


Basic Science Department Mathematics I Code: Math 101 Final Exam: December 30, 2014	 Modern University For Technology & Information	Academic year: 2014 / 2015 Semester: Autumn Time Allowed: 2 Hours
Answer All Questions	Faculty of Engineering	No. of Questions: 4 Total Mark: 40
<p><u>Question 1</u></p> <p>Find $\frac{dy}{dx}$</p> <p>(i) $y = 2x^4 + 4^x + 4x$ (ii) $y = \sin 3x + \sinh x^3 + \sqrt{3}$</p> <p>(iii) $y = \sec x \cdot \cos 2x + \log x$ (iv) $y = \tanh^{-1} 2x + \tanh^{-3} 2x$</p> <p>(v) $y = \tan^5 x + \ln(\tan x)$ (vi) $y = \ln \frac{\sqrt[5]{1-x^3}}{[\ln(3+x^2)]^5}$</p> <p>(vii) $2y^2 + \sinh^{-1}(xy) + 2x = 0$ (viii) $y = t \cdot \cosh t, \quad x = t + \operatorname{sech} t$</p>		16
<p><u>Question 2</u></p> <p>Find the Maclaurin's expansion of the function: $f(x) = xe^{2x}$.</p>		2
<p><u>Question 3</u></p> <p>Find the integrals:</p> <p>(i) $\int (2x^2 - 3^x) dx$ (ii) $\int (\cos 3x \cdot \cos x) dx$ (iii) $\int (3^x - 2^x)^2 dx$</p> <p>(iv) $\int \left(\frac{1+2x}{\sqrt{1+x^2}} + \frac{1}{1+x^2} \right) dx$ (v) $\int \ln x dx$ (vi) $\int \tan^{-1} 2x dx$</p> <p>(vii) $\int \frac{x}{x^2 - 2x - 3} dx$ (viii) $\int \cos^5 2x dx$ (ix) $\int \frac{1}{x^2 \cdot \sqrt{1+x^2}} dx$</p>		18
<p><u>Question 4</u></p> <p>(a) Find the area of the region bounded by $y = x - x^3$, x-axis, x in $[0, 2]$.</p> <p>(b) Find the volume V_x of the solid generated by rotating, about x-axis, the region between the curve $y = x - x^2$, x-axis, x in $[0, 2]$.</p>		2 2

Good Luck

Dr. Mona Samir

Dr. Mohamed Eid

Mathematics I Code: Math 101

Time: 60 Minutes

Mid-Term Exam: November, 2014

Answer All questions Total Mark: 30

ممنوع إستخدام المحمول كألة حاسبة. يُسمح فقط بإستخدام الألة الحاسبة العادية

Do not use Mobile as Calculator. Only use Calculator

[1] Find $\frac{dy}{dx}$

(i) $y = 2x^3 - 3^x + 3$

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

(iii) $y = \sin 2x + \cosh x^2$

(iv) $y = (\sin x)^{\tan x}$

(v) $y = \log_2 \sqrt[4]{\tanh^{-1} e^{2x}}$

(vi) $y = \sec x \cdot \ln \cos x$

[2] Find y' : (i) $y = 2^y + x \cdot \sinh x$

(ii) $y = t + \sin^{-1} t^2$, $x = t + \sinh^{-1} 2t$

[3](a) Write the Talyor's expansion of the function: $f(x) = \frac{1}{x-1}$ at $x = 2$.

(b) Find: (i) $\lim_{x \rightarrow 0} \frac{\ln(1+x)}{2^x - 1}$

(ii) $\lim_{x \rightarrow \infty} \frac{x^2 - 2}{x - x^3}$

(iii) $\lim_{x \rightarrow \frac{\pi}{2}} (\sec x - \tan x)$

Good Luck

Dr. Mona Samir

Dr. Mohamed Eid

Group:	Sec:	ID:	Name:
--------	------	-----	-------

Find the integrals

(1) $\int (x^2 - 2^x) dx$

.....

(2) $\int (\frac{1}{x+1} - \frac{3}{x-2}) dx$

.....

(3) $\int (\frac{1}{4} - \frac{1}{3x}) dx$

.....

(4) $\int 2x \cdot (3 + x^2)^5 dx$

.....

(5) $\int (x^2 + 3)^2 dx$

.....

(6) $\int (\frac{x}{3} + 2x \cdot 4^{x^2}) dx$

.....

(7) $\int \frac{x}{x^2 - 4x + 3} dx$

(8) $\int x \cdot \ln x dx$

Group:	Sec:	ID:	Name:
--------	------	-----	-------

Find the integrals

(1) $\int (3^x + 3^{2x}) dx$

.....

(2) $\int (\frac{1}{x^2} - \frac{4x}{x^2+3}) dx$

.....

(3) $\int (\sqrt{3} - \frac{4}{x^4}) dx$

.....

(4) $\int e^x \cdot \sqrt{1 + e^x} dx$

.....

(5) $\int (\sqrt{x} + x)^2 dx$

.....

(6) $\int (\frac{2}{3^x} + 2x \cdot 3^{x^2}) dx$

.....

(7) $\int \frac{x+1}{x^2-6x+9} dx$

(8) $\int \tan^{-1} 2x dx$

Group:	Sec:	ID:	Name:
--------	------	-----	-------

Find the integrals

(1) $\int (2x^6 + 2^{3x}) dx$

.....

(2) $\int (\frac{3}{1+x} + \frac{4}{3+2x}) dx$

.....

(3) $\int (\frac{3}{4} + \frac{1}{2x}) dx$

.....

(4) $\int \frac{1}{x} \ln^5 x dx$

.....

(5) $\int (x + \frac{1}{x})^2 dx$

.....

(6) $\int (x^{-1} + 2x \cdot 5^{-x^2}) dx$

.....

(7) $\int \frac{x-2}{x^2-3x} dx$

(8) $\int \sinh^{-1} 2x dx$

Find the integrals

(1) $\int \left(\frac{2}{\sqrt{x}} + \frac{4^x}{4} \right) dx$ (2) $\int \left(\frac{1}{x \ln x} + \frac{1}{x + \sqrt{2}} \right) dx$ (3) $\int \left(\frac{3}{4} + \frac{1}{2^x} \right) dx$ (4) $\int \frac{2x}{\sqrt[3]{3+x^2}} dx$

(5) $\int (2^x - 3^x)^2 dx$ (6) $\int \left(x^{-1} + \frac{5\sqrt{x}}{\sqrt{x}} \right) dx$ (7) $\int \frac{x}{x^2 - 3x - 4} dx$ (8) $\int \tanh^{-1} 3x dx$

Group: *	Sec:	ID:	Name:
-------------	------	-----	-------

Find y' , where

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

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

(3) $y = (2x + 2^x)^6 + \log x$

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

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

(6) $y = \sin^{-1} 2t + \sec t, \quad x = \sinh^{-1} t^2 + \operatorname{sech} t$

(7) $y = x + 4^x + \cos y$

Group: **	Sec:	ID:	Name:
--------------	------	-----	-------

Find y' , where

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

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

(3) $y = (x - 3^x)^8 + \ln(x + 1)$

(4) $y = 2^{\tanh x} + \cosh 3x$

(5) $y = \frac{\sinh x}{x - 2 \cos x}$

(6) $y = \cos^{-1} t^3 + \cosh 3t, \quad x = \tan^{-1} 2t + \tan 2^t$

(7) $y = x^2 + 4^x + \sin 2y$

Group: ***	Sec:	ID:	Name:
---------------	------	-----	-------

Find y' , where

(1) $y = 3x^4 + 5^x - \sinh x^2$

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

(3) $y = (x - 3^x)^8 + \ln^7(x + 1)$

(4) $y = 3^{\sinh 2x} + \cosh^2 x$

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

(6) $y = \tan^{-1} 2t + \ln \sin t, \quad x = \tanh^{-1} t + \sin \ln t$

(7) $y^3 = x^2 + 4^x + \ln y$

Quiz 3

الكود:

الإسم:

Find the integrals:

(1) $\int x \cdot \log x \, dx$

(2) $\int (x + 1) \sin x \, dx$

(3) $\int x \cdot \cos 2x \, dx$

(4) $\int x \cdot 4^x \, dx$

Answer