

MATH 1272 SAMPLE MIDTERM I PROBLEMS

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The midterm exam will cover the Sections 7.1 - 7.5, 7.8.

1. Evaluate the following integrals.

a) $\int_0^{\pi/2} \frac{\cos(x)\sin(x)}{3 + \cos^2(x)} dx$

b) $\int \frac{10}{(x-1)(x^2+9)} dx$

c) $\int_0^{\pi/2} \sin^6(x) dx$

d) $\int_0^1 5x^3 \sqrt{x^2+1} dx$

e) $\int \frac{1}{x^2 \sqrt{9-x^2}} dx$

f) $\int \cos(x) \ln(\sin(x)) dx$

2. Determine whether each integral is convergent or divergent. Evaluate those that are convergent.

a) $\int_1^{\infty} \frac{\ln(x)}{x^3} dx$

b) $\int_{-\infty}^{\infty} \frac{x^2}{16+x^6} dx$

c) $\int_e^{\infty} \frac{1}{x \ln(x)^2} dx$

3. Show that $\int_0^{\infty} e^{-x^4} dx$ is convergent.