

# MATH 1572H SAMPLE MIDTERM I PROBLEMS

February 12, 2018

INSTRUCTOR: Anar Akhmedov

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)  $\int \sec^9(x)\tan^5(x) dx$

c)  $\int_{-3}^3 \frac{x^3 + \sin(x)}{e^{x^2}} dx$

d)  $\int_0^4 \frac{x}{1+x^4} dx$

e)  $\int_0^3 \sqrt{9-x^2} dx$

f)  $\int \cos(6x)\cos(8x) dx$

2. Evaluate the following integrals

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

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

3. Evaluate the following integrals

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

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  $R > r$ .