



**SET A**

Department of Mathematics and Natural Sciences

Quiz 1

Semester: Fall 2015

Course Title: Linear Algebra and Fourier Analysis (MATH IV)

Course No.: MAT216

Section: 04

Student Name	:		Student ID	:	
Time	:	40 min	Date	:	Sep 21, 2015
Total marks	:	25	Marks Obtained	:	

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Answer the following

1. Define *system of linear equations*. Solve the following system by *Gauss-Jordan elimination* process. [10]

$$\begin{aligned}x_1 - x_2 + 2x_3 &= 6 \\ -x_1 + 2x_2 + 3x_3 &= 5 \\ 3x_1 - 7x_2 + 4x_3 &= 4\end{aligned}$$

2. Define *consistent* and *inconsistent* systems. Determine the values of parameter  $\lambda$ , such that the following system has: (i) no solution, (ii) unique solution, (iii) infinitely many solutions. [15]

$$\begin{aligned}x + y - z &= 1 \\ 2x + 3y + \lambda z &= 3 \\ x + \lambda y + 3z &= 2\end{aligned}$$

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**SET B**

Department of Mathematics and Natural Sciences

Quiz 1

Semester: Fall 2015

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Course No.: MAT216

Section: 04

Student Name	:		Student ID	:	
Time	:	40 min	Date	:	Sep 21, 2015
Total marks	:	25	Marks Obtained	:	

---

Answer the following

1. Define *system of linear equations*. Solve the following system by *Gauss-Jordan elimination* process. [10]

$$\begin{aligned}x_1 + x_2 + 2x_3 &= 5 \\ -x_1 - 2x_2 + 3x_3 &= 12 \\ 3x_1 - 7x_2 + 4x_3 &= 29\end{aligned}$$

2. Define *consistent* and *inconsistent* systems. Determine the values of parameter  $k$ , such that the following system has (i) no solution, (ii) unique solution, (iii) infinitely many solutions. [15]

$$\begin{aligned}x + y + kz &= 2 \\ 3x + 4y + 2z &= k \\ 2x + 3y - z &= 1\end{aligned}$$

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**SET A**

Department of Mathematics and Natural Sciences

Quiz 2

Semester: Summer 2015

Course Title: Linear Algebra and Fourier Analysis (MATH IV)

Course No.: MAT216

Section: 04

Student Name	:		Student ID	:	
Time	:	40 min	Date	:	Oct 17, 2015
Total marks	:	25	Marks Obtained	:	

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Answer the following

1. Define *inverse* matrix. Find  $A^{-1}$  for the following matrix [9]  
$$A = \begin{bmatrix} 1 & -1 & 0 \\ 1 & 0 & -1 \\ -6 & 2 & 3 \end{bmatrix}.$$
  2. Define *vector space*. Show that the set  $M_{2 \times 2}$  of all  $2 \times 2$  matrices is a vector space under the [9]  
matrix addition and scalar multiplication.
  3. Write  $w = (1, 1, 1)$  as a linear combination of vectors in the set  $S$ . [7]  
 $S = \{(1, 2, 3), (0, 1, 2), (-1, 0, 1)\}.$   
Are the vectors in  $S$  linearly independent?
-



**SET B**

Department of Mathematics and Natural Sciences

Quiz 2

Semester: Summer 2015

Course Title: Linear Algebra and Fourier Analysis (MATH IV)

Course No.: MAT216

Section: 04

Student Name	:		Student ID	:	
Time	:	40 min	Date	:	Oct 17, 2015
Total marks	:	25	Marks Obtained	:	

---

Answer the following

1. Define *inverse* matrix. Find  $A^{-1}$  for the following matrix [9]  
$$A = \begin{bmatrix} 1 & 2 & 3 \\ 1 & 3 & 3 \\ 2 & 4 & 3 \end{bmatrix}.$$
  2. Define *vector space* and *subspace*. Show that the following set [9]  
 $R^3 = \{(a, b, c) : a, b, c \in R\}$   
is a vector space.
  3. Write  $w = (1, 1, 1)$  as a linear combination of vectors in the set  $S$ . [7]  
 $S = \{(1, 2, 3), (0, 1, 2), (-2, 0, 1)\}.$   
Are the vectors in  $S$  linearly independent?
-



**SET A**

Department of Mathematics and Natural Sciences

Quiz 3

Semester: Fall 2015

Course Title: Linear Algebra and Fourier Analysis (MATH IV)

Course No.: MAT216

Section: 04

Student Name	:		Student ID	:	
Time	:	25 min	Date	:	Nov 09, 2015
Total marks	:	15	Marks Obtained	:	

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Answer the following:

1. Evaluate the iterated integral

[5]

$$\int_{\pi/2}^{\pi} \int_1^2 x \cos(xy) dy dx.$$

2. Evaluate the following double integral:

[10]

$$\iint_R (x \sin y - y \sin x) dA$$

where  $R = \{(x, y): 0 \leq x \leq \pi/2, 0 \leq y \leq \pi/3\}$ .

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**SET B**

Department of Mathematics and Natural Sciences

Quiz 3

Semester: Fall 2015

Course Title: Linear Algebra and Fourier Analysis (MATH IV)

Course No.: MAT216

Section: 04

Student Name	:		Student ID	:	
Time	:	25 min	Date	:	Nov 09, 2015
Total marks	:	15	Marks Obtained	:	

---

Answer the following:

1. Evaluate the iterated integral

[5]

$$\int_{\pi/2}^{\pi} \int_1^2 x \cos(xy) dy dx.$$

3. Evaluate the following double integral:

[10]

$$\iint_R (2x - y^2) dA$$

where  $R$  is the triangular region enclosed by the lines  $y = -x + 1$ ,  $y = x + 1$ , and  $y = 3$

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**SET C**

Department of Mathematics and Natural Sciences

Quiz 3

Semester: Fall 2015

Course Title: Linear Algebra and Fourier Analysis (MATH IV)

Course No.: MAT216

Section: 04

Student Name	:		Student ID	:	
Time	:	25 min	Date	:	Nov 09, 2015
Total marks	:	15	Marks Obtained	:	

---

Answer the following:

1. Evaluate the iterated integral

[5]

$$\int_{-1}^1 \int_{-x^2}^{x^2} (x^2 - y) dy dx.$$

3. Evaluate the following double integral:

[10]

$$\iint_R xy dA$$

where  $R$  is the region enclosed by the curves  $y = \sqrt{x}$  and  $y = x^2$ .

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**SET A**

Department of Mathematics and Natural Sciences

Quiz 4

Semester: Fall 2015

Course Title: Linear Algebra and Fourier Analysis (MATH IV)

Course No.: MAT216

Section: 04

Student Name	:		Student ID	:	
Time	:	25 min	Date	:	Nov 18, 2015
Total marks	:	15	Marks Obtained	:	

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Answer the following:

1. Use the transformation  $u = x - 2y, v = 2x + y$  to find [15]

$$\iint_R \frac{x - 2y}{2x + y} dA$$

where  $R$  is the region enclosed by the lines  $x - 2y = 1$ ,  $x - 2y = 4$ ,  $2x + y = 1$ , and  $2x + y = 3$ .

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**SET B**

Department of Mathematics and Natural Sciences

Quiz 4

Semester: Fall 2015

Course Title: Linear Algebra and Fourier Analysis (MATH IV)

Course No.: MAT216

Section: 04

Student Name	:		Student ID	:	
Time	:	25 min	Date	:	Nov 18, 2015
Total marks	:	15	Marks Obtained	:	

---

Answer the following:

1. Use the transformation  $u = x - y, v = x + y$  to find [15]

$$\iint_R (x - y)e^{x^2 - y^2} dA$$

where  $R$  is the region enclosed by the lines  $x + y = 0, x + y = 1, x - y = 1$ , and  $x - y = 4$ .

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**SET C**

Department of Mathematics and Natural Sciences

Quiz 4

Semester: Fall 2015

Course Title: Linear Algebra and Fourier Analysis (MATH IV)

Course No.: MAT216

Section: 04

Student Name	:		Student ID	:	
Time	:	25 min	Date	:	Nov 18, 2015
Total marks	:	15	Marks Obtained	:	

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Answer the following:

1. Use the transformation  $u = \frac{1}{2}(x + y)$ ,  $v = \frac{1}{2}(x - y)$  to find [15]

$$\iint_R \sin \left[ \frac{1}{2}(x + y) \right] \cos \left[ \frac{1}{2}(x - y) \right] dA$$

where  $R$  is the triangular region with vertices at  $(0,0)$ ,  $(2,0)$ ,  $(1,1)$ .

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**SET D**

Department of Mathematics and Natural Sciences

Quiz 4

Semester: Fall 2015

Course Title: Linear Algebra and Fourier Analysis (MATH IV)

Course No.: MAT216

Section: 04

Student Name	:		Student ID	:	
Time	:	25 min	Date	:	Nov 18, 2015
Total marks	:	15	Marks Obtained	:	

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Answer the following:

1. Use the transformation  $u = x + y, v = x - y$  to find [15]

$$\iint_R (x^2 - y^2) dA$$

where  $R$  is the region enclosed by the lines  $y = -x, y = 1 - x, y = x$ , and  $y = x + 2$

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**SET A**

Department of Mathematics and Natural Sciences

Quiz 4 II

Semester: Fall 2015

Course Title: Linear Algebra and Fourier Analysis (MATH IV)

Course No.: MAT216

Section: 04

Student Name	:		Student ID	:	
Time	:	20 min	Date	:	Dec 03, 2015
Total marks	:	10	Marks Obtained	:	

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Answer the following:

1. Graph the following function

[15]

$$f(x) = \begin{cases} 8 & 0 < x < 2 \\ -8 & 2 < x < 4 \end{cases}$$

And find its corresponding Fourier series. Assume that the function is periodic outside the given interval.

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**SET B**

Department of Mathematics and Natural Sciences

Quiz 4 II

Semester: Fall 2015

Course Title: Linear Algebra and Fourier Analysis (MATH IV)

Course No.: MAT216

Section: 04

Student Name	:		Student ID	:	
Time	:	20 min	Date	:	Dec 03, 2015
Total marks	:	10	Marks Obtained	:	

---

Answer the following:

1. Graph the following function

[15]

$$f(x) = \begin{cases} -x & -4 \leq x \leq 0 \\ x & 0 < x \leq 4 \end{cases}$$

And find its corresponding Fourier series. Assume that the function is periodic outside the given interval.

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**SET C**

Department of Mathematics and Natural Sciences

Quiz 4 II

Semester: Fall 2015

Course Title: Linear Algebra and Fourier Analysis (MATH IV)

Course No.: MAT216

Section: 04

Student Name	:		Student ID	:	
Time	:	20 min	Date	:	Dec 03, 2015
Total marks	:	10	Marks Obtained	:	

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Answer the following:

1. State the Dirichlet conditions. Expand the following function  $f(x) = x, 0 < x < 2$  in a half range Fourier sine series. [15]
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**SET D**

Department of Mathematics and Natural Sciences

Quiz 4 II

Semester: Fall 2015

Course Title: Linear Algebra and Fourier Analysis (MATH IV)

Course No.: MAT216

Section: 04

Student Name	:		Student ID	:	
Time	:	20 min	Date	:	Dec 03, 2015
Total marks	:	10	Marks Obtained	:	

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Answer the following:

1. Define even and odd functions with examples. Expand the following function  $f(x) = x, 0 < x < 2$  in a half range Fourier cosine series. [15]
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