

### Write

Define each term using your own words.

1. solution to a system of inequalities
2. linear programming

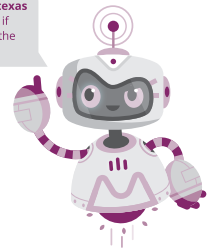
### Remember

The solution to a system of linear inequalities is the intersection of the shaded regions for each linear inequality in the system. In linear programming, the vertices of the solution region of the system of linear inequalities are substituted into a given equation to find the maximum or minimum value.

### Practice

1. Paul works for Majestic Flooring as a carpet installer. His primary responsibility is to install carpet. His secondary responsibility is to call prospective clients in order to earn the company future business. At least 25% of his total number of work hours must be spent making these calls. According to his contract, he can work a maximum of 40 hours per week installing carpet and a maximum of 25 hours per week calling prospective clients. Paul is allowed a maximum of 60 total work hours per week. Paul is trying to determine the number of hours he should spend installing carpet and calling clients in order to maximize his income.
  - a. Write a system of inequalities to represent the constraints of the problem situation. Define the unknowns in the inequalities.
  - b. Graph the inequalities on a coordinate plane. Shade the region that represents the solution set.
  - c. Paul earns \$25 for every hour he works installing carpet and \$20 for every hour he works calling prospective clients. Determine the number of hours Paul should work installing carpet and the number of hours he should work calling clients in order to maximize his weekly income.
  - d. According to Majestic Flooring's accountant, the company earns \$40 in profit from new business for every hour Paul spends calling prospective clients. The company also makes a profit of \$34 for every hour Paul spends installing carpets. Determine the number of hours the company should have Paul install carpets and the number of hours they should have Paul calling clients each week in order to maximize their weekly profit.

Visit [livehint.com/texas](https://livehint.com/texas) or use this QR code if you need a hint on the Practice questions.



## Stretch

1. Lucy's Perfect Pizza sells every pizza for \$12. Lucy currently has 400 customers per day. She is considering raising the price for each pizza in order to maximize her daily income. She estimates that the business will lose 10 customers per day for every increase of \$0.50 in the price of a pizza.
  - a. Write a function to represent Lucy's daily income as a function of the number of \$0.50 increases in the price of a pizza.
  - b. Determine the  $x$ - and  $y$ -intercepts and explain what each represents in the context of the problem situation.
  - c. Determine the maximum daily income for Lucy's Perfect Pizza, the corresponding pizza price, and the corresponding number of daily customers.

## Review

1. Solve the system of equations.

$$\begin{cases} x - y + z = 8 \\ 2x + y - z = -2 \\ 3x - y + 4z = 4 \end{cases}$$