Check Your Knowledge 6

This is a preview of the published version of the quiz

Started: Dec 1 at 5:53pm

Quiz Instructions

Question 1

1 pts

Find the integral $I = \int \cos\left(\frac{\pi}{2} + 2\ln(\sqrt{x})\right) \mathrm{d}x.$

- $\frac{x}{2}\left[\cos\left(\ln(x)\right) - \sin\left(\ln(x)\right)\right] + c\,, \qquad x > 0$
- $\frac{x}{2}\left[\ln\left(\cos(x)\right) - \ln\left(\sin(x)\right)\right] + c\,, \qquad x \in (0, \pi/2)$
- 2
- $\frac{x}{3}\ln(\cos(x) + \sin(x)) + c\,, \qquad x \in (-\pi/4, 3\pi/4)$

Question 2

1 pts

Find a recursive formula for the Integral $I_n = \int_0^{\pi/2} x^n \cos(x) \mathrm{d}x.$

- $\left(\frac{\pi}{3}\right)^{n+1} - n(n+1)I_{n+2}$
- $\left(\frac{\pi}{2}\right)^{n} - n(n-1)I_{n-2}$
- $\frac{\pi}{2} + \frac{n}{n+1}I_{n+1}$
- $\left(\frac{\pi}{2}\right)^{-n} - n(n+1)(n+2)I_{n-3}$

Question 3

1 pts

If the function f has a continuous second derivative with $f\left(\frac{\pi}{4}\right) = 3$ and $f'\left(\frac{\pi}{4}\right) = 0$, then find the integral $I = \int_0^{\pi/4} \left[\frac{f(x)}{\cos^2(x)} + \ln\left(\cos(x)\right) f''(x)\right] \mathrm{d}x$

- 4
- 1
- 3
- 2

Question 4

1 pts

Suppose the function f with $f(x) = \int \frac{x}{1 - x\cot(x)}\mathrm{d}x$. If the graph of f passes through the point $A\left(\frac{\pi}{2}, 2\right)$, then find the limit $L = \lim\limits_{x\to 0^+}[f(x) - \ln(|x\cos(x)|)]$.

- ○ 0
- ○ $-\infty$
- ○ $+\infty$
- ○ $\frac{3}{2}$

Question 5

1 pts

Find the integral $I = \int_1^{\sqrt{e}} \frac{\ln(x) + 3}{\left(\ln^2(x) - 1\right)x}\mathrm{d}x$

- ○ $\ln(4)$

- ○ $-\ln(6)$
- ○ $-\ln(2)$
- ○ $\ln(1/3)$

Question 6

1 pts

Find the integral $I = \int \frac{\mathrm{d}x}{(x^2-4)\sqrt{4+3x^2}}$ using the substitution $\sqrt{4+3x^2} = xt$.

- ○ $\frac{1}{16}\ln\left|\frac{\sqrt{1+3x^2}-2x}{\sqrt{1+3x^2}+2x}+c\right|$
- ○ $\frac{1}{14}\exp\left|\frac{\sqrt{4+3x^2}-3x}{\sqrt{4+3x^2}+3x}\right|+2c$
- ○ $\frac{1}{15}\ln\left|\frac{\sqrt{4+3x^2}-2x}{\sqrt{4+3x^2}+2x}+1\right|+c$
- ○ $\frac{1}{16}\ln\left|\frac{\sqrt{4+3x^2}-2x}{\sqrt{4+3x^2}+2x}\right|+c$

Question 7

1 pts

Evaluate the integral $I = \int_{-\infty}^{+\infty} \frac{\mathrm{d}x}{e^{-x} + e^{x}}$.

- ○ $\frac{3\pi}{2}$
- ○ $\frac{\pi}{2}$
- ○ $-\frac{\pi}{3}$
- ○ $-\frac{3\pi}{4}$

Question 8

1 pts

Evaluate the integral $I = \int_{0}^{3} \frac{\mathrm{d}x}{(x-1)^2}$

- ○ $-\infty$
- ○ 3

- ◯ 0
- ◯ $+\infty$

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