Student Name (Print):

Group (Print):   ID (Print):

مسلسل كشف التوقيع:
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This exam contains 7 pages (including this cover page) and 5 Questions. Check to see if any pages are missing. Enter all requested information on the top of this page, and put your initials on the top of every page, in case the pages become separated.

You may *not* use your books, notes, or any calculator on this exam.

You are required to show your work on each problem on this exam. The following rules apply:

If you use a "fundamental theorem" you must indicate this and explain why the theorem may be applied.

Organize your work, in a reasonably neat and coherent way, in the space provided. Work scat- tered all over the page without a clear ordering will receive very little credit.

Mysterious or unsupported answers will not receive full credit. A correct answer, unsup- ported by calculations, explanation, or algebraic work will receive no credit; an incorrect answer supported by substantially correct calculations and explanations might still receive partial credit.

If you need more space, use the back of the pages; clearly indicate when you have done this.

Do not write in this table		
Question	Points	Score
1	10	
2	15	
3	7	
4	10	
5	8	
Total:	50	

Question 1(/10 Marks)

1) (2 Marks) Show that the indicated function is the solution of the given differential equation

$$\frac{d^2y}{dx^2} + y = 0; \quad y = C\sin x + \cos x$$

2) (2 Marks) find the general solution the find the particular solution that satisfy the condition $y = 6$ *when* $x = 0$

$$\frac{dy}{dx} = \frac{x + 3x^2}{y^2}$$

3) (3 Marks) Evaluate $\int_{-1}^{1}(2x^2-8)dx$ using definition (Riemann sums)

4) (3 Marks) Evaluate $\quad G(x) = D_x\left[\int_{\cos x}^{\sin x} t^5 dt\right]$

Question 2(/15 Marks):
Evaluate the Following Integrals

a) $\int_{-1}^{2} x^3 dx$

g) $\int x \sin x^2 dx$

b) $\int \cos(3 - 2x) dx$

h) $\int x^3 \sqrt[3]{x^4 + 11} dx$

c) $\int \cos^2 x \sin x \, dx$

d) $\int \frac{z}{2z^2 + 8} dz$

i) $\int \frac{\cos\sqrt{x}}{\sqrt{x}} dx$

e) $\int e^{3x+1} dx$

j) $\int \frac{\sin t}{1 + \cos^2 t} dt$

f) $\int_0^x \sin(t) dt$

Question 3(/7 Marks):

a) $y = \ln \sqrt{x}$

b) $y = x \, e^{x/2}$

c) $y = 3^{\sqrt{x}}$

d) $y = \sin^{-1}(3x - 1)$

e) $y = (\tan^{-1}(x))^3$

f) $y = (\operatorname{sech}^{-1}(x))$

g) $y = \cosh^2 x$

Question 4(/10)

1) (6 Marks) By parts, evaluate each of the following integrals:

$$\int x^2 \sin x \ dx \qquad\qquad \int x\sqrt{x+1} \ dx$$

2) (4 Marks) Evaluate each of the following <u>improper integrals:</u>

$$\int_{-\infty}^{1} xe^{-x^2} \qquad\qquad \int_{0}^{\infty} \sin x$$

Question 5a(/8)

a) (4 Marks) find the following limits

i) $\lim_{x\to 0} \dfrac{1-\cos x}{x^2+3x}$

ii) $\lim_{x\to \pi/2}(\tan x.\ln \sin x)$

b) (4 Marks) Find the Area of the region between the parabola $y^2 = 4x$ and the line $4x-3y = 4$