

Academic Year: 2013 – 2014 Semester: Autumn Date: January 9, 2014 Duration Time: 2 Hours	 Modern University For Technology & Information Faculty of Pharmacy	Mathematics: OCM 103 Final Exam Examiner: Dr. Mohamed Eid
Answer All Questions		Total Mark: 60
Question 1		
Find y' where:		12
(a) $y = 3x^3 + 4x + 3$	(b) $y = \cos x \cdot \ln x$	(c) $y = \frac{3}{5} - x \log x$
(d) $y = [2^x + \sin x]^{-4}$	(e) $y = 4^{2x} - \log x$	(f) $y = \frac{\sin x}{\cos x} - 2$
Question 2		
Find the integrals:		12
(a) $\int (x^4 + \frac{1}{x})dx$	(b) $\int (2^x + \sin x) dx$	(c) $\int \frac{2x}{(3+x^2)^8} dx$
(d) $\int \frac{x+2}{x^2-3x-4} dx$	(e) $\int x \cdot \ln x dx$	(f) $\int_0^2 (x^2 + 4) dx$
Question 3		
(a) If $A = \begin{bmatrix} 1 & 2 & -2 \\ 2 & 1 & 0 \\ 0 & 1 & -3 \end{bmatrix}$. Find, if possible, $2A$, $ A $, $A \cdot A^t$.		10
(b) Find the eigenvalues and the eigenvectors of : $A = \begin{bmatrix} 1 & 2 \\ 1 & 2 \end{bmatrix}$		10
Question 4		
(a) If $A = \begin{bmatrix} 2 & 1 & 3 \\ 1 & 0 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 3 \\ 0 & 2 \\ 2 & 4 \end{bmatrix}$.		8
Find, if possible, $A + B$, $ A $, $A + B^t$, $B \cdot A$, $ AB $.		
(b) If $A = \begin{bmatrix} 2 & 1 \\ 1 & -4 \end{bmatrix}$. Show that: $A^2 + 2A = 9I$		5
(c) Write the linear system in matrix form :		3
$x - y + z = 1, \quad 2x + y + z = 2, \quad 3x + 2z = 4.$		

Good luck

Dr. Mohamed Eid

Academic Year: 2013 – 2014 Semester: Autumn Date: January, 2014 Duration Time: 2 Hours	 Modern University For Technology & Information Faculty of Pharmacy	Mathematics: OCM 103 Final Exam Examiner: Dr. Mohamed Eid
Answer All Questions		Total Mark: 60
Question 1		
Find y' where:		12
(a) $y = \frac{3}{x^3} + 3x - 3$	(b) $y = \sin x \cdot \log x$	(c) $y = \ln^6 x + \ln x^5$
(d) $y = [2^x + \ln x]^5$	(e) $y = 3^{2x} + \frac{1}{\sin x}$	(f) $y = \frac{2}{3} + \sin^{-3} x$
Question 2		
Find the integrals:		12
(a) $\int (x^3 + \frac{1}{x^3})dx$	(b) $\int (4^x + 2 \sin x) dx$	(c) $\int \frac{x+2}{x^2-4x} dx$
(d) $\int x \cdot \sin x dx$	(e) $\int \ln x dx$	(f) $\int_0^1 (x^2 - 1)^2 dx$
Question 3		
(a) If $A = \begin{bmatrix} 1 & -1 & 2 \\ 1 & 3 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & -1 \\ 3 & 2 \\ 2 & 1 \end{bmatrix}$.		10
Find, if possible, $A + B$, $ A $, $A + B^t$, $A \cdot B \cdot A$, $ A \cdot B $.		
(b) Find the eigenvalues and the eigenvectors of : $A = \begin{bmatrix} 1 & 9 \\ 1 & -1 \end{bmatrix}$		8
(c) If $B = \begin{bmatrix} -1 & 3 \\ 3 & 1 \end{bmatrix}$. Show that: $B^2 = 9I$		4
Question 4		
(a) If $A = \begin{bmatrix} 2 & -1 & -2 \\ 1 & 1 & 0 \\ 3 & 0 & -2 \end{bmatrix}$. Find, $ A $, $A \cdot A$, $A \cdot A^t$.		10
(b) Write the linear system in matrix form :		
$x - 2y + 3z = 2$, $2x + y + z = 0$, $3y + z = 3$.		4

Good luck

Dr. Mohamed Eid

Academic Year: 2013 – 2014 Semester: Autumn Date: November, 28, 2013 Duration Time: 1 Hour	 Modern University For Technology & Information Faculty of Pharmacy	Mathematics: OCM 103 Mid-Term Exam Examiner: Dr. Mohamed Eid
Answer All Questions		Total Mark: 20
[1] Find y' where:		4
(a) $y = 3x^4 - 2^x + 4x$	(b) $y = \sin x \cdot \log x + \log 8$	
(c) $y = (\cos x + \ln x)^5$	(d) $y = \frac{2x+1}{3^x+x^3}$	
[2] Determine the maximum and minimum points of : $f(x) = \frac{1}{x} + \frac{x}{4}$		3
[3] Find the following integrals:		8
(a) $\int (x^4 - 2 \cos x) dx$	(b) $\int (3^x + \frac{1}{3^x} + \sin x) dx$	
(c) $\int 2x \cdot (1 + x^2)^5 dx$	(d) $\int \ln x dx$	(e) $\int_1^2 (2 + \frac{1}{x}) dx$
[4] If y is the quantity of a drug in the blood at time t and decreases according to the equation: $\sqrt{y_0} - \sqrt{y} = 4t$. If $y_0 = 400$ units (the initial quantity at $t = 0$). Find:		5
(a)The time at which 50 % of drug exists in the blood.		
(b)The time at which 25 % of drug exists in the blood.		
(c)The time at which there is no drug in the blood.		
(d)The quantity of drug exists in blood after 4 hours.		
(e)Sketch the curve of this relation.		

Good luck

Dr. Mohamed Eid

ID:	Name:
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(1)Find y' , where

(a) $y = 3^x + 2x^3$

(b) $y = \sin x \cdot \log x$

(c) $y = (x^{-3} + \cos x)^8$

(d) $y = \cos x + \ln x$

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

(2)Find the maximum and minimum points of the function: $f(x) = x^3 - 12x + 1$

G1	Sec:	ID:	Name:
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(1) Find y' , where

(a) $y = 4^x + 3x^2$

(b) $y = \sin x \cdot \log x$

(c) $y = (2x + \cos x)^5$

(d) $y = 2^{3x} + \ln x$

(e) $y = \frac{\cos x}{2 + \sin x}$

(2) Find the maximum and minimum points of the function: $f(x) = 2x^3 - 6x + 1$

G1	Sec:	ID:	Name:
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(1) Find y' , where

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

(b) $y = x^3 \cdot \log x$

(c) $y = (2x + 2^x)^6$

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

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

(2) Find the maximum and minimum points of the function: $f(x) = 2x^3 - 3x^2 + 1$

G1	Sec:	ID:	Name:
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(1) Find y' , where

(a) $y = 3 \sin x - 7 \log x$

(b) $y = 3^x \cdot x^3$

(c) $y = (x + \sin x)^5$

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

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

(2) Find the maximum and minimum points of the function: $f(x) = x - 2 \ln x$

G2	Sec:	ID:	Name:
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(1) Find y' , where

(a) $y = 2 \cos x + 4 \ln x$

(b) $y = x^{-4} \cdot \sin x$

(c) $y = (3^x - 3x)^8$

(d) $y = 5^{2x} + \frac{x}{3}$

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

(2) Find the maximum and minimum points of the function: $f(x) = (x - 1)^3 + 2$

G2	Sec:	ID:	Name:
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(1) Find y' , where

(a) $y = 4^x - 2x^{-3}$

(b) $y = \cos x \cdot \log x$

(c) $y = 2(x - \cos x)^{-4}$

(d) $y = \ln^5 x + \ln x^5$

(e) $y = \frac{x}{\sin x + \cos x}$

(2) Find the maximum and minimum points of the function: $f(x) = (x - 1)^4$

G2	Sec:	ID:	Name:
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(1) Find y' , where

(a) $y = 5^x \cdot \log_5 x$

(b) $y = 2x^3 - 3 \cos x$

(c) $y = (x + \ln x)^{-4}$

(d) $y = \frac{3}{x} - \frac{x}{3}$

(e) $y = \frac{\log x}{x^3}$

(2) Find the maximum and minimum points of the function: $f(x) = x - e^x$

*Group1	Sec:	ID:	Name:
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[1] If $A = \begin{bmatrix} 2 & 1 & 3 \\ 1 & 2 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 1 & 2 \\ 1 & 0 & 3 \end{bmatrix}$. Find, if possible: $A + B$, $A.B$, $|A.B^t|$

[2] Find the eigenvalues and eigenvectors of : $A = \begin{bmatrix} 3 & 0 \\ 2 & 1 \end{bmatrix}$

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Answer

**Group1	Sec:	ID:	Name:
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[1]If $A = \begin{bmatrix} 2 & 1 & 3 \\ 1 & 2 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 1 \\ 2 & 0 \\ -2 & 3 \end{bmatrix}$. Find, if possible: $A + B$, $A + B^t$, $|A.B|$

[2]Find the eigenvalues and eigenvectors of : $A = \begin{bmatrix} 0 & 1 \\ 2 & 1 \end{bmatrix}$

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Answer

***Group1	Sec:	ID:	Name:
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[1] If $A = \begin{bmatrix} 1 & 3 \\ 2 & -2 \\ 3 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 1 & 3 \\ 1 & 4 & 0 \end{bmatrix}$. Find, if possible: $A + B$, $A^t + B$, $|A \cdot B|$

[2] Find the eigenvalues and eigenvectors of : $A = \begin{bmatrix} 0 & 3 \\ 1 & 2 \end{bmatrix}$

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Answer

*Group2	Sec:	ID:	Name:
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[1] If $A = \begin{bmatrix} 1 & 4 \\ 2 & -2 \\ 3 & 0 \end{bmatrix}$. Find, if possible: $|A|$, $A.A^t$, $|A^t.A|$

[2] Find the eigenvalues and eigenvectors of : $A = \begin{bmatrix} 1 & 2 \\ 1 & 2 \end{bmatrix}$

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Answer

**Group2	Sec:	ID:	Name:
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[1]If $A = \begin{bmatrix} 3 & -2 \\ 1 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 & 3 \\ 2 & 1 & 4 \end{bmatrix}$. Find, if possible, $|A|$, $A + B$, $A.B$

[2]Find the eigenvalues and eigenvectors of : $A = \begin{bmatrix} 0 & 2 \\ 2 & 0 \end{bmatrix}$

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Answer

***Group2	Sec:	ID:	Name:
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[1]If $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 2 & 2 \\ -1 & 3 & 1 \end{bmatrix}$. Find $\frac{A}{2}$, $|A|$, $A.A^t$

[2]Find the eigenvalues and eigenvectors of : $A = \begin{bmatrix} 0 & 2 \\ 2 & 0 \end{bmatrix}$

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Answer

