

# MATH 205: Calculus II

## Midterm Examination

Instructor: Dr. Ming Mei

1. [60 pts] Evaluate the following integrals.

a).  $\int e^x \sin(e^x) dx$ ;      b).  $\int_0^7 \sqrt{4 + 3x} dx$ ;

c).  $\int (\ln x)^2 dx$ ;      d).  $\int_{\sqrt{\pi/2}}^{\sqrt{\pi}} \theta^3 \cos(\theta^2) d\theta$ ;

2. [15 pts] Find the number  $b$  such that the average value of  $f(x) = 2 + 6x - 3x^2$  on the interval  $[0, b]$  is equal to 3.
3. [25 pts] Let  $R$  be the region bounded by the curve  $y = 1 - x^2$  and the  $x$ -axis.
- a). Find the area of  $R$ ;
- b). For a solid obtained by rotating  $R$  about the  $x$ -axis, find its volume.