MATH 1572H SAMPLE MIDTERM PROBLEMS

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The midterm exam will cover the Sections 10.1 - 10.9, 11.1 - 11.3

1. Compute the following integrals. Note that some of these integrals are indefinite and some definite.

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

   b) $\int sec^5(x)tan^3(x)dx$

   c) $\int_0^4 \sqrt{16 - x^2} dx$

   d) $\int \frac{x^5 + sin(x)}{e^{x^2}} dx$

   e) $\int \frac{x}{x^4 + 1} dx$

   f) $\int \frac{1}{x^2 + 3x - 4} dx$

   g) $\int sin(4x)cos(6x)dx$

2. Evaluate the following integrals

   a) $\int sec^3(x)dx$

   b) $\int e^x sin(x)dx$

3. Evaluate the following integrals

   a) $\int \frac{\sqrt{49x^2 - 1}}{x} dx$

   b) $\int \frac{x^2 - 29x + 5}{(x - 4)^2(x^2 + 3)} dx$

4. Using $n = 6$ and Simpson's rule approximate the value of the given integral.

   $\int_0^3 e^{x^2} dx$

5. Use Pappus's Theorems to find the volume and the surface area of the torus (doughnut) generated by revolving a circle of radius r about a line in its plane at a distance R from its center, where $R > r$.