Math 102 Sem II (052) Second Major Exam Wed 26 / 4 / 2006 Time $1\frac{1}{4}$ hours

Answer all the questions

Show all of your work

Question #	1	2	3	4	5	6	7	8	Total
Grade	/5	/5	/5	/5	/5	/5	/5	/5	/40

1. Find the arclength of the parametric curve $y \quad e^t \sin t$, $x \quad e^t \cos t$ from $t \quad 0$ to $t \quad 1$

2. $x \tan^{1} x \, dx$ 8. $\dfrac{x^2}{\sqrt{4x \quad x^2}} dx$

3. Find the surface area generated if the curve $y \quad \cosh x$, $0 \quad x \quad 2$ is revolving about the y *axis*.

4. $\dfrac{^{2} \quad 2}{x \; x \quad 1^{\;2}} dx$ 6. $\int_{0} \dfrac{e^x}{\sqrt{e^{2x} \quad 1}} dx$ 7. $\tan^{\frac{3}{2}} x \sec^4 x \, dx$

5. Determine if the sequence $\left(\dfrac{3 \quad 2n}{3n} \right)^{n}_{n \; 1}$ is convergent or divergent , if convergent find the limit.

Math 102 Sem II (052) First Major Exam Wed 22 / 3 / 2006 Time $1\frac{1}{4}$ hours

Question #	1a	1b	1c	2	3	4	5	6	7	Total
Grade	/4	/4	/4	/4	/5	/5	/5	/4	/5	/40

1. Integrate each of the following:

a. $\int_{1}^{4} \dfrac{x^3 \quad 3x \quad 2}{\sqrt{x}} dx$ *b*. $\dfrac{\cos 2x}{\sqrt{4 \quad 3\sin 2x}} dx$ *c*. $x \quad 1^{\;23} x^2 \, dx$

2. Find the derivative $\dfrac{d}{dx} \int_{\tan x}^{x^2} \dfrac{t \quad 3}{t^2 \quad 1} dt$

3. Find the area of the region bounded by $y \quad x^2$, $y \quad 4x \quad 4$, and $y \quad 0$

4. Find the volume generated if the region bounded by the curves $y \quad x^3$, $x \quad 1$, $y \quad 0$ is revolving about the x *axis*

5. Express the Riemann Sum $\lim_{n} \sum_{k \; 1}^{n} \dfrac{n}{n^2 \quad k^2}$ over the interval $0,1$ as a definite integral and solve it

6. Find the volume generated if the region bounded by the curves $y \quad x^2$, $y \quad x \quad 2$, is revolving about the line $x \quad 1$

7. $\int_{0}^{\ln 2} \dfrac{1}{1 \quad e^{\;x}} dx$