MINIA UNIVERSITY
MiniaUniversity

Faculty of Science
Math.Dept.

Class: first year FCI
Subject: Qualifying Mathematics
Code: BMA001
Final Examination

Time: 2 hours
Mar...: 2021

Answer the following questions:

First: calculus (30 marks)

(1)(a) Let $R = \{(a,b): a \in A, b \in B \text{ and } 2a + b = 7\}$ be a relation from $A = \{1,2,,3\}$ to $B = \{1,2,3,4,5,6\}$ find R and R^{-1}.

(b) Sketch the curves of the functions:

(i) $y = x^3$, (ii) $y = \cos x$ and give the domain and rang of them.

(2) Find the inverse of the function $y = 2x - 3$ and find $(f \circ f^{-1})(2)$.

(3)Find: $\lim\limits_{n\to\infty}\left(1+\frac{2}{n}\right)^{5n-1}$, $\lim\limits_{x\to 0}\frac{\sin 3x}{\tan 4x}$, $\lim\limits_{x\to\infty}\frac{3x^2-5}{4x^2-3x+2}$.

(4) If $(x) = \begin{cases} \frac{x^3-8}{x-2}, & x \neq 2 \\ 4, & x = 2 \end{cases}$, is $f(x)$ continuous at $x = 2$?

(5) Find $\frac{dy}{dx}$ of the following functions:

(i)$y = (x^2 + 3x + 4)^5$, (ii)$y = x^2 e^{\tan x} + \frac{\sec x}{4x - 2}$,

(iii)$y = \sin^3(2x - 3)$.

Second:Algebra (30 marks)

(1) Find the middle term of $(3x^2 + \frac{1}{2x})^{10}$.

(2) Find the expansion of $(x + \frac{1}{x})^4$.

(3) Show that $\binom{n}{r} = \binom{n}{n-r}$. If $\binom{10}{r} = \binom{10}{2r+1}$ find the value of r.

(4) (a)How many four digit numbers can be formed with digits 1,2,3 and 4 with distinct digits?.

(b)Out of 5 men and 3 women,a committee of 3 persons is to be formed. In how many ways can it be formed selecting (i) exactly 1 women (ii) at least 1 women?.

مع تمنياتي لكم بالتوفيق.　　　　أ.م.د. عبد الرحمن محمد شحاته

Good Luck,

2021

1) $2a+b=7$

$(1,1), (1,2), (1,3), (1,4), (1,5), (1,6)$
$(2,1), (2,2), (2,3), (2,4), (2,5), (2,6)$
$(3,1), (3,2), (3,3), (3,4), (3,5), (3,6)$

$R = \{(1,5)\ (2,3)\ (3,1)\}$

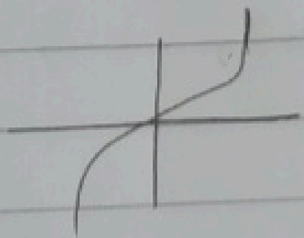
$R' = \{(5,1)\ (3,2)\ (1,3)\}$

b)

1) $y = x^3$

Domain $= R$

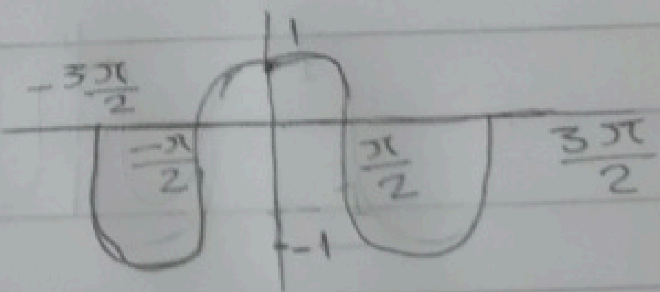
Range $= R$



2) $y = \cos x$

Domain $= R$

Range $[-1, 1]$



2) $y = 2x - 3$

$x = 2y - 3 \Rightarrow y = \frac{x+3}{2} = f^{-1}(x)$

$f \circ f^{-1} = 2\left(\frac{x+3}{2}\right) - 3$

$\therefore f_{(x)} \circ f^{-1}_{(x)} = 2$

---

(3) $\lim\limits_{n \to \infty} \left(1 + \frac{2}{n}\right)^{5n-1}$

$\lim\limits_{n \to \infty} \left(1 + \frac{2}{n}\right)^{5n} \left(1 + \frac{2}{n}\right)^{-1}$

$\left[\lim\limits_{n \to \infty} \left(1 + \frac{2}{n}\right)^{n}\right]^{5} \times 1$

$[e^2]^5 = e^{10}$

$\lim\limits_{x \to 0} \dfrac{\frac{\sin 3x}{x}}{\frac{\tan 4x}{x}} = \frac{3}{4}$

$\lim\limits_{x \to \infty} \dfrac{6x}{8x - 3} = \lim\limits_{x \to \infty} = \frac{6}{8} = \frac{3}{4}$

4) ??

i) $y = (x^2 + 3x + 4)^5$

$y' = 5(x^2 + 3x + 4)^4 . 2x + 3$

ii) $y = x^2 e^{\tan x} + \frac{\sec x}{4x - 2}$

$y' = 2x . e^{\tan x} + e^{\tan x} . \sec^2 x . x^2 + \frac{(4x - 2 . \tan x - 4 . \sec x}{(4x-2)^2}$

$y' = 2x e^{\tan x} + x^2 \sec^2 x \, e^{\tan x} + \frac{(4x - 2\tan x - 4\sec x}{(4x-2)^2}$

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

$3\sin^2(2x-3) . (\cos(2x-3) . 2$

MINIA UNIVERSITY

Minia University
Level: 1st year Students
Subject: Qualifying math
Code: BMA001

Faculty of Computers & Informatics
Academic Year (2019/2020)
First Term - Final Examination

Date: [illegible]
Time: 2 hours

Answer the following questions:

First: calculus (30 marks):

(1) Let $R = \{(a,b): a \in A, b \in B \text{ and } b = a+1\}$ be a relation from $A = \{1,3,4\}$ to $B = \{2,3,4,5\}$ find R and R^{-1}.

$y = 3x - 5$
$3x = y + 5$
$x = \frac{y}{3} + \frac{5}{3}$

(2) Sketch the curves of the functions: $(i)\ y = x^3$, $(ii)\ y = \sin x$ and give the domain and rang of them.

(3) Find the inverse of the function $y = 3x - 5$ and find $(f \circ f^{-1})(2)$.

(4) Find: $\lim_{n \to 0}\left(1 + \frac{2}{n}\right)^{3n-1}$, $\lim_{n \to 0}\frac{\sin 3x}{7x}$, $\lim_{n \to \infty}\frac{x^2+3x-5}{4x^2-3x+2}$.

(5) If $(x) = \begin{cases} \frac{x^2-9}{x-3}, & x \neq 3 \\ 5, & x = 3 \end{cases}$, is $f(x)$ continuous at $x = 3$?

(6) Find $\frac{dy}{dx}$ of the following functions:

$$(i)\, y = (x^2+3x+4)^5,\ (ii)\, y = x^2\tan x + \sin^3(2x-3),$$
$$(iii)\, x^2 + 3xy + 4y^2 = 5.$$

Second: Algebra (30 marks)

(1) Write $\frac{1-2i}{1+3i}$ in its general form.

(2) Expand $\left(x - \frac{1}{x}\right)^4$ by the binomial formula.

(3) Find the middle term of $\left(\frac{a}{2} - \frac{b}{3}\right)^{11}$.

(4) Show that $\binom{n}{r} = \binom{n}{n-r}$, If $\binom{10}{r} = \binom{10}{2r+1}$ find the value of r.

(5) (i) How many 3 digit numbers are multiples of 5?

(ii) In a box , there are 5 black pens , 3 white pens and 4 red pens. In how many ways can 2 black pens , 2white pens and 2 red pens canbe chosen?

مع تمنياتي لكم بالتوفيق. أ.م.د. عبد الرحمن محمد شحاته

5 3 4

Good Luck,

2018

$b = a + 1$

(1,2) (1,3) (1,4) (1,5)

(3,2) (3,3) (3,4) (3,5)

(4,2) (4,3) (4,4) (4,5)

$R = \{(1,2)\ (3,4)\ (4,5)\}$

$R' = \{(2,1)\ (4,3)\ (5,4)\}$

$y = x^3$ 2021 [illegible]

$y = \sin x$

3) $y = 3x - 5$

$x = 3y - 5 \Rightarrow y = \dfrac{x+5}{3} = F^{-1}_{(x)}$

$F \circ F^{-1} = 3\left(\dfrac{x+5}{3}\right) - 5$

$F \circ F^{-1} = 2$

4)

$\lim\limits_{n \to 0} \left(1+\dfrac{2}{n}\right)^{3n-1} = \lim\limits_{n \to 0} \left(1+\dfrac{2}{n}\right)^{3n} \left(1+\dfrac{2}{n}\right)^{-1}$

$= \left[\left(1+\dfrac{2}{n}\right)^{n}\right]^3 = \left[e^2\right]^3 = e^6$

$\lim\limits_{n \to 0} \dfrac{\sin 3x}{7x} = \dfrac{\frac{\sin 3x}{x}}{\frac{7x}{x}} = \dfrac{3}{7}$

$\lim\limits_{x \to \infty} \dfrac{x^2+3x-5}{4x^2-3x+2} = \lim\limits_{x \to \infty} \dfrac{2x+3}{8x-3}$

$\lim\limits_{x \to \infty} \dfrac{2}{8} = \dfrac{1}{4}$

5

6)

i) صحيحة

ii) $y = x^2 \tan x + \sin^3(2x-3)$

$y' = 2x . \tan x + x^2 . \sec^2 x + 3\sin^2(2x-3) . \cos(2x-3) . 2$

$y' = 2x \tan x + x^2 \sec^2 x + 3\sin^2(2x-3) . \cos(2x-3) . 2$

---

iii) $x^2 + 3xy + 4y^2 = 5$

$2x + 3y + 3xy' + 4yy' = 0$

$3xy' + 8yy' = -2x - 3y$

$y'(3x + 8y) = -2x - 3y$

$y' = \dfrac{-2x - 3y}{3x + 8y}$

الجبر

1) $\frac{1-2i}{1+3i} \times \frac{1-3i}{1-3i}$

$\frac{1-3i-2i+6i^2}{1-3i+3i-9i^2} = \frac{1-6-5i}{1+9}$

$\frac{-5}{10} - \frac{5}{10} i$

2) 2021 صيفا غ

3) $\frac{n+1}{2} \quad , \quad \frac{n+1}{2} + 1$

$\frac{11+1}{2} = 6 \quad , \quad \frac{11+1}{2} + 1 = 7$

$T_6 = C^{11}_{5} \left(\frac{a}{2}\right)^6 \left(\frac{b}{3}\right)^5 = -\frac{77}{2592} a^6 b^5$

$T_7 = C^{11}_{6} \left(\frac{a}{2}\right)^5 \left(\frac{b}{3}\right)^6 = \frac{77}{3888} a^5 b^6$

4) 2021 صيفا غ

MINIA UNIVERSITY
MiniaUniversity

Faculty of Science
Math.Dept.

Class: first year FCI
Subject: Qualifying Mathematics
Code: BMA001
Mid Term Examination

Time: 3 hours
Jan...:5/1/2019

Answer the following questions:

First: calculus (30 marks)

(1)(a) Let $R = \{(a,b): a \in A, b \in B \text{ and } a + b = 7\}$ be a relation from $A = \{1,2,,3\}$ to $B = \{2,3,4,5,6\}$ find R and R^{-1}.

(b) Sketch the curves of the functions:

(i) $y = x^2$, (ii) $y = \sin x$ and give the domain and rang of them.

(2) Find the inverse of the function $y = 3x + 5$and find $(f . f^{-1})(2)$.

(3)Find: $\lim\limits_{n\to\infty}\left(1+\frac{2}{n}\right)^{5n-1}$, $\lim\limits_{n\to 0}\frac{\sin 3x}{4x}$, $\lim\limits_{n\to\infty}\frac{2x-5}{4x^2-3x+2}$.

(4) If $(x) = \begin{cases} \frac{x^2-4}{x-2}, & x \neq 2 \\ 4, & x = 2 \end{cases}$, is $f(x)$ continuous at $x = 2$?

(5) Find $\frac{dy}{dx}$ of the following functions:

(i)$y = (x^2 + 3x + 4)^5$, (ii)$y = x^2 e^{\tan x} + \dfrac{\sec x}{4x - 2}$,

(iii)$y = \sin^3(2x - 3)$.

Second:Algebra(30 marks)

(1) Write $\frac{1+3i}{1-2i}$ in its general form.

(2) Find the middle term of $(3x^2 + \frac{1}{2x})^{10}$.

(3) Find the square roots of $z = 1 + i$.

(4) Show that $\binom{n}{r} = \binom{n}{n-r}$. If $\binom{10}{r} = \binom{10}{2r+1}$ find the value of r.

(5) Find the 5^{th} term of $(x - \frac{1}{x})^9$.

أ.م.د. عبد الرحمن محمد شحاته

مع تمنياتي لكم بالتوفيق.

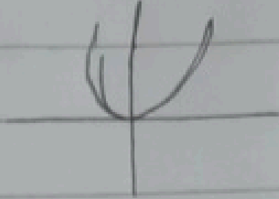
....

.... **Good Luck,**

2019

1) (a) حليتها

(b) $y = x^2$



Domain = $\mathbb{R}$
Range = $[0, \infty[$

sinx   2018 i حليتها

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2) $y = 3x + 5$

$x = 3y + 5$

$y = \frac{x-5}{3} = f^{-1}$

$f \circ f^{-1} = \cancel{3}\left(\frac{x-5}{\cancel{3}}\right) + 5$

$f \circ f^{-1} = 2$

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3 i) حليتها

ii) $\dfrac{\frac{\sin 3x}{x}}{\frac{4x}{x}} = \dfrac{3}{4}$

iii) حليتها

الجبر

1) $\frac{1+3i}{1-2i} \cdot \frac{1+2i}{1+2i}$

$= \frac{1+2i+3i+6i^2}{1+4} = \frac{-5+5i}{5}$

$= -1+i$

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2) $(3x^2+\frac{1}{2x})^{10}$

$\frac{10}{2}+1 = 6$

$T_6 = C_5^{10}(3x^2)^5(\frac{1}{2x})^5 = \cancel{252}$

$= 252\,(243x^{10})\cdot(\frac{1}{32x^5}) = \frac{15309}{8}x^5$

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3)

4) حسبتها

5) $(x - \frac{1}{x})^9$

$T_5 = {}^9C_4 \, x^5 (\frac{1}{x})^4$

$= \frac{9!}{4!\,5!} \, x^5 \cdot \frac{1}{x^4} = 126\,x$

Minia University
Level: 1st year. Students
Subject: Qualifying math
BMA001

Academic Year (2017/2018)
First Term - Final Examination

Faculty of Computers & Informatics
Date: 9/1/2018
Time: 2 hours

Answer the following questions:

First: calculus (30 marks)

(1)Sketch the curves of the functions: $(i)\ y = e^{-x}$, $(ii)\ \ y = sinx$

and give the domain and rang of them.

(2) Find the inverse of the function $y = 3x - 4$and find $(f \circ f^{-1})(2)$.

(3)Find: $\lim_{n\to\infty}\left(1-\frac{2}{n}\right)^{3n+1}$, $\lim\limits_{n\to 0}\frac{sin3x}{x}$, $\lim\limits_{n\to\infty}\frac{3x^2+2x-5}{4x^2-3x+2}$.

(4) If $f(x) = \begin{cases} \frac{x^3-27}{x-3} & ,x \neq 3 \\ 6 & ,x = 3 \end{cases}$, is $f(x)$ continuous at $x = 3$?

(5) Find $\frac{dy}{dx}$ of the following functions:

$(i)y = (x^2+3x+4)^5$, $(ii)y = x^2e^{tanx} + secx\ln(x^2+3x-2)$,
$(iii)y = cosx\,a^x + sin^2(2x-3)$.

Second:Algebra(30 marks)

(1) Write $\frac{(1+i)(2-i)}{(3+i)}$ in its general form.

(2) The middle term of $(\frac{x}{y} - \frac{y}{x})^4 is\ \frac{4x^2}{y^2}$,6 , 8 , $\frac{4x}{y}$.

(3) find the roots of $\left((1-i)^{1/3}\right)$.

(4) Show that $\binom{n}{r} = \binom{n}{n-r}$, If $\binom{10}{r} = \binom{10}{2r+1}$ find the value of r.

(5) (i)How many multiples of 5 are there from 10 to 95?

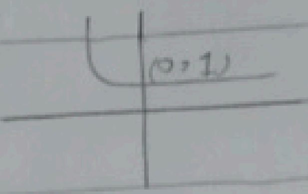
(ii) In a box , there are 5 black pens , 3 white pens and 4 red pens.
In how many ways can 2 black pens , 2white pens and 2 red pens canbe chosen?

أ.م.د.عبد الرحمن محمد شحاته　　　　مع تمنياتي لكم بالتوفيق

Good Luck,

2017

1) $y = e^{-x}$



Domain = R

Range =]0, ∞[

2) $y = \sin x$ Loíaws

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2) $y = 3x - 4$

$x = 3y - 4$

$y = \frac{x+4}{3}$

$f \circ f^{-1} = 3 \cdot \left(\frac{x+4}{3}\right) - 4$

$f \circ f^{-1} = 2$

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3) $\lim_{n \to \infty} \left(1 - \frac{2}{n}\right)^{3n+1}$

$\lim_{n \to \infty} \left(1 - \frac{2}{n}\right)^{3n} \left(1 - \frac{2}{n}\right)$

$[e^2]^3 = e^6$

$$\lim_{n \to 0} \frac{\text{sim} 3x}{x} = \lim_{n \to 0} \frac{\frac{\sin 3x}{x}}{\frac{x}{x}} = 3$$

3) حليتها

4) ??

1) حليتها

2) $y = x^2 e^{\tan x} + \sec x \, Ln(x^2 + 3x - 2)$

$y' = x^2 . e^{\tan x} . \sec^2 x + 2x e^{\tan x} + \sec x . \left(\frac{2x+3}{x^2+3x-2}\right)$
$\tan x \sec x . Ln(x^2 + 3x - 2)$

3) $y = \cos x \, a^2 + \sin^3(2x - 3)$

$y' = \cos x . 2a - \sin x . a^2 + 3\sin^2(2x-3) . 2$
$= 2a \cos x - a^2 \sin x + 6 \sin^2(2x-3)$

الجبر

$$\frac{(1+i)(2-i)}{(3+i)}$$

$$\frac{(2-i+2i-i^2)}{(3+i)} = \frac{2-3i-i^2}{3+i} \cdot \frac{3-i}{3-i}$$

$$= \frac{9+1}{10} = 1$$

2) 6

$$\frac{4}{2}+1=3$$

$$T_3 = C^4_2\left(\frac{\cancel{x}}{\cancel{y}}\right)^2\left(-\frac{\cancel{y}}{\cancel{x}}\right)^2 = \frac{4!}{2!\,2!} = 6$$

3)

4) حيثها

5) i) $2 \times 9 = 18$

ii)

جامعة المنيا　　امتحان منتصف الفصل الدراسي الأول٢٠١٧\٢٠١٨　　الزمن: ساعة

كلية العلوم _قسم الرياضيات　الفرقة: اولى حوسبة حيوية معلوماتية　المادة:تاهيلي رياضيات

اجب عن الأسئلة التالية :

أولا : التفاضل :

(1) Sketch the curves of the functions:

$(i)\ y = e^x$, $(ii)\ y = x^3$ and give the domain and rang of them.

(2) Find the inverse of the function $y = 2x - 3$.

(3) Find: $\lim_{n\to\infty}\left(1-\frac{3}{n}\right)^{2n}$.

ثانيا : الجبر:

(1) Find the 7^{th} term in the expansion of $(x-\frac{1}{x})^9$.

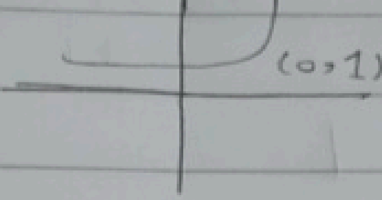
(2) find the roots of الرابع $\left((1-\sqrt{3}\ i)^{1/3}\right)$.

(3) Express $cos3\theta$ in terms of $cos\theta$ and $sin\theta$.

مع تمنياتي لكم بالتوفيق.　　　د.عبد الرحمن محمد شحاته

2017 صيـ

1) $y = e^x$



Domain = R
Range =]0, ∞[

2) $y = x^3$ رسمتها

$y = 2x - 3$
$x = 2y - 3$
$y = \frac{x+3}{2} = f^{-1}$

$f \circ f^{-1} = 2\left(\frac{x+3}{2}\right) - 3$

$f \circ f^{-1} = 2$

$\lim_{n \to \infty} \left(1 - \frac{3}{n}\right)^{2n} = (e^3)^2 = e^8$

$$(x - \frac{1}{x})^9$$

$$T_7 = C^9_6 \, x^3 \left(\frac{-1}{x}\right)^6 = -\frac{84}{x^3}$$

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2) ??

3) ??

MINIA UNIVERSITY
MiniaUniversity

Faculty of Science
Math.Dept.

Class: first year FCI
Subject: QualifyingMathematics

Time: 2 hours
Sep.:2018

Answer the following questions:

First: calculus (30 marks)

(1)(a)Sketch the curves of the functions:$(i)\ \ y = 2x + 1$, $(ii)\ \ y = e^x$.
and give the domain and rang of them.

(b) Find the inverse of the function $y = 5x - 2$and find $(f \circ f^{-1})(2)$.

(2)(a)Find: $\lim\limits_{n\to 0}\left(1-\frac{2}{n}\right)^{3n+1}$, $\lim\limits_{n\to 0}\frac{sin3x}{x}$, $\lim\limits_{n\to\infty}\frac{3x^2+2x-5}{4x^2-3x+2}$.

(b)If $f(x) = \begin{cases} \frac{x^2-4}{x-2} & ,x \neq 2 \\ 4 & ,x = 2 \end{cases}$, is $f(x)$ continuous at $x = 2$?

(3) Find $\frac{dy}{dx}$ of the following functions:
$(i) y = (x^2 + 3x + 4)^5$, $(ii) y = x^2 e^{tanx} + cosx \ln(x^2 + 3x - 2)$,
$(iii) y = sec^2 x + sin^3(2x - 3)$.

Second:Algebra(30 marks)

(1) Write $\frac{(3+i)(2-i)}{(1+i)}$ in its general form.

(2) Find the third term of $(x - y)^4$.

(3) find the roots of $\left((1 + i)^{1/3}\right)$.

(4) Show that $\binom{n}{r} = \binom{n}{n-r}$, If $\binom{10}{r} = \binom{10}{2r+1}$ find the value of r.

(5) (i)If you have 6 new year greeting cards and you want to send them to 4 of your friends , in how many ways can this be done?

(ii) In a box , there are 5 black pens , 3 white pens and 4 red pens. In how many ways can 2 black pens , 2white pens and 2 red pens can be chosen?

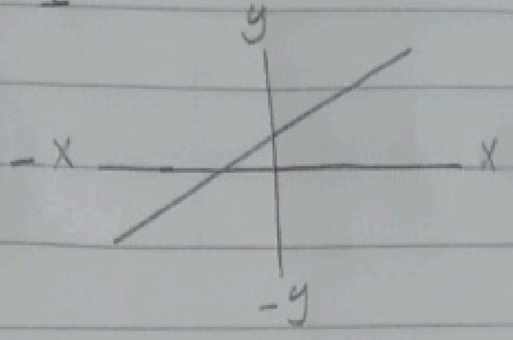
أ.م.د.عبد الرحمن محمد شحاته

مع تمنياتي لكم بالتوفيق.

Good Luck,

2018

1) $y = 2x + 1$



Domain = R

Range = R

2) e^x حليتها

$y = 5x - 2$

$x = 5y - 2$

$\therefore f \circ f^{-1}(2) = 2$

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2) محلول قبل كدة

1) حليتها ، 2) ، 3

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3)

1, 2 حليتهم

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

$y' = 2\sec x \cdot 1 + 3\sin^2(2x-3) \cdot 2$

$y' = 2\sec x + 6\sin^2(2x-3)$

الجبر

1) حبيتها

2) $(x-y)^4$

$T_3 = C_2^4 \, x^2 (-y)^2$

$= -6x^2y^2$

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3) ??

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4) حبيتها

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5) ??

Gehad Mousa Ebrahim

MINIA UNIVERSITY
Minia University
Faculty of Science
Math.Dept.

Class: first year FCI
Subject: Qualifying Mathematics
Code: BMA001
Mid Term Examination

Time: 1 hours
Nov. 2018

Answer the following questions:

First: calculus (10 marks)

(1) Let $R = \{(a,b): a \in A, b \in B \text{ and } a < b\}$ be a relation from $A = \{1,4,5\}$ to $B = \{2,3,4,5\}$ find R and R^{-1}.

(2) Find the inverse of the function $y = 3x + 2$ and find $(f \circ f^{-1})(2)$.

Second: Algebra (10 marks)

(1) Find the 7^{th} term of $\left(x - \frac{1}{x}\right)^9$.

(2) The middle term of $\left(\frac{x}{y} - \frac{y}{x}\right)^4$ is $\frac{4x^2}{y^2}$, 6, 8, $\frac{4x}{y}$.

أ.م.د. عبد الرحمن محمد شحاته

مع تمنياتي لكم بالتوفيق.
Good Luck,

Aya Tarek

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1) $a<b$

$(1,2)\ (1,3)\ (1,4)\ (1,5)$

$(4,2)\ (4,3)\ (4,4)\ (4,5)$

$(5,2)\ (5,3)\ (5,4)\ (5,5)$

$R = \{(1,2)\ (1,3)\ (1,4)\ (1,5)\ (4,5)\}$

$R' = \{(2,1)\ (3,1)\ (4,1)\ (5,1)\ (5,4)\}$

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2) $y = 3x + 2$

$x = 3y + 2$

$y = \frac{x-2}{3}$

$f \circ f^{-1} = 2$

الجبر

1) $(x - \frac{1}{x})^9$ محلولة قبل كدة

$= -\frac{84}{x^3}$

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2) محلولة $= 6$