WebAssign
CH 2.2 (Homework)

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MA 265 Spring 2013, section 132, Spring 2013
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Current Score : 20 / 20 **Due :** Thursday, January 24 2013 11:40 PM EST

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1. 2/2 points | Previous Answers KolmanLinAlg9 2.2.004.

Each of the given linear systems is in reduced row echelon form. Solve the system. (Use the parameters x, y, z, and w as necessary. If there is no solution, enter NO SOLUTION.)

(a)
$$\begin{aligned} x \quad - 2z &= 5 \\ y + z &= 4 \end{aligned}$$

$(x, y, z) = \Big(\qquad \Big)$

(b)
$$\begin{aligned} x &= 4 \\ y &= 3 \\ z - w &= 1 \end{aligned}$$

$(x, y, z, w) = \Big(\qquad \Big)$

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2. 2/2 points | Previous Answers KolmanLinAlg9 2.2.006.

Answer the questions for each of the following linear systems. (Use the parameters x, y, z, and w as necessary. If there is no solution, enter NO SOLUTION.)

(a)
$$\begin{aligned} x + y + 2z + 3w &= 13 \\ x - 2y + z + w &= 8 \\ 3x + y + z - w &= 1 \end{aligned}$$

(i) Find all solutions, if any exist, by using the Gaussian elimination method.

$(x, y, z, w) = \Big(\qquad \Big)$

(ii) Find all solutions, if any exist, by using the Gauss-Jordan reduction method.

$(x, y, z, w) = \Big(\qquad \Big)$

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

(i) Find all solutions, if any exist, by using the Gaussian elimination method.

$(x, y, z) = \Big(\qquad \Big)$

(ii) Find all solutions, if any exist, by using the Gauss-Jordan reduction method.

$(x, y, z) = \Big(\qquad \Big)$

(c)
$$\begin{aligned} 2x + y + z - 2w &= 4 \\ 3x - 2y + z - 6w &= -8 \\ x + y - z - w &= -4 \\ 6x + z - 9w &= -8 \\ 5x - y + 2z - 8w &= 12 \end{aligned}$$

(i) Find all solutions, if any exist, by using the Gaussian elimination method.

$(x, y, z, w) = \Big(\qquad \Big)$

(ii) Find all solutions, if any exist, by using the Gauss-Jordan reduction method.

$(x, y, z, w) = \Big(\qquad \Big)$

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3. 2/2 points | Previous Answers KolmanLinAlg9 2.2.008.

Solve the linear system, with the given augmented matrix, if it is consistent. (Use the parameters x, y, z, and w as necessary. If there is no solution, enter NO SOLUTION.)

(a) $\left[\begin{array}{cccc|c} 4 & 2 & 3 & 2 & 8 \\ 4 & 3 & 0 & 2 & 7 \\ 4 & 0 & 2 & 2 & 3 \end{array}\right]$

$(x, y, z, w) = \Big(\qquad \Big)$

(b) $\left[\begin{array}{cccc|c} 1 & 1 & 3 & -3 & 0 \\ 0 & 2 & 1 & -3 & 3 \\ 1 & 0 & 2 & -1 & -1 \end{array}\right]$

$(x, y, z, w) = \Big(\qquad \Big)$

4. 2/2 points | Previous Answers KolmanLinAlg9 2.2.010.

Find a 2 × 1 matrix **x** with entries not all zero such that

$$A\mathbf{x} = 8\mathbf{x}, \quad \text{where } A = \begin{bmatrix} 8 & 1 \\ 0 & 4 \end{bmatrix}.$$

[*Hint:* Rewrite the matrix equation $A\mathbf{x} = 8\mathbf{x}$ as $8\mathbf{x} - A\mathbf{x} = (8I_2 - A)\mathbf{x} = \mathbf{0}$, and solve the homogeneous linear system.]

$\mathbf{x} =$

1

0

5. 2/2 points | Previous Answers KolmanLinAlg9 2.2.012.

Find a 3 × 1 matrix **x** with entries not all zero such that

$$A\mathbf{x} = 9\mathbf{x}, \quad \text{where } A = \begin{bmatrix} 7 & 2 & -1 \\ 1 & 6 & 1 \\ 4 & -4 & 11 \end{bmatrix}.$$

$\mathbf{x} =$

-1/4

1/4

1

6. 2/2 points | Previous Answers KolmanLinAlg9 2.2.014.

In the following linear system, determine all values of *a* for which the resulting linear system has no solution, a unique solution, and infinitely many solutions. (Enter your answers as a comma-separated list. If there is no solution, enter NO SOLUTION.)

$$\begin{aligned} x + y - z &= 5 \\ x + 2y + z &= 6 \\ x + y + (a^2 - 26)z &= a \end{aligned}$$

(a) no solution

$a =$

(b) a unique solution

$a \neq$

(c) infinitely many solutions

$a =$

7. 2/2 points | Previous Answers KolmanLinAlg9 2.2.016.

In the following linear system, determine all values of *a* for which the resulting linear system has no solution, a unique solution, and infinitely many solutions. (Enter your answers as a comma-separated list. If there is no solution, enter NO SOLUTION.)

$$\begin{aligned} x + y + z &= 9 \\ x + 2y + z &= 17 \\ x + y + (a^2 - 2)z &= a \end{aligned}$$

(a) no solution

$a =$

(b) a unique solution

$a \neq$

(c) infinitely many solutions

$a =$

8. 2/2 points | Previous Answers KolmanLinAlg9 2.2.020.

Let f: $R^3 \to R^3$ be the matrix transformation defined by

$$f\left(\begin{bmatrix} x \\ y \\ z \end{bmatrix}\right) = \begin{bmatrix} 4 & 1 & 3 \\ 2 & -1 & 3 \\ 2 & 2 & 0 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix}.$$

Find x, y, and z so that $f\left(\begin{bmatrix} x \\ y \\ z \end{bmatrix}\right) = \begin{bmatrix} 12 \\ 9 \\ 3 \end{bmatrix}$. (Use the parameter t as necessary.)

$(x, y, z) = \Big(\qquad \Big)$

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9. 2/2 points | Previous Answers KolmanLinAlg9 2.2.022.

Let f: $R^3 \to R^3$ be the matrix transformation defined by

$$f\left(\begin{bmatrix} x \\ y \\ z \end{bmatrix}\right) = \begin{bmatrix} -1 & 0 & 3 \\ 2 & -1 & 3 \\ -5 & 1 & 6 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix}.$$

Find an equation relating u, v, and w so that we can always compute values of x, y, and z for which

$$f\left(\begin{bmatrix} x \\ y \\ z \end{bmatrix}\right) = \begin{bmatrix} u \\ v \\ w \end{bmatrix}.$$

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10. 2/2 points | Previous Answers KolmanLinAlg9 2.2.026.

Find an equation relating u, v, and w so that the linear system

$$\begin{aligned} x + 2y - 3z &= u \\ 5x + 4y + 4z &= v \\ 8x + 4y + 14z &= w \end{aligned}$$

is consistent for any values of u, v, and w that satisfy that equation.