# 7.5 Finding the Better Paying Job

## Using the Best Method to Solve a Linear System, Part 1



### Objective

In this lesson, you will:

- Solve a linear system by using an algebraic method.

### Key Terms

- linear system
- inequality

***SCENARIO*** A friend of yours interviewed for two different sales positions at competing companies. One of the companies, Stellar, pays $500 per week plus a 10% commission on the total sales per week in dollars. The other company, Lunar, pays $200 per week plus a 20% commission on the total sales per week in dollars.

## Problem 1 Comparing Salaries

**A.** Write an equation that gives the weekly salary from Stellar in dollars in terms of the weekly total sales in dollars. Be sure to define your variables. Use a complete sentence in your answer.

**B.** Write an equation that gives the weekly salary from Lunar in dollars in terms of the weekly total sales in dollars. Be sure to define your variables. Use a complete sentence in your answer.

**C.** Find the salary from Stellar if the total sales are $1200 in one week. Show your work and use a complete sentence in your answer.

Find the salary from Lunar if the total sales are $1200 in one week. Show your work and use a complete sentence in your answer.

**D.** Find the total sales from Lunar if the weekly salary was $1200. Show your work and use a complete sentence in your answer.

## Problem 1 Comparing Salaries

**E.** The salary from Stellar for one week is $540. Find the salary at Lunar if the total sales at Lunar are the same as the total sales at Stellar for this week. Show all your work and use a complete sentence in your answer.

## Investigate Problem 1

**1.** Use an algebraic method to determine whether the salary from Lunar will ever be the same as the salary at Stellar. Show all your work and use a complete sentence in your answer.

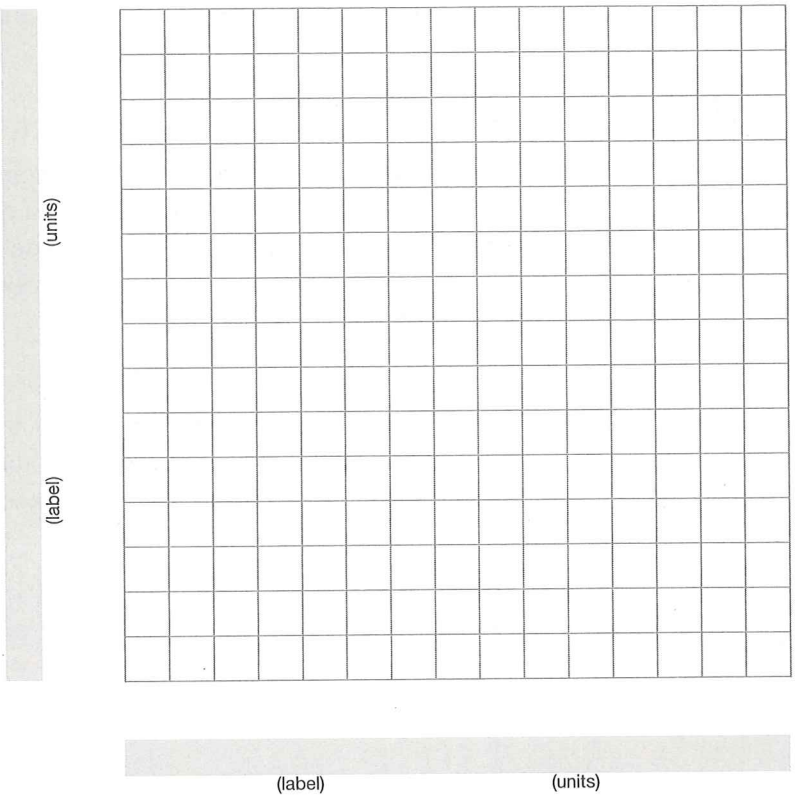
If the salaries will be the same, what will the salaries be? Show all your work and use a complete sentence in your answer.

**2.** Which method did you use to find the answer to Question 1? Use a complete sentence to explain your choice.

**3.** Check your solution by creating a graph of your linear system on the grid on the next page. First, choose your bounds and intervals. Be sure to label your graph clearly.

| Variable quantity | Lower bound | Upper bound | Interval |
|---|---|---|---|
| | | | |
| | | | |

## Investigate Problem 1




Is your solution confirmed by your graph?

4. Complete the table of values that shows the salaries from both companies for different sales amounts.

| Quantity Name | Total sales | Stellar salary | Lunar salary |
|---|---|---|---|
| Unit | dollars | dollars | dollars |
| Expression | $x$ | | |
| | 0 | | |
| | 100 | | |
| | | | |
| | 500 | | |
| | | | |
| | 2500 | | |
| | | | |
| | | | |
| | 10,000 | | |

## Investigate Problem 1

5. Which company would you recommend to your friend? Why? Use complete sentences in your answer.

6. Your friend interviews at a third company, Solar. Solar pays a salary of $750 per week with no commissions. Write an equation that gives the salary in dollars in terms of the total sales in dollars. Then add the graph of this equation to your graph in Question 3.

7. Describe the conditions for which the salary from Solar is better than the salaries at Stellar and Lunar. Show all your work and use complete sentences in your answer.

8. Your friend takes the job with Stellar and wants to earn at least $975 each week. Write an **inequality** that represents this situation.

   Solve the inequality. Then use a complete sentence to explain what the solution means in the problem situation.