

MA 2132

Polytechnic University  
WORKSHEET 5

DATE:

Print Name:
Signature:
ID #:
Instructor:

Problem	Possible	Points
1	25	
2	25	
3	25	
4	25	
Total	100	

YOUR SIGNATURE:

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(1) Find a fundamental set of solutions for the problem  $x' = Ax$  where  $A$  is as specified.

(a)

$$A = \begin{pmatrix} -1 & 1 \\ -4 & 3 \end{pmatrix}$$

(b)

$$A = \begin{pmatrix} 3 & 2 \\ -8 & -5 \end{pmatrix}$$

YOUR SIGNATURE:

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(2) Find a fundamental set of solutions for the problem  $x' = Ax$  where  $A$  is as specified.

$$A = \begin{pmatrix} 0 & 1 & 1 \\ 1 & 1 & -1 \\ -2 & 1 & 3 \end{pmatrix}$$

YOUR SIGNATURE:

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(3) Find a fundamental set of solutions for the problem  $x' = Ax + b$  where  $A$  and  $b$  are as specified.

(a)

$$A = \begin{pmatrix} 2 & 1 \\ -3 & -2 \end{pmatrix} \text{ and } b(t) = [2e^t, 4e^t]$$

(b)

$$A = \begin{pmatrix} 2 & 2 \\ -3 & -3 \end{pmatrix} \text{ and } b(t) = [1, 2t]$$

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- (4) Using the Euler method with step size  $h = 0.1$ , find approximate values for the solution of the initial value problem.

$$y' + 2y = 4x^2, \quad y(0) = 2,$$

at  $x = 0.1, 0.2$  and  $0.3$ . Then find the exact solution and determine its values at the same points. Show all your work.