a sequence of +ve measurable functions an E. if $f_n \to f$ in measure on E, then $\int_E f \leq \lim_{n\to\infty} \inf \int_E f_n$ True Theorem

7- مكرر

8- مكرر

9. By means of the monotone Convergence theorem we can evaluate the integrals such as $\int_{-\infty}^{\infty} e^{-|x|} dx = \lim \int f_n = 2 = \int_0^1 x^{-1/2} dx$
True 2 Example in book Page 99 ياللي تيجي بروقي

10- Assume A is a lebesgue measurable subset of R of finite measure and $\varphi(x) = |A \cap (-\infty, x]|$. Then φ is Continuous at each $x \in R$ True بركة يا جامع اللي جت متجمعتش

Mostafa Abdelkarem
Desha 2022

Page: Date:

May 2019

1- A set function is a function whose ~~range~~ is a class of set

Domain false

2- Extended Real valued set function is a set function of range of ~~Complex~~ numbers and also could be $\pm\infty$

false Real

3- if μ is a measure on a ring R a set E in R is said to have finite measure if $\mu(E) \leq \infty$

false $\mu(E) < \infty$

4- The measure of E is σ-finite if there exists a sequence $\{E_n\}$ of sets in R such that $E \subset \bigcup_{n=1}^{\infty} E_n$ & $\mu[E_n] < \infty$, $n = 1, 2, \ldots$ True Definition

5- An extended real valued set function μ on a class G is not continuous from below at a set E (in G) if for every increasing sequence $\{E_n\}$ of sets in G for which $\lim_n E_n = E$, we have $\lim \mu_n (E_n) = \mu(E)$ false Continuous

6- A hereditary class is σ-ring iff it's not closed under the formation of countable unions false Closed

7- An outer measure μ^* is a set function from a hereditary σ-ring H to the positive extended real values such that (negative) (Monotonic) and (Countable subadditive) false non-negative

8- let Σ be a σ-algebra over a set X and μ be a measure on Σ Then The inner measure μ induced by μ is defined by $\mu(T) = \inf \{\mu(S) : S \in \Sigma \text{ and } S \subseteq T\}$ sup false

9- if μ is σ-finite measure on a ring R, then there is a unique measure $\bar{\mu}$ on the σ-ring $S(R)$, such that for E in R, $\bar{\mu}(E) \neq \mu(E)$; the measure $\bar{\mu}$ is σ-finite $\bar{\mu}(E) = \mu(E)$ false

10- A set X is non-measurable set iff $\mu^*(X) > \mu_*(X)$; which means inner and outer measure of X are equal false

$\mu^*(X) > \mu_*(X)$ or $\mu^*(X) = \mu_*(X) = \infty$

Mostafa Abdelkarem Desha 2022

Page: Date: Statistics

May 2019

11- A Measurable function is a function between two ~~un~~Measurable spaces such that the preimage of any Measurable set is measurable false measurable

12- A sequence $\{f_n\}$ of a finite valued Measurable functions Converges in measure to the Measurable function f, if for every any $\varepsilon > 0$ $\lim_{n\to\infty} m(\{x : |f_n(x) - f(x)| \leq \varepsilon\}) = 0$ $\varepsilon > 0$

false $\geq, \leq$

13- So long as there are non Measurable sets in a Measure space, there aren't non-Measurable functions from that space

are false

14- if m is a measure on a ring R, then m is Monotone or Subtractive True Theorem monotone & ring

15- Every set E in H(S) has a measurable kernel

True Theorem

16- Every Countable set is a Borel set of measure zero

True Theorem

17- The measure of a singleton is zero

True Theorem

18- let a closed set F be a subset of a bounded closed set G Then $m(F) \leq m(G)$

True Theorem

19- ~~Error~~ Repeated

20- if f is measurable and $|f|$ is integrable, then f is integrable. True Propsition

Mostafa Abdelkarem

Pesha

May 2018

1- if (X, A, M) is a measure space and $1 \le p \le \infty$ then $L^p(X)$ is a Banach space True Theorem

2- مكرر

3- مكرر

4- if a +ve function has Lebesgue integral equal to zero then the function is zero a.e. ω True Theorem

5- The function $f(x) = \frac{1}{1+x^2}$ has supremum = max and infimum = min

False $\max = \sup = 1$, $\min \ne \inf$

6-9 مكرر

10- The function $f: R^k \to R$ is measurable if the truncated function $\mathrm{Mid}\{-g, f, g\}$ is integrable for every positive integarable function g in $L^1(R^k)$ True Definition pg 120

11-12- مكرر

13- The smallest linear space containing L^{inc} is denoted by L^1 which is the set of all function of the from $f = g - h$ where g, $h \in L^{inc}$ and so L' is called the space of lebesgue integrable functions True Definition

14-15- مكرر

16- The union and intersection of a countable number of measurable sets are measurable sets. True Theorem

[illegible]

17- مكرر

18- Any ring is a semi-ring True Theorem

19- The lebesgue measure of S $M(S) = \infty$ if X_S is not integrable True Definition Measure pg 125

20- The rational numbers are countable set

True Theorem

Mostafa Abdelkarem

Math

May 2018

1- let S, T be measurable sets then $M(S \cup T) + M(S \cap T) = M(S) + M(T)$ True Theorem

2- Holder inequality let $p, q > 1$ satisfy the relation $\frac{1}{p} + \frac{1}{q} = 1$ if $f \in L^p$ and $g \in L^q$ then $fg \in L^1$ and $\int |fg| \leq \|f\|_p \|g\|_q$

True Theorem

3- L^1 has the property of completeness of the real numbers

True $\times$ P.g 112 skip

4- let $\{\varphi_n\}$ be a decreasing sequence of positive step functions converging a.e.w to zero then $\int \varphi_n \to 0$

True Theorem

5- The inner measure $M_*(E)$ of E is the least upper bound of measure of closed sets F contained in the set E:

$M_*(E) = \sup\{M(F) : F \subseteq E, F \text{ is closed}\}$. false

The set $F \subseteq E$ must be closed and bdd $\equiv$ compact

6- ~~If M is a measure on α~~

7- 8-

9- A measurable space is a set X and a σ-ring S of subsets of X with the property that $\cup S = X$

True Theorem

10- A measure space is a measurable space (X, S) and a measure M on S True Definition

L1 → is the space of lebesgue integrable function.

Mostafa Abdelkarem 2023

Page: Statistics Date:

Q1 ~~[illegible]~~ May 2017

1- d 2- d 3- a 4- c 5- d

6- d 7- d 8- a 9- d 10-

Q3 Repeated

May 2016

1- L^{inc} denotes the set of all function f where f is the limit almost every where of an increasing sequence of step function whose integrals are bounded.

True Definition

2- The Monotone function f is continuous at the point P if and only if, $f(P-0) = f(P+0)$. True Theorem

3- $m^*(E_1) - m^*(E_2) \leq 2m^*(E_1 \Delta E_2) + 2m^*(E_1 \cap E_2)$, where m^* is the lebesgue outer measure on R & $E_1, E_2 \subset R$

True

4- مكرر

5- مكرر

6- The symmetric difference of 2 sets is $A \Delta B = (A/B) \cup (B/A)$

True

7- 8- 9- 10- مكرر

صفحتين prove 2 آنا عملت ليهم skip

عايز عم اجتهدوا هاتلك ياعم بجوج

Mostafa Abdelkarem Desha

4/6/2022

May 2015

1- let $A \subset \mathbb{R}$ be a lebesgue measurable set if $0 \leq b \leq m(A)$ then there is a lebesgue measurable set $B \subset A$ with $m(B) = b$

True

2- كرر

3- if $|A \cap I| \leq b|I|$ for all open intervals $I \subset \mathbb{R}$ & $b < 1$, then $|A| = 0$

مش حالك مرح تصدق طلعت T

4- if $a|I| \leq |A \cap I|$ for all open intervals $I \subset \mathbb{R}$ & $a > 0$ then $|A| = \infty$

مش حالك مرح زي ادتها

5- كرر

6- A measurable map $T: X \to X$ on a measure space (X, A, η) is said to be measure preserving if $\eta(T^{-1}(A)) = \eta(A)$.

True

7- كرر

8- All closed sets in $\mathbb{R}^k$ are measurable True Theorem

9- كرر

10- كرر

Mostafa Abdelkarem

Desha

Desha Mansy

01121899789

الى اللقاى يا بهجين

ان شاء الله خير تجيب Torf

قولوا الذى حدماً في السماء يديلنا Torf

هنشلوح يا كازيما

Page: Date:

May 2021

1- The Axiom of Completeness assures that $\{(1+\frac{1}{n})^n\}$ Converges to a real number between 2 and 3

True Theorem

13- let $\{f_n\}$ be an increasing sequence of function in L^{inc} where integrals are bounded. Then $\{f_n\}$ Converges almost every where here to a function f, where f lies in L^{inc} and $\int f = \lim \int f_n$.

True Theorem

15- let $f: R^k \to R$ be the limit almost everywhere of a sequence of integrable function and suppose that $|f| \leq g$ for positive integrable function g. Then f is integrable.

True Theorem

16- The product of two integrable function may not be integrable while the product of any two measurable function is measurable

True Theorem

19- If $f_n \to f$ almost everywhere and f_n is measurable for $n = 1, 2 \ldots$ then f is measurable

True Theorem

17- All continuous and all integrable function are measurable

True Theorem

Desha Mansy

Desha

Mostafa Abdelkarem

Senior 2022

Desha Mansy

CamScanner

Page: Date: Math

May 2019

1- in R^3 the open sphere reduces to open interval in R^1
True Theorem

2- The space defined by the Cartesian product R^n is called n dimensional Euclidean space True Theorem

3- if a bounded set S in R^n is infinite and bounded; then there is at least one point in R^n which is an accumulation point of S True Theorem

6- fatou's Lemma implies the Monotone Convergence theorem
True Theorem

12- it is necessary and sufficient for the sequence $\{S_n\}$ of real number to converge to a real number if there exists an integer N such that $|S_m - S_n| < \varepsilon$ for $m, n \geq N$, $\varepsilon > 0$
True Theorem

Repeated als math 2021 Repeated 2021

Destiny 2022
Mostafa Abdeltawab
2022 Senior