

MATH 133 – Practice Multiple Choice Questions for Final Exam

- For each multiple choice problem below, write the letter of your answer in the blank provided; partial credit is possible for some answers.
- Show your work on all problems, including multiple choice problems.

1. Evaluate: $\int_1^2 \frac{dx}{x(x^2+1)}$.

Write the letter of the best answer here: _____

- (A) $\ln\left(\frac{2}{\sqrt{5}}\right)$ (B) $\ln\left(\frac{1}{\sqrt{2}}\right)$ (C) $\ln\left(\frac{3}{\sqrt{2}}\right) - \ln\left(\frac{5}{\sqrt{2}}\right)$ (D) $\ln\left(\frac{7}{\sqrt{3}}\right) - \ln\left(\frac{1}{\sqrt{5}}\right)$ (E) $\ln\left(\frac{3}{\sqrt{2}}\right)$
(F) $\ln\left(\frac{7}{\sqrt{2}}\right)$ (G) $\ln\left(\frac{5}{\sqrt{5}}\right)$ (H) $\ln\left(\frac{2}{\sqrt{5}}\right) + \ln(\sqrt{2})$ (I) $\ln\left(\frac{2}{\sqrt{7}}\right) + \ln\left(\frac{3}{\sqrt{2}}\right)$ (J) $\ln 3$

2. Determine whether the integral $I = \int_0^1 x \ln x \, dx$ is convergent (**conv**) or divergent (**div**).
If it is convergent, evaluate it. Write the letter of the best answer here: _____

- (A) **conv**, $I = \frac{1}{8}$ (B) **conv**, $I = \frac{1}{2}$ (C) **conv**, $I = 1$ (D) **conv**, $I = -\frac{1}{2}$ (E) **conv**, $I = -1$
(F) **conv**, $I = 2$ (G) **conv**, $I = -\frac{1}{4}$ (H) **conv**, $I = 4$ (I) **conv**, $I = -4$ (J) **div**

3. Solve the differential equation $\frac{dy}{dx} = xy^2$ with initial condition $y(0) = -1$.

Write the letter of the best answer here: _____

(A) $\frac{2}{x^3 - 2}$

(B) $\frac{5}{x^2 - 5}$

(C) $\frac{-2}{x + 2}$

(D) $\frac{2}{x^4 - 2}$

(E) $\frac{4}{x^4 - 4}$

(F) $\frac{-4}{x + 4}$

(G) $\frac{3}{x^3 - 3}$

(H) $\frac{1}{x^4 - 1}$

(I) $\frac{-2}{x^2 + 2}$

(J) $\frac{-5}{x + 5}$