Unit 11 - Week 9

Assignment 9

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-11-18, 23:59 IST.

1) Which of the following functions defined on [0, 1] are integrable? *1 point*

- The function x^2
- The Dirichlet function
- The function $\sqrt{x}$
- The topologist's sine curve.

No, the answer is incorrect.
Score: 0
Accepted Answers:
The function x^2
The function $\sqrt{x}$

2) Let f be an increasing and bounded function on $f:[0,1]\to\mathbb{R}$. Then *1 point*

- f is integrable.
- f is integrable iff f is also continuous.
- f is integrable if f is strictly increasing but need not be integrable if f is merely increasing.
- Irrespective of the partition P of $[0,1]$, we always have $U(f,P)>L(f,P)$.

No, the answer is incorrect.
Score: 0
Accepted Answers:
f is integrable.

3) Let $f:[0,1]\to\mathbb{R}$ be integrable. Then *1 point*

- If we modify the value of f at one point then the modified function is also integrable.
- If we modify the value of f at finitely many points then the modified function is also integrable.
- If the value of f is modified on a set of measure zero then the modified function is integrable.
- If we modify the value of f at countably many points then the modified function is also integrable

No, the answer is incorrect.
Score: 0
Accepted Answers:
If we modify the value of f at one point then the modified function is also integrable.
If we modify the value of f at finitely many points then the modified function is also integrable.

4) Which of the following properties about a function $f:[a,b]\to\mathbb{R}, a<b$ is guaranteed if it is integrable. *1 point*

- f is differentiable at least at one point in $[a,b]$
- f is continuous at least at one point in $[a,b]$
- f satisfies the intermediate value property
- The set of discontinuities of f cannot be uncountable

No, the answer is incorrect.
Score: 0
Accepted Answers:
f is continuous at least at one point in $[a,b]$

5) Let $f,g:[a,b]\to\mathbb{R}$ be integrable. Then *1 point*

- The function $|f|$ is integrable.
- The function f^2g is integrable.
- The function min$\{f^2,g\}$ is integrable.
- The function max$\{f,g^2\}$ is integrable.

No, the answer is incorrect.
Score: 0
Accepted Answers:
The function $|f|$ is integrable.
The function f^2g is integrable.
The function min$\{f^2,g\}$ is integrable.
The function max$\{f,g^2\}$ is integrable.

6) Which of the following were used in the proof of the Riemann–Lebesgue theorem. *1 point*

- The fundamental theorem of calculus.
- Existence of Lebesgue number for an open cover of a compact set.
- The countable union of sets of measure zero is a set of measure zero
- The notion of the oscillation of a function at a point.

No, the answer is incorrect.
Score: 0
Accepted Answers:
Existence of Lebesgue number for an open cover of a compact set.
The countable union of sets of measure zero is a set of measure zero
The notion of the oscillation of a function at a point.

7) Which of the following were used to prove that any continuous function $f:[a,b]\to\mathbb{R}$ is integrable. *1 point*

- Heine–Borel theorem.
- Uniform continuity.
- The extreme value theorem
- Countable union of sets of measure zero is a set of measure zero.

No, the answer is incorrect.
Score: 0
Accepted Answers:
Uniform continuity.
The extreme value theorem