MAC 2312H (202) ∘ Honors Calculus II ∘ Spring 2014

EXAM 2

(SAMPLE)

NAME(print) _____

UCF PID _____

* **Show all your work** on the test itself. Correct answers with little or no supporting work will not be given credit.

* You are allowed a **hand written**, **half** of **8.5 in** × **11 in**, **one-sided** sheet of notes. Books, calculators or other aids are not allowed.

* Write legibly. **Circle** your final answer to each problem.

# 1	# 2	# 3	# 4	TOTAL
8	8	24	30	70

1. Find the area enclosed by the ellipse

$$\frac{x^2}{4} + \frac{y^2}{1} = 1.$$

2. The average time until a computer chip fails is

$$\frac{1}{20000}\int_0^\infty te^{-\frac{1}{20000}t}\,dt \quad \text{hours.}$$

Find this value.

3. Determine whether each integral is convergent or divergent. Evaluate those that are convergent.

(1) $\displaystyle\int_1^{\infty} \frac{1}{(3x+1)^2}\,dx$

(2) $\displaystyle\int_{-\infty}^{\infty} \frac{x}{1+x^2}\,dx$

(3) $\displaystyle\int_{-2}^{14} \frac{1}{\sqrt[4]{x+2}}\,dx$

(4) $\displaystyle\int_{0}^{3} \frac{1}{x^2-6x+5}\,dx$

4. Evaluate the integral.

(1) $\int \tan^3 x \sec x \, dx$

(2) Evaluate $\int \frac{1}{x^2 - a^2} \, dx$ by two methods

(a) Trig-substitution :

(b) Partial Fractions :

(3) Evaluate $\int \sin x \cos x \, dx$ by four methods

(a) the substitution $u = \sin x$

(a) the substitution $u = \cos x$

(c) the identity $\sin 2x = 2 \sin x \cos x$

(d) integration by parts

ANSWERS:

1. 2π

2. 20,000 hr

3. (1) $\dfrac{1}{12}$ (2) Diverges (3) $\dfrac{32}{3}$ (4) Diverges

4. (1) $\dfrac{\sec^3 x}{3} - \sec x + C$