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NPTEL

reviewer3@nptel.iitm.ac.in ▼

Courses » Integral Equations,calculus of variations and its applications

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Unit 8 - Week 7

Course outline

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Assignment 7

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

Due on 2018-09-19, 23:59 IST.

1) The solution of the Cauchy type integral equation 1 point

of the first kind $\int_{-1}^{*1} \frac{g(t)dt}{t-s} = 1, -1 < s < 1$ is

$g(s) = \frac{s}{\pi\sqrt{(1-s^2)}}$

$g(s) = \frac{s+c}{\sqrt{(1-s^2)}}$

$g(s) = \frac{s}{\sqrt{(1-s^2)}}$

$g(s) = \frac{s+c}{\pi\sqrt{(1-s^2)}}$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$g(s) = \frac{s+c}{\pi\sqrt{(1-s^2)}}$

2) The solution of the Cauchy type integral equation 1 point

of the second kind $g(s) = s^2 + \frac{2}{\pi} \int_0^{*1} \frac{g(t)dt}{t-s}$ is

$g(s) = -\frac{s^2}{5} + \frac{2}{5\pi s^{1-\alpha}(1-s)^\alpha} \int_0^1 \frac{(1-t)^\alpha t^{3-\alpha}}{(t-s)} dt + \frac{c}{\sqrt{5} s^{1-\alpha}(1-s)^\alpha}, 0 < s < 1$

$g(s) = -\frac{s^2}{5} + \frac{1}{s^{1-\alpha}(1-s)^\alpha} \int_0^1 \frac{(1-t)^\alpha t^{3-\alpha}}{(t-s)} dt + \frac{c}{\sqrt{5} s^{1-\alpha}(1-s)^\alpha}, 0 < s < 1$

$g(s) = -\frac{s^2}{5} + \frac{d}{ds} \int_0^1 \frac{(1-t)^\alpha t^{3-\alpha}}{(t-s)} dt + \frac{c}{s^{1-\alpha}(1-s)^\alpha}, 0 < s < 1$

$g(s) = -\frac{s^2}{5} + \frac{d}{ds} \int_0^1 \frac{(1-t)^\alpha t^{1-\alpha}}{(t-s)} dt + \frac{c}{\sqrt{5} s^{1-\alpha}(1-s)^\alpha}, 0 < s < 1$

No, the answer is incorrect.

Score: 0

Accepted Answers:

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$\frac{\pi}{t(t-u)}$

$\frac{\pi}{\sqrt{t(t-u)}}$

$\sqrt{\frac{\pi}{t(t-u)}}$

$\sqrt{\frac{\pi}{(t-u)}}$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$\frac{\pi}{\sqrt{t(t-u)}}$

4) The value of the integral $\int_0^\infty \frac{\sin \pi x}{x(1-x^2)} dx$ is

1 point

$\frac{\pi}{2}$

π

$\frac{\pi}{3}$

2π

No, the answer is incorrect.

Score: 0

Accepted Answers:

π

5) $\int_{1/2}^1 \frac{du}{\sqrt{u-1/2}\sqrt{u-1/3}}$ is equal to

1 point

$2 \ln(\sqrt{2} + \sqrt{3})$

$\ln(\sqrt{3} + \sqrt{2}) + \ln(2 + \sqrt{3})$

$2 \ln(2 + \sqrt{3})$

$2 \ln(3 + \sqrt{2})$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$2 \ln(2 + \sqrt{3})$

6) The integral $I = \int_0^u \left(\frac{u-s}{s}\right)^{1/3} \frac{ds}{(u-s)(s-t)}$, when $0 < t < u$ is equal to

1 point

$\frac{\pi\sqrt{3}}{\{t(u-t)^2\}^{1/3}}$

$\frac{\pi}{\sqrt{3}\{t(u-t)^2\}^{1/3}}$

$\frac{\sqrt{3}}{\{t(u-t)^2\}^{1/3}}$

$\frac{\pi}{\sqrt{3}\{t(u-t)\}^{1/3}}$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$\frac{\pi}{\sqrt{3} \left\{ t(u-t)^2 \right\}^{1/3}}$$

7)

The function $f : [-1, 1] \rightarrow \mathbb{Q}$ defined by $f(x_1, x_2) = |2x_1 - 3x_2|$ is Lipschitz continuous with Lipschitz constant 1 point

- 1
- 2
- 3
- 5

No, the answer is incorrect.

Score: 0

Accepted Answers:

3

8) The function $f(x) = x^{3/4}$, $0 \leq x < \infty$ is α -Holder continuous if α is equal to 1 point

- 1
- 1/2
- 1/4
- 3/4

No, the answer is incorrect.

Score: 0

Accepted Answers:

3/4

9) The function $f(x) = x^{1/2}$, $x \in [0, 1]$ is α -Holder continuous where the exponent α is equal to 1 point

- 1
- 1/2
- 3/4
- 2/3

No, the answer is incorrect.

Score: 0

Accepted Answers:

1/2

10) Let f be α -Holder continuous on an interval $I \subset \mathbb{R}$ with $0 < \alpha \leq 1$ then 1 point

- f is a constant function
- f is differentiable
- f is uniformly continuous
- none of these

No, the answer is incorrect.

Score: 0

Accepted Answers:

f is uniformly continuous

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