

Concordia University
Math 205
Sample Midterm

Time Allowed: 2 hours

Directions: Answer all the questions below. Explain what you do and show all your work on the pages provided.

1. Calculate the following integrals:

(a)

$$1) \int \frac{\sin \sqrt{x}}{\sqrt{x}} dx \quad 2) \int \frac{x+1}{x^2+1} dx \quad 3) \int \tan^4(x) dx.$$

(b)

$$1) \int \arctan(x) dx \quad 2) \int x^3 \sqrt{x^2-1} dx \quad 3) \int \frac{\sin(2x)}{\sin(x)} dx.$$

(c)

$$1) \int \frac{\sin(x)}{1-\sin^2(x)} dx \quad 2) \int \cos \sqrt{x} dx \quad 3) \int \frac{1}{x^2 \sqrt{25-x^2}} dx.$$

(d)

$$\int \frac{(x+2) dx}{\sqrt{1+4x+x^2}}.$$

2. Find the area between the curves $y = \cos(x)$, $y = \sin(2x)$, $x = 0$, $x = \pi/2$.

3. Find the volume of the solid obtained by rotating the region bounded by the curves $y^2 = x$, $x = 2y$ about the x -axis.