

EXERCISES FOR APPENDIX: LINEAR SYSTEMS

Question 1 In Exercises ?? - ??, solve the given system using substitution and/or elimination. Classify each system as consistent independent, consistent dependent, or inconsistent. Check your answers both algebraically and graphically.

Problem 1.1
$$\begin{cases} x + 2y = 5 \\ x = 6 \end{cases}$$

The system is:

Multiple Choice:

1. consistent independent ✓
2. consistent dependent
3. inconsistent

$$\left(6, -\frac{1}{2}\right)$$

Problem 1.2
$$\begin{cases} 2y - 3x = 1 \\ y = -3 \end{cases}$$

The system is:

Multiple Choice:

1. consistent independent ✓
2. consistent dependent
3. inconsistent

$$\left(-\frac{7}{3}, -3\right)$$

Problem 1.3
$$\begin{cases} \frac{x + 2y}{3x - y} = -5 \\ \frac{4}{2} = 1 \end{cases}$$

The system is:

Multiple Choice:

1. consistent independent ✓
2. consistent dependent
3. inconsistent

$$\left(-\frac{16}{7}, -\frac{62}{7}\right)$$

Problem 1.4
$$\begin{cases} \frac{2}{3}x - \frac{1}{5}y = 3 \\ \frac{1}{2}x + \frac{3}{4}y = 1 \end{cases}$$

The system is:

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Multiple Choice:

1. consistent independent ✓
2. consistent dependent
3. inconsistent

$$\left(\frac{49}{12}, -\frac{25}{18}\right)$$

Problem 1.5
$$\begin{cases} \frac{1}{2}x - \frac{1}{3}y = -1 \\ 2y - 3x = 6 \end{cases}$$

The system is:

Multiple Choice:

1. consistent independent
2. consistent dependent ✓
3. inconsistent

$$\left(t, \frac{3}{2}t + 3\right) \text{ for all real numbers } t$$

Problem 1.6
$$\begin{cases} x + 4y = 6 \\ \frac{1}{12}x + \frac{1}{3}y = \frac{1}{2} \end{cases}$$

The system is:

Multiple Choice:

1. consistent independent
2. consistent dependent ✓
3. inconsistent

$$(6 - 4t, t) \text{ for all real numbers } t$$

Problem 1.7
$$\begin{cases} 3y - \frac{3}{2}x = -\frac{15}{2} \\ \frac{1}{2}x - y = \frac{3}{2} \end{cases}$$

The system is:

Multiple Choice:

1. consistent independent
2. consistent dependent
3. inconsistent ✓

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No solution

$$\textbf{Problem 1.8} \quad \begin{cases} \frac{5}{6}x + \frac{5}{3}y = -\frac{7}{3} \\ -\frac{10}{3}x - \frac{20}{3}y = 10 \end{cases}$$

The system is:

Multiple Choice:

1. consistent independent
2. consistent dependent
3. inconsistent ✓

No solution

Problem 2 A local buffet charges \$7.50 per person for the basic buffet and \$9.25 for the deluxe buffet (which includes crab legs.) If 27 diners went out to eat and the total bill was \$227.00 before taxes, how many chose the basic buffet and how many chose the deluxe buffet?

13 chose the basic buffet and 14 chose the deluxe buffet.

Problem 3 At The Old Home Fill'er Up and Keep on a-Truckin' Cafe, Mavis mixes two different types of coffee beans to produce a house blend. The first type costs \$3 per pound and the second costs \$8 per pound. How much of each type does Mavis use to make 50 pounds of a blend which costs \$6 per pound?

Mavis needs 20 pounds of \$3 per pound coffee and 30 pounds of \$8 per pound coffee.

Problem 4 Skippy has a total of \$10,000 to split between two investments. One account offers 3% simple interest, and the other account offers 8% simple interest. For tax reasons, he can only earn \$500 in interest the entire year. How much money should Skippy invest in each account to earn \$500 in interest for the year?

Skippy needs to invest \$6000 in the 3% account and \$4000 in the 8% account.

Problem 5 A 10% salt solution is to be mixed with pure water to produce 75 gallons of a 3% salt solution. How much of each are needed?

22.5 gallons of the 10% solution and 52.5 gallons of pure water.

Problem 6 This exercise is a follow-up to Example ???. Work with your classmates to explain why mixing 4 gallons of Sasquatch Sweat™ Energy Drink and 1 gallon of Frooty Giggle Delight™ would also produce a mixture that was "close enough for the Dude-Bros".