

# Week 1 WeBWorK

full credit by January 19, 2026, 11:59:00 PM MST, closes February 2, 2026, 11:59:00 PM MST

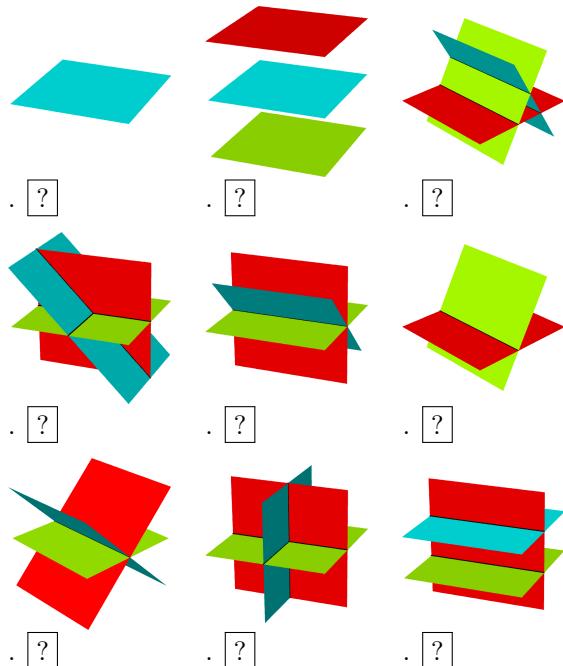
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Section: MATH301 001

This PDF is available for convenience. Assignments must be submitted within **WeBWorK** for credit.

## Problem 1. (2 points)

Each graph below is the graph of a system of three linear equations in three unknowns. Determine which systems are consistent (that is, have at least one solution) and which are inconsistent (have no solutions).



(Click on a graph to enlarge it.)

Correct Answers:

- consistent
- inconsistent
- inconsistent
- consistent
- consistent
- consistent
- consistent
- consistent
- inconsistent

## Problem 2. (2 points)

Graph each of the following linear systems to determine whether they have no solution, an infinite number of solutions, or a unique solution.

[?] 1. 
$$\begin{cases} -8x + 8y = -8 \\ 4x - 4y = 4 \\ -14x + 14y = -14 \end{cases}$$

[?] 2. 
$$\begin{cases} 7x - 7y = 3 \\ 6x + 2y = 4 \\ -33x + 17y = -17 \end{cases}$$

[?] 3. 
$$\begin{cases} 7x - 7y = 3 \\ 6x + 2y = 4 \\ -33x + 17y = -16 \end{cases}$$

Correct Answers:

- Infinite Solutions
- Unique Solution
- No Solution

## Problem 3. (2 points)

Determine which of the points  $(6, -6, 3)$ ,  $(1, -4, -3)$ , and  $(1, 6, -3)$  are solutions to the linear system

$$\begin{aligned} 8x_1 + 3x_2 - 3x_3 &= 21 \\ 3x_1 + 9x_2 - 4x_3 &= -48 \end{aligned}$$

If more than one point is a solution, enter your answer as a comma-separated list. If none of the points are solutions, enter "NONE".

Answer: \_\_\_\_\_

Solution: SOLUTION:

$8(6) + 3(-6) - 3(3) = 21$  and  $3(6) + 9(-6) - 4(3) = -48$ , so  $(6, -6, 3)$  satisfies the linear system  
 $8(1) + 3(6) - 3(-3) = 35$  and  $3(1) + 9(6) - 4(-3) = 69$ , so  $(1, 6, -3)$  does not satisfy the linear system  
 $8(1) + 3(-4) - 3(-3) = 5$  and  $3(1) + 9(-4) - 4(-3) = -21$ , so  $(1, -4, -3)$  does not satisfy the linear system

Correct Answers:

- $(6, -6, 3)$

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**Problem 4. (2 points)**

Find the set of solutions for the linear system

$$\begin{array}{rclcl} x_1 & - & 2x_2 & + & 6x_3 = 6 \\ & - & x_2 & + & 3x_3 = 7 \\ & & - & 3x_3 & = -6 \end{array}$$

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

$$(x_1, x_2, x_3) = \left( \underline{\hspace{2cm}}, \underline{\hspace{2cm}}, \underline{\hspace{2cm}} \right)$$

**Solution:** **SOLUTION:** Equation 3  $\Rightarrow x_3 = 2$ . Substitute into equation 2,  $-x_2 + 3(2) = 7 \Rightarrow x_2 = -1$ . Substitute into equation 1,  $x_1 - 2(-1) + 6(2) = 6 \Rightarrow x_1 = -8$ .

*Correct Answers:*

- -8
- -1
- 2

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**Problem 5. (3 points)**

Find the set of solutions for the linear system

$$\begin{array}{rclcl} -3x_1 & + & 5x_2 & - & 5x_3 = -12 \\ & - & 6x_2 & + & 8x_3 = 9 \end{array}$$

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

$$(x_1, x_2, x_3) = \left( \underline{\hspace{2cm}}, \underline{\hspace{2cm}}, \underline{\hspace{2cm}} \right)$$

**Solution:** **SOLUTION:** Note that  $x_3$  is a free variable so let  $x_3 = s_1$ . The second equation then gives  $-6x_2 + 8s_1 = 9 \Rightarrow x_2 = -\frac{3}{2} + \frac{4}{3}s_1$ . Substitute this into the first equation,  $-3x_1 + 5(-\frac{3}{2} + \frac{4}{3}s_1) - 5s_1 = -12 \Rightarrow x_1 = \frac{3}{2} + \frac{5}{9}s_1$ .

*Correct Answers:*

- $\frac{3}{2} + \frac{5}{9}s_1$
- $-\frac{3}{2} + \frac{4}{3}s_1$
- $s_1$

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**Problem 6. (3 points)**

Find the set of solutions for the linear system

$$\begin{array}{rclcl} 4x_1 & + & 4x_2 & - & x_3 - x_4 = 17 \\ & - & x_2 & - & 7x_3 - 12x_4 = 6 \\ & & 3x_3 & + & x_4 = -12 \end{array}$$

If your answer includes any arbitrary parameters name them **s1**, **s2**, etc., as needed.

$$(x_1, x_2, x_3, x_4) = \left( \underline{\hspace{2cm}}, \underline{\hspace{2cm}}, \underline{\hspace{2cm}}, \underline{\hspace{2cm}} \right)$$

**Solution:** **SOLUTION:** Note that  $x_4$  is a free variable so let  $x_4 = s_1$ . The third equation then gives

$$3x_3 + s_1 = -12 \Rightarrow x_3 = \frac{1}{3}s_1 - 4.$$

Substitute into the second equation

$$-x_2 - 7\left(\frac{1}{3}s_1 - 4\right) - 12s_1 = 6 \Rightarrow x_2 = \frac{29}{3}s_1 + 22.$$

Substitute both of these into the first equation,

$$4x_1 + 4\left(\frac{29}{3}s_1 + 22\right) - \left(\frac{1}{3}s_1 - 4\right) - s_1 = 17 \Rightarrow x_1 = -\frac{59}{6}s_1 - \frac{75}{4}.$$

*Correct Answers:*

- $9.83333s_1 - 18.75$
- $22 - 9.66667s_1$
- $-(0.333333s_1 + 4)$
- $s_1$

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**Problem 7. (3 points)**

Consider the following system of linear equations:

$$\begin{array}{rcl} x & + & y = 5 \\ -2x & - & y = 4 \end{array}$$

Find the unique solution to this system.

$$x = \underline{\hspace{2cm}} \quad y = \underline{\hspace{2cm}}$$

*Correct Answers:*

- -9
- 14

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**Problem 8. (3 points)**

Solve the system using any method

$$\begin{aligned}-x + y + z &= 5 \\4x - 3y - z &= -20 \\x + y + z &= -1\end{aligned}$$

The unique solution is:

$$\begin{aligned}x &= \underline{\hspace{2cm}} \\y &= \underline{\hspace{2cm}} \\z &= \underline{\hspace{2cm}}\end{aligned}$$

*Correct Answers:*

- -3
- 3
- -1

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**Problem 9. (0 points)****Accessing Gradescope and Python**

This question will walk you through using Gradescope to submit written work. In future homework assignments you will actually be submitting work to be graded, this assignment is just graded based on completion.

First, you should go to Google Colab (or somewhere else where you can write and execute Python scripts). Run the command

```
print("My name is (your name).")
```

Make sure to substitute (your name) with your actual name. Take a screenshot including both the command and the output and save the screenshot in a PDF document.

Go to the assignment "Week 1 Gradscope" in Canvas. Follow the link to Gradescope where you will submit your document.