Umm Al-Qura University
Faculty of Applied Science
Department of Mathematical Sciences
22-08-1439

Final exam Second semester1438/1439 Calculus(II) 2904102-4

Time limit: 2 hours

		مسلسل كشف التوقيع:
Group (Print):	ID (Print):	
Student Name (Print):		

This exam contains <u>6 pages</u> (including this cover page) and <u>5 problems</u>. 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					
Problem	Points	Score			
1	12				
2	12				
3	10				
4	8				
5	8				
Total:	50				

Question 1(12 Marks)

Evaluate the following integrals using second fundamental theorem of calculus

a) $\int_2^4 3x^2 dx$

b) $\int_{-1}^{2} (4x - 6x^2) dx$

c) $\int_{-1}^{2} (x^{\frac{1}{3}} - x^{\frac{4}{3}}) dx$

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

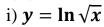
Ouestion 2(12 Marks):

Evaluate the following integrals using <u>Substitution Rule</u> determine each substitution term					
a) $\int x \sin x^2 dx$					
1 > C = 2 3 \(\tau \)					
b) $\int x^3 \sqrt[3]{x^4 + 11} dx$					
$c \cos \sqrt{x}$					
c) $\int \frac{\cos\sqrt{x}}{\sqrt{x}} dx$					

Ouestion 3(10 Marks):

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a)	(2	Marks)find	the	formula	for .	f^{1}	if:-b) (2 Marks) if $y = x^5 + 2 x + 1$ find $f^{-1}(4)$
ν	= x /	(1-x)					using inverse function theorem

c) (6 Marks)find the differentiation of each of the functions



ii) $y = x e^{x/2}$

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

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

 $\mathbf{v})\; y = (tan^{-1}(x))^3$

 $vi) y = (sech^{-1}(x))$

Question 4(8 Marks):

a) By parts, evaluate each of the following integral
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$\int x^2 \sin x dx$	$\int_{1}^{2} x\sqrt{x+1} \mathrm{d}x$

b) Evaluate each of the following improper integrals:

$\int_{-\infty}^{1} x e^{-x^2}$	$\int_0^\infty \sin x$

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a,	, ,	(+	IVIA	$u \mathbf{v} \mathbf{o}$	IIIIu	uic	101	lowing	111111113

:\	lim .	$1-\cos x$
1)	$\lim_{x\to 0}$	$x^2 + 3x$

ii) $\lim_{x\to\pi/2}(tanx. \ln t)$	sinx))
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b) (4 Marks) Find the Area of the region	between the parabola $y^2 = 4x$ and the line $4x-3y = 4$