What Were the Headlines After a Mad Scientist Trained Two Eggs to Attack a Candy Store With Sharp Sticks?

Solve each system of equations below by graphing. Cross out the box containing your answer. When you finish, print the letters from the remaining boxes in the spaces at the bottom of the page.

1. \[ y = \frac{2}{3}x - 1 \]
   \[ y = -x + 4 \]

2. \[ y = -2x + 1 \]
   \[ y = x - 5 \]

3. \[ y = \frac{1}{2}x - 3 \]
   \[ y = \frac{3}{2}x - 1 \]

4. \[ y = 2x \]
   \[ x + y = 3 \]

5. \[ x + y = 0 \]
   \[ 3x + y = -4 \]

6. \[ x = 3 - 3y \]
   \[ x + 3y = -6 \]

7. \[ x + 2y = -4 \]
   \[ 4y = 3x + 12 \]

8. \[ y = -2 \]
   \[ 2x - 5y = 20 \]

9. \[ 4x + 3y = -15 \]
   \[ y = x + 2 \]

<table>
<thead>
<tr>
<th>TW</th>
<th>EG</th>
<th>OS</th>
<th>GS</th>
<th>WE</th>
<th>ET</th>
<th>SP</th>
<th>TR</th>
</tr>
</thead>
<tbody>
<tr>
<td>(-4, 0)</td>
<td>(-4, -5)</td>
<td>no solution</td>
<td>(4, 1)</td>
<td>(3, 1)</td>
<td>(-2, -4)</td>
<td>(-1, 6)</td>
<td>(-3, -1)</td>
</tr>
<tr>
<td>EA</td>
<td>TS</td>
<td>RA</td>
<td>TI</td>
<td>MI</td>
<td>SS</td>
<td>NT</td>
<td>UP</td>
</tr>
<tr>
<td>(-3, 5)</td>
<td>(1, 2)</td>
<td>(0, 3)</td>
<td>(2, -3)</td>
<td>(4, -3)</td>
<td>(5, -2)</td>
<td>(-1, 0)</td>
<td>(-2, 2)</td>
</tr>
</tbody>
</table>
Radio Raves

Why did the car radio have to go see a mechanic?

To find out, circle the letter in each problem that represents the solution to the linear system. Then write the corresponding letter above its problem number at the bottom of the page.

1. \( x + y = 9 \)
   \(-2x + y = -3\)
   (H) (4, 2)
   (F) (4, 5)

2. \( -x + y = 7 \)
   \( x + y = 9 \)
   (O) (1, 8)
   (U) (9, 2)

3. \( x + y = 27 \)
   \( 3x - y = 41 \)
   (T) (-7, 10)
   (R) (17, 10)

4. \( x + y = 6 \)
   \( y = 3 \)
   (A) (3, 3)
   (I) (-3, 3)

5. \( x + 2y = 1 \)
   \( 2x + y = 5 \)
   (T) (3, -1)
   (S) (4, 2)

6. \( 2x + y = -4 \)
   \( 5x + 3y = -6 \)
   (Y) (6, 5)
   (U) (-6, 8)

7. \( x + y = 8 \)
   \( -4x + y = -7 \)
   (N) (3, 5)
   (O) (-2, 7)

8. \( 4x + 3y = 24 \)
   \( 5x - 8y = -17 \)
   (G) (-4, -3)
   (E) (3, 4)

9. \( 3x - 2y = 11 \)
   \( x - \frac{1}{2}y = 4 \)
   (U) (5, 2)
   (K) (-5, 3)

10. \( x + 4y = 8 \)
    \( 2x - 5y = 29 \)
    (L) (6, -5)
    (P) (12, -1)
Hints for Solving word Problems
1. Assign variables first.
2. Summarize information.
3. Create two equations.
4. Solve the system using the easiest method.
5. Write a conclusion.
6. Check your answer in the context of the problem.

Example: Based on a true story.
The Keenan Group has put on a performance of Shakespeare’s King Lear. Tickets for non-students were $15 and tickets for college students were $10. For marketing purposes, the company wants to know how many people came that were not college students. If a total of 550 people attended and total amount of money collected was $7,625. How many students attended?
In the Lead

This famous actor starred in movies from 1927 to 1976. He appeared in 153 movies and played the lead in all but 11 of them. Who was this famous man, still holding the record for the most leading roles in movies?

To find out, solve each linear system below using the substitution method. Find your solution in the list of answers provided and write the letters by the corresponding problem numbers to spell out the two-word answer.

1. \( y = x \)
   \( 3x - y = -4 \)

2. \( 3x - 5y = -9 \)
   \( 4x + y = -12 \)

3. \( 3x - y = 12 \)
   \( 4x - 5y = 16 \)

4. \( 4x + 3y = 3 \)
   \( x + 2y = 2 \)

5. \( y = 2x - 6 \)
   \( x = y + 4 \)

6. \( x - y = -1 \)
   \( -2x + 3y = 5 \)

7. \( y = 5x + 4 \)
   \( y = -2x - 3 \)

8. \( 5x + 4y = 0 \)
   \( x - y = 9 \)

9. \( 2x - y = -1 \)
   \( x - 2y = -11 \)

N (4, -5)
E (3, 7)
H (4, 0)
J (-2, -2)
Y (-1, -1)
N (0, 1)
O (-3, 0)
W (2, -2)
A (2, 3)

Answer: ____________________________

Using substitution in linear systems
$6,000 is to be invested in two accounts.

One account draws 6% interest, the second draws 12%.

If the total interest earned needs to be $540, how much money should be invested in each account?

Create a system of equations that will solve the problem.
"What do you lose every time you stand up?"

Solve each system of equations. The answer to each problem will match a letter that will allow you to figure out the joke.

1. \(-2x + y + 3z = 7\)
   \(x + 2y + z = 4\)
   \(2x - 3y - 2z = -10\)
   
   E: \((2, 2, -3)\)
   F: \((-1, 2, -4)\)
   Y: \((1, 1, -3)\)
   O: \((3, 1, -2)\)
   I: \((0, 4, 1)\)
   M: \((3, 3, 3)\)
   L: No Solution

2. \(2x + 3y - 4z = 1\)
   \(x - y + 2z = 6\)
   \(5x + 2y - 2z = 3\)
   
   R: \((-1, 2, 1)\)
   N: \((5, 2, -1)\)
   U: \((2, -3, 1)\)
   B: \((4, 0, 3)\)
   A: \((-2, 21, \frac{24}{2})\)
   C: \((4, \frac{1}{2}, 0)\)
   P: \((-\frac{8}{3}, 3, \frac{1}{4})\)

3. \(x + y - z = 6\)
   \(-2x + 3y + z = -5\)
   \(3x + y - 2z = 14\)
   
   Solving systems of three equations

4. \(-x + y - z = 1\)
   \(3x + 2y + z = 2\)
   \(2x + 3y = 0\)
   
   Solving systems of three equations

Joke #32
A hospital dietician is to design a meal plan that will provide exactly 14 grams of fat, 9 grams of carbohydrates, and 9 grams of protein. He is to use a combination of three types of food: Type A, Type B, and Type C. The nutritional content of one ounce of each food is summarized in the table below.

<table>
<thead>
<tr>
<th>Food</th>
<th>Fat</th>
<th>Carbohydrates</th>
<th>Protein</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2 g</td>
<td>1 g</td>
<td>2 g</td>
</tr>
<tr>
<td>B</td>
<td>3 g</td>
<td>2 g</td>
<td>1 g</td>
</tr>
<tr>
<td>C</td>
<td>1 g</td>
<td>1 g</td>
<td>2 g</td>
</tr>
</tbody>
</table>

How many of each type of food should he serve to meet the exact requirements?
An Advanced Sound System (of Equations)

Supreme Audio, Inc. makes three types of speaker: the Deaf-Speaker, the Deaf-Adder, and the Deaf-Bringer. The company has a warehouse full of 1000 speakers that were just made. The following table gives the cost and revenue associated with each type of speaker:

<table>
<thead>
<tr>
<th>Speaker Type</th>
<th>Cost</th>
<th>Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deaf-Speaker</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>Deaf-Adder</td>
<td>60</td>
<td>90</td>
</tr>
<tr>
<td>Deaf-Bringer</td>
<td>70</td>
<td>120</td>
</tr>
</tbody>
</table>

The warehouse manager has lost track of how many of each type of speaker is in the warehouse.

He has, however, just received a memo stating that the cost of making the 1000 speakers was $5200 and that the total revenue that will generated from selling all 1000 speakers will be $8100.

Can the manager determine how many of each type of speaker are in the warehouse without having to count them?
"What do you call the back door to a cafeteria?"

Solve each system of equations using matrices. The answer to each problem will match a letter that will allow you to figure out the joke.

1. \( x + 2y = 5 \)
   \( 3x - 2y = -13 \)
   \[ \text{N: (2, 6)} \]
   \[ \text{U: (2, 3/4)} \]

2. \( 3x - 6y = -3 \)
   \( 3x + 2y = 3 \)
   \[ \text{E: (2, -3)} \]
   \[ \text{I: (1/2, 3/4)} \]

3. \( \frac{1}{4}x + \frac{1}{2}y = -1 \)
   \( x - 2y = 8 \)
   \[ \text{A: No Solution} \]

4. \( x - 2y + 3z = 7 \)
   \( 4x + 2y + 2z = 8 \)
   \( -3x + 2y - 2z = -10 \)
   \[ \text{T: (-2, 7/2)} \]
   \[ \text{S: (3, 4, -1)} \]

5. \( 2x - y - z = 3 \)
   \( x + y - 3z = 5 \)
   \( 4x - 2y - 2z = -2 \)
   \[ \text{B: (2, -1, 4, -1)} \]
   \[ \text{R: (8, 2, 0)} \]

6. \( 2y + z = 4 \)
   \( x - y = 6 \)
   \( 2x - 3z = 16 \)
   \[ \text{M: (2, -4, 0)} \]
   \[ \text{L: (1, 3, 0, 2)} \]

7. \( x - 2y - z = 0 \)
   \( 3x + 3y + 3z + 3w = 12 \)
   \( 2x + 3y + z - w = 6 \)
   \( -2x + y + 2z + 2w = 1 \)
   \[ \text{C: (2, -1, 1)} \]
   \[ \text{O: (2, -2, 1, -1)} \]

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Solving systems with matrices

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Joke #47
"What occurs just before childbirth?"

Solve the following problems. The answer to each problem will match a letter that will allow you to figure out the joke.

Find the value of each determinant.

1. \[
\begin{vmatrix}
3 & 2 \\
4 & 5
\end{vmatrix}
\]
2. \[
\begin{vmatrix}
-7 & -4 \\
5 & 3
\end{vmatrix}
\]
3. \[
\begin{vmatrix}
3 & -4 & -1 \\
2 & 5 & -2 \\
1 & 0 & 3
\end{vmatrix}
\]

O: -1
S: 7
E: 2

Solve each system of equations using Cramer's Rule.

4. \[x + y = 6 \]
   \[x - y = 4\]

U: 74
R: 82

5. \[2x - 4y = 16 \]
   \[5x + 4y = 12\]

M: (4, 3)
N: (5, 1)

6. \[2x - 3y = -1 \]
   \[14x + 14y = 7\]

A: \((\frac{1}{10}, \frac{2}{5})\)

7. \[3x + 3y + z = 1 \]
   \[x + 2y + z = 0 \]
   \[2x - y + z = 4\]

T: (4, -2)
B: (1, -1, 1)

8. \[3x + 3y + z = 8 \]
   \[2x - y + z = 4 \]
   \[x + 2y + z = 5\]

H: (1, 3, 4)
L: (1, -1, \frac{1}{2})

9. \[x - y = 2 \]
   \[x + 2z = 2 \]
   \[-2x + 4y + 6z = -3\]

C: \((\frac{6}{7}, \frac{5}{7}, \frac{17}{7})\)
W: \((\frac{1}{7}, \frac{3}{7}, \frac{6}{7})\)

Determinant and Cramer's rule to solve systems

Joke #45