Math 1271 Midterm III (12/04/2014)

Version I

Name: ______________

Student ID: ___________

Discussion Section: ________

#	Score
1	
2	
3	
4	
Total	

The exam consists of 4 problems out of 100 total points. Read the directions of each problem carefully. Please show your work when necessary, unless stated otherwise. Clearly indicate your final answers.

1.(8 points each) Multiple choices.

(1) Let $f(x) = \int_2^x \sqrt{3t^2+4}dt$, what is $f'(2)$? ________

(A) 0

(B) $\frac{3}{2}$

(C) 2

(D) 4

(E) 6

(2) The substitution $x = u^2$ turns $\int_2^3 \tan \sqrt{x}dx$ into ________

(A) $\int_2^3 \tan u du$

(B) $\int_2^3 2u \tan u du$

(C) $\int_4^9 2u \tan u du$

(D) $\int_{\sqrt{2}}^{\sqrt{3}} 2u \tan u du$

(E) $\int_{\sqrt{2}}^{\sqrt{3}} \frac{1}{2}u \tan u du$

(3) If $\int_1^{\sqrt{a}} \frac{1}{x}dx = 3$, then $\int_1^a \frac{1}{x}dx =$ ________

(A) 6

(B) 9

(C) 12

(D) $\sqrt{3}$

(E) Cannot be determined from the given information

(4) Evaluate $\int_{-\pi/4}^{\pi/4} \cos^3 x \sin^3 x dx$. ________

(A) $-\frac{1}{24}$

(B) $-\frac{1}{12}$

(C) $\frac{1}{24}$

(D) $\frac{1}{12}$

(E) 0

(5) Find the volume of the solid obtained by rotating about the x-axis the region bounded by the curve $y = \sqrt{1 - x^2}$ from $x = -1$ to $x = 1$. ________

(A) $\frac{2}{3}$

(B) $\frac{4}{3}$

(C) $\frac{4\pi}{3}$

(D) $\frac{4\pi^2}{3}$

(E) $\frac{3\pi}{4}$

2.(10 points each) Find indefinite integrals in the general form.

(a) $\int (x^2+1)(x^3+3x)^4 dx$

(b) $\int \cot x dx$

3.(20 points) The acceleration of a particle moving in a straight line is constant $a = 4\ m/s^2$, the initial velocity is $v(0) = -4\ m/s$, initial position is $s(0) = 0\ m$. Find

(i) the velocity function $v(t)$;

(ii) the displacement (change of position) after 3 seconds;

(iii) the total distance traveled during the time interval $0 \le t \le 3$.

4. (20 points) Sketch the region enclosed by the curves $y = \cos \pi x$ and $y = 4x^2 - 1$, clearly label the intersections, and find the area of this region.