

MATH 141, FALL 2010, SAMPLE MIDTERM 2

1) Solve the differential equation

$$\frac{dy}{dx} = \frac{1}{1-x}y + \cos(x).$$

2) Evaluate the integral

$$\int x^7 e^{x^4} dx.$$

3) Compute

$$\int \frac{2}{x^2 \sqrt{4-x^2}} dx.$$

4) Compute

$$\int \sin^2(x) \cos^3(x) \sec^2(x) dx.$$

[NO PARTIAL CREDIT]

5) Find the value of the following limit, if it exists:

$$\lim_{x \rightarrow \infty} \left(1 + \frac{1}{x^2}\right)^x.$$

If the limit does not exist, explain why.