**Assignment WW-M1-LinearSystem**

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**1.** (1 point) Solve the system

$$2x-6y=23,$$
$$-3x+9y=-36.$$

Your answer is _____
If there is more than one point, type the points separated by a comma (i.e.: (1,2),(3,4)).
If the system has no solutions, type *none* in the answer blank.

*Correct Answers:*

- none

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**2.** (1 point) Find the quadratic polynomial whose graph goes through the points $(-1,7)$, $(0,6)$, and $(1,13)$.

$f(x) =$ _____.

*Correct Answers:*

- 4*x^2+3*x+6

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**3.** (1 point)
Solve the system using matrices (row operations)

$$\begin{cases} -2x-y-3z &= 9 \\ -x+4y-4z &= 17 \\ 3x-3y-6z &= 39 \end{cases}$$

How many solutions are there to this system?

- A. None
- B. Exactly 1
- C. Exactly 2
- D. Exactly 3
- E. Infinitely many
- F. None of the above

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If there is one solution, give its coordinates in the answer spaces below.

If there are infinitely many solutions, enter $z$ in the answer blank for $z$, enter a formula for $y$ in terms of $z$ in the answer blank for $y$ and enter a formula for $x$ in terms of $z$ in the answer blank for $x$.

If there are no solutions, leave the answer blanks for $x$, $y$ and $z$ empty.

$x =$ _____

$y =$ _____

$z =$ _____

*Correct Answers:*

- B
- 3
- 0
- -5

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**4.** (1 point) Solve the system by finding the reduced row-echelon form of the augmented matrix.

$$\begin{cases} x+2y-2z &= -1 \\ -3x-5y+9z &= 2 \\ x+4y+4z &= -3 \end{cases}$$

reduced row-echelon form:

$$\left[\begin{array}{ccc|c} \_\_ & \_\_ & \_\_ & \_\_ \\ \_\_ & \_\_ & \_\_ & \_\_ \\ \_\_ & \_\_ & \_\_ & \_\_ \end{array}\right]$$

How many solutions are there to this system?

- A. None
- B. Exactly 1
- C. Exactly 2
- D. Exactly 3
- E. Infinitely many
- F. None of the above

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If there is one solution, give its coordinates in the answer spaces below.

If there are infinitely many solutions, enter $z$ in the answer blank for $z$, enter a formula for $y$ in terms of $z$ in the answer blank for $y$ and enter a formula for $x$ in terms of $z$ in the answer blank for $x$.

If there are no solutions, leave the answer blanks for $x$, $y$ and $z$ empty.

$x =$ _____

$y =$ _____

$z =$ _____

*Correct Answers:*

- 1
- 0
- -8
- 1
- 0
- 1
- 3

- -1
- 0
- 0
- 0
- 0
- E
- 1--8*z
- -1 - 3*z
- z

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**5.** (1 point) Solve the system using any method

$$-x+y+z=5$$
$$4x-3y-z=-8$$
$$x+y+z=7$$

Your answer is

$x=$ _____

$y=$ _____

$y=$ _____

*Correct Answers:*

- 1
- 3
- 3

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**6.** (1 point) A dietician is planning a meal that supplies certain quantities of vitamin C, calcium, and magnesium. Three foods will be used, their quantities measured in milligrams. The nutrients supplied by these foods and the dietary requirements are given in the table below.

| Nutrient | Food 1 | Food 2 | Food 3 | Total Required (mg) |
|---|---|---|---|---|
| Vitamin C | 10 | 10 | 10 | 955 |
| Calcium | 20 | 35 | 40 | 3395 |
| Magnesium | 30 | 40 | 50 | 4155 |

Write the augmented matrix for this problem.

$$\left[\begin{array}{ccc|c} \_\_\_\_ & \_\_\_\_ & \_\_\_\_ & \_\_\_\_ \\ \_\_\_\_ & \_\_\_\_ & \_\_\_\_ & \_\_\_\_ \\ \_\_\_\_ & \_\_\_\_ & \_\_\_\_ & \_\_\_\_ \end{array}\right]$$

What quantity (mg) of Food 1 is necessary to meet the dietary requirements?

_____

What quantity (mg) of Food 2 is necessary to meet the dietary requirements?

_____

What quantity (mg) of Food 3 is necessary to meet the dietary requirements?

_____

*Correct Answers:*

- 10
- 10
- 10
- 955
- 20
- 35
- 40
- 3395
- 30
- 40
- 50
- 4155
- 11.5
- 39
- 45

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**7.** (1 point) Find the set of solutions for the linear system

$$\begin{array}{rcrcrcr} -3x_1 & - & 5x_2 & + & 4x_3 & = & 8 \\ & - & 4x_2 & - & 9x_3 & = & -9 \end{array}$$

Use **s1**, **s2**, etc. for the free variables if necessary.

$(x_1,x_2,x_3) = \left(\ \_\_\_\_,\ \_\_\_\_,\ \_\_\_\_\ \right)$

**Solution:** **SOLUTION:** Note that $x_3$ is a free variable so let $x_3 = s_1$. The second equation then gives $-4x_2 - 9s_1 = -9 \Rightarrow x_2 = \frac{9}{4} - \frac{9}{4}s_1$. Substitute this into the first equation, $-3x_1 - 5(\frac{9}{4} - \frac{9}{4}s_1) + 4s_1 = 8 \Rightarrow x_1 = -\frac{77}{12} + \frac{61}{12}s_1$.

*Correct Answers:*

- -(77/12)+61/12*s1
- 9/4-9/4*s1
- s1

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**8.** (1 point)

For the following system to be consistent,

$$\begin{array}{rcrcrcr} -5x & + & 7y & - & 5z & = & 3 \\ 6x & + & 9y & + & kz & = & -5 \\ 39x & + & 15y & - & 21z & = & -32 \end{array}$$

we must have, $k \neq$ _____

*Correct Answers:*

- -9