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

# EXAM 1

(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 | # 5 | # 6 | TOTAL |
|---|---|---|---|---|---|---|
| 8 | 8 | 8 | 14 | 18 | 14 | 70 |
| | | | | | | |

1. Find an equation of the tangent line to the curve at the given point.

$$y = \ln(xe^{x^2}), \qquad (1, 1)$$

2. Show that the function $y = e^x + e^{-x/2}$ satisfies the differential equation $2y'' - y' - y = 0$.

3. Find the inverse function of $f(x) = \dfrac{x+1}{2x+1}$.

4. Evaluate the limit.

(1) $\lim_{x \to 0^+} (1 + \sin 4x)^{\cot x}$

(2) $\lim_{x \to \infty} x^{1/x}$

5. Differentiate the function.

(1) $f(x) = \ln \dfrac{x+1}{\sqrt{x-2}}$

(2) $f(x) = \pi^{\sin x} \cot^{-1} x$

(3) $f(x) = \log_2(\log_2(x^2+2))$

(4) $f(x) = \dfrac{x^{3/4}\sqrt{x^3+1}(x+2)^3}{(3x+e)}$

(5) $f(x) = (1+x^2)^{\cos x}$

6. Evaluate the integral.

(1) $\displaystyle\int_0^{1/4} \frac{1}{\sqrt{1-4x^2}}\,dx$

(2) $\displaystyle\int_1^4 \frac{6^{-\sqrt{x}}}{\sqrt{x}}\,dx$

ANSWERS:

1. $y = 3x - 2$

3. $f^{-1}(x) = \dfrac{1-x}{2x-1} \quad \left(x \neq \dfrac{1}{2}\right).$

4. (1) $e^4$ (2) $1$

6. (1) $\dfrac{\pi}{12}$ (2) $\dfrac{5}{18 \ln 6}$