



Basic Science Department Math. I Code: Math 101 Final Exam: 5 / 1 / 2014 Time Allowed: 2 hours	 Modern University For Technology & Information	Academic year: 2013 / 2014 Semester: Autumn Examiners: Dr. Mona Samir Dr. Mohamed Eid
Answer All Questions	Faculty of Engineering	Total Mark: 40
Question 1		
Find y' from the following: (a) $y = 2x^4 + 4^x - 1$ (b) $y = 4^{\sin x} + \tan^{-1} x^2$ (c) $y = \cos x + x^{\cos x}$ (d) $y = \cosh 3x \cdot \tanh^{-1} x^2$ (e) $y \sec x + x \operatorname{sech} y = 1$ (f) $y = t + \log t, \quad x = \sqrt{t} + \ln t$		10
Question 2		
(a) Determine the maximum and minimum points of the function: $f(x) = 2x - e^{2x}$ (b) Write the Talyor's expansion of the function: $f(x) = x \cos x$ at $x = \pi$.		3 3
Question 3		
Find the following integrals: (a) $\int (x^4 + e^{2x}) dx$ (b) $\int \left(\frac{1}{x^4} + \frac{1}{x} + 4x\right) dx$ (c) $\int (\cosh x + e^x \cosh x) dx$ (d) $\int x \cdot \cos 2x dx$ (e) $\int \frac{x}{x^2 - 4x + 3} dx$ (f) $\int \sin 3x \cdot \cos x dx$		12
Question 4		
(a) Find the integral: $\int \cos^5 x dx$ (b) Find the area of the region between the curve $y = x^3 - x$, x - axis, x in $[-1, 1]$ (c) If the region between the curve $f(x) = 2^x$, x - axis, x in $[1, 2]$, is rotated about: (i) x - axis (ii) y - axis. Compute the volume of the generated solids.		4 4 4

Good luck

Dr. Mona Samir

Dr. Mohamed Eid

Engineering Mathematics Department Math. 1 Code: Math 101 Mid-Term Exam Time Allowed: 60 Minuets	 Modern University For Technology & Information Faculty of Engineering	Academic year: 2013 / 2014 Semester: Autumn Date: 24 / 11 / 2013 Examiners: Dr. Mona Samir Dr. Mohamed Eid
Answer All Questions		Total Mark: 30
[1] Find y' where: (a) $y = 2x^3 + e^x + 4$ (b) $y = 7^{x^2} + \sin^{-1} x^3$ (c) $y = \log x + \ln(x + \sin x)$ (d) $y = \cos 3x \cdot \sinh^{-1} x^2$ (e) $y^3 = \sin(xy) + \ln(\cosh x + \cos x)$ (f) $y = \tan t + \sec t, \quad x = \tanh t + \operatorname{sech} t$		12
[2] Find the integrals: (a) $\int (x^3 + 3^x + \ln 3) dx$ (b) $\int \left(\frac{1}{x^4} + \frac{1}{4^x} + 4x\right) dx$ (c) $\int (x^2 + 3)^2 dx$		6
[3] Find the following limits: (a) $\lim_{x \rightarrow 0} \frac{\tan x}{3^x - 1}$ (b) $\lim_{x \rightarrow 1} \frac{x^3 - 3x^2 + 3x - 1}{x^3 - 2x^2 + x}$		4
[4] Determine the maximum and minimum points of: $f(x) = x - 2 \ln x$		4
[5] Write the Talyor's expansion of the function: $f(x) = \ln x$ at $x = 1$.		4

Good luck

Dr. Mona Samir

Dr. Mohamed Eid

I	ID:	الاسم:
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- (1) Find the integrals: (a) $\int \ln x \, dx$ (b) $\int x \sin x \, dx$ (c) $\int \sin^{-1} x \, dx$
(2) Find the area of region bounded by $y = x^2 - 2x$, x-axis, x in $[0, 3]$
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Answer

II	ID:	الاسم:
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(1) Find the integrals: (a) $\int \log x \, dx$ (b) $\int x \cdot 4^x \, dx$ (c) $\int \sinh^{-1} x \, dx$

(2) Find the volume V_y of the solid generated by rotating the region between $y = \frac{1}{1+x^2}$, x-axis, x in $[1, 2]$ about y-axis.

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Answer

III	ID:	الاسم:
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(1) Find the integrals: (a) $\int x \ln x \, dx$ (b) $\int x \cdot \cos x \, dx$ (c) $\int \tanh^{-1} x \, dx$

(2) Find the volume V_y of the solid generated by rotating the region between:
 $y = x + e^x$, x-axis, x in $[0, 1]$ about x-axis.

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Answer

IV	ID:	الاسم:
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(1) Find the integrals: (a) $\int x^2 \ln x \, dx$ (b) $\int x \sinh x \, dx$ (c) $\int \tanh^{-1} x \, dx$

(2) Find the area of region bounded by $y = 4 - x^2$, x-axis, x in $[1, 3]$

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Answer

G4	Sec:	ID:	Name:
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Find y' , where

(1) $y = 3^x + 2 \cos x^3 + \sec x$

(2) $y = x^3 \cdot \log x + \ln(2x + \sin x)$

(3) $y = 5 + (2x + 2^x)^6$

(4) $y = 3^{\tan x} + \log_3(x + 2)$

(5) $y = \frac{\sin x}{x + \ln x}$

(6) $y = 3x + \tanh^{-1} 3x$

(7) $y = x + 3^x + \cos y$

(8) $y = 2^t + \cos 2t, \quad x = t^4 + \tanh 3t$

G4	Sec:	ID:	Name:
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Find y' , where

$$(1) y = 3 \sin x^2 - \log(x + \sin x)$$

$$(2) y = 3^x \cdot x^3 + \ln x$$

$$(3) y = 3 + (x + \cos x)^5$$

$$(4) y = \left(\frac{3}{5}\right)^x + \frac{\ln x}{4} + \tan^{-1} x^3$$

$$(5) y = \frac{\log x}{3 + \cos x}$$

$$(6) y = x - 2 \sinh x + \tan 3x$$

$$(7) y = x + \log x + \sinh y$$

$$(8) y = \sqrt{t} + \cosh 2t, \quad x = t^4 + \ln t$$

G5	Sec: A	ID:	Name:
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Find y' , where

(1) $y = 3^x + 3x^2 + \sin 2x$

(2) $y = \sinh x \cdot \ln x + \cosh 3x$

(3) $y = (\log x + \sec x)^5$

(4) $y = 2x^3 + \sin^{-1} x^2$

(5) $y = \frac{2 + \ln x}{2x + \sin x}$

(6) $y = \tan^{-1} x + \sinh^{-1} x^2$

(7) $y = x \sin x + \cos y$

(8) $y = t^3 + \cos 2t, \quad x = 3^t + \operatorname{sech} 3t$

G5	Sec: B	ID:	Name:
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Find y' , where

(1) $y = 3^x + \log x + \tan 2x$

(2) $y = \sinh x \cdot x^4 + \ln^4 x$

(3) $y = 8 \log 3 + x + \cos^4 x$

(4) $y = 2^{x^4} + \tanh^{-1} x^2$

(5) $y = \frac{x + \tanh x}{2x + \sin x}$

(6) $y = \tanh^{-1} x + \ln(x^2 + 3)$

(7) $y = x \ln x + \sin 2y$

(8) $y = \sqrt{t} + \cosh 2t, \quad x = e^t + \log 3t$

G5	Sec: C	ID:	Name:
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Find y' , where

(1) $y = e^x \cdot \log x + \tanh 2x$

(2) $y = \sinh x + x^4 + \log^4(x + 3)$

(3) $y = 8 \log x + \tan^4 x$

(4) $y = 2^{\sqrt{x}} + \sinh^{-1} x^2$

(5) $y = (\sin 3x + \log x)^8$

(6) $y = \tan^{-1} x + \ln(x^2 + \sinh x)$

(7) $y = x \tan x + \ln y$

(8) $y = \sqrt{t} + \cos 3t, \quad x = 4^t \cdot \log t$