

Math 120. - Exam 2 - October 30, 2002

1. Let $f(x) = \sinh x$. Find the value of $f'(0)$.

- A) $\sqrt{2}$ B) $\frac{1}{2}$ C) 2 D) $\frac{1}{3}$ E) 1

2. Find the value of the limit $\lim_{x \rightarrow 0^+} \frac{x}{\sin x + \tan x}$.

- A) -2 B) 0 C) $-\frac{1}{2}$ D) $\frac{1}{4}$ E) $\frac{1}{2}$

3. Find the value of the integral $\int_0^1 x e^x dx$

- A) 2 B) $e^2 - e$ C) 1 D) e^2 E) e

4. Find the value of the integral $\int_0^\pi x \sin x dx$

- A) $4\pi - 2$ B) $2\pi - 2$ C) $\frac{\pi}{2}$ D) $4\pi - 4$ E) π

5. Evaluate the following integral $\int \frac{\ln(2x) dx}{x}$

- A) $\ln(2\ln x) + C$ B) $\ln(2\ln x) + \frac{1}{2}(\ln x)^2 + C$ C) $(\ln 2)(\ln x) + \frac{1}{2}(\ln x)^2 + C$
D) $(\ln 2)(\ln x) + (\ln x)^2 + C$ E) $\frac{1}{2}(\ln x)^2 + C$

6. Find the value of the integral $\int_0^\pi \sin^2 x dx$

- A) $2\pi - 4$ B) $\pi - 2$ C) $\pi - 1$ D) π E) $\frac{\pi}{2}$

7. Find the value of the integral $\int_0^\pi \sin^2 x \cos x dx$

- A) $\frac{4}{3}$ B) 1 C) 0 D) $\frac{2}{3}$ E) $4\frac{\pi}{3}$

8. Find the integral $\int \frac{\tan^2 x}{\cos^2 x} dx$

- A) $\frac{1}{3} \tan^3 x + C$ B) $\cos x \tan^2 x + C$ C) $\ln \tan x + C$ D) $\cos^3 + C$ E) $\ln |\cos x| + C$

9. Find the value of the integral $I = \int_0^1 \frac{dx}{\sqrt{x^2+1}}$

- A) 1 B) $\ln(\sqrt{2}-1)$ C) $\ln(\sqrt{3}+1)$ D) $\ln 2$ E) $\ln(\sqrt{2}+1)$

10. Find the value of the integral $\int_0^{\frac{1}{2}} \frac{x^2}{x^2-1} dx$

- A) $\frac{1}{2}(1 - \ln 3)$ B) $\ln 3$ C) $1 - \ln \frac{3}{4}$ D) $1 + \ln(\frac{3}{4})$ E) $1 + \ln 3$