Feng Chia University 110-1 Class Purdue I Calculus Final Exam

(Time：90 minutes. Pages: Three Pages, Total 100 points)

Name：_____ SID：_____

A、Filling blanks：(4% each. total 40% , Answer should be in the corresponding box.)

(A)	(B)	(C)
(D)	(E)	(F)
(G)	(H)	(I)
(J)	GRADES:	

1. Evaluate the critical number(s) of the function $f(x) = 2x - 3x^{\frac{2}{3}}$ is(are) x=(A).

2. Find all value of c that satisfies the Rolle's Theorem for $f(x) = x^4 - 2x^2$ on the interval [-2, 2] is (are) c = (B) .

3. Find the interval(s) of increasing of the function $f(x) = \frac{x^4+1}{x^2}$ is(are) (C) .

4. Find the interval(s) of concave upward of the function $f(x) = e^{\frac{-x^2}{2}}$ is(are) (D) .

5. Find the point(s) of inflection of the function $f(x) = x^4 - 4x^3$ is(are) (E) .

6. Find the differential of the function $f(x) = \sqrt{1+x^2}$ is df = (F) .

7. Find the antiderivative of $f(x) = \frac{\sin x}{\cos^2 x}$ is F(x) = (G) +C.

8. Evaluate $\int_{-1}^{4} |x-2| dx$ = (H) .

9. Evaluate the definite integral $\int_{-5}^{5} (\frac{x^3}{x^2+1} - \sqrt{25-x^2}) dx$ = (I) .

10. Let $h(x) = \int_3^x \sqrt{t^2+1} dt$, $x \geq 3$, evaluate $(h^{-1})'(0)$ = (J) .

B、Computations : (total 60%, Show all your work, NO DETAIL WORK, NO POINTS!!)

1. (6%) Find the absolute extrema of function $f(x) = 3x^4 - 4x^3$ on the interval [-1, 2].	2. (6%) To approximate the value of $\sqrt{16.5}$ by the linear approximation
3. (6%) Solve the initial value problem $f''(x) = 2, f'(2) = 5,\ f(2) = 10.$	4. (6%)Evaluate $\int \sin 3x\ e^{\cos 3x} dx$
5. (6%)Evaluate $\int_1^9 \frac{1}{\sqrt{x}(\sqrt{x}+1)^2} dx$	6. (6%)Evaluate $\lim_{x \to 0^+} x^x$.

7. (6%)Evaluate $\int \frac{x^2+x+2}{x^2+1} dx$	8. (6%)Evaluate $\int \frac{1}{\sqrt{-x^2+4x}} dx$.
9.(6%)Show that $tanh^{-1}x = \frac{1}{2}\ln(\frac{1+x}{1-x})$ for x$\in (-1,1)$	10.(6%) Find the area of the region bounded by the graph of $f(x) = 9 - x^2$, x-axis and the vertical lines x=-1 and x=2.