

Graph the system of inequalities

Draw a graph showing the solution set for the system of inequalities. Determine the coordinates of any corner points and show them on your diagram. Indicate which boundary curves and corner points belong and which do not belong to the solution set.

13. $x + y < 4$
 $2x - y < -1$

14. $3x - 2y > 5$
 $-x - y < -5$

25. $y > 2x$
 $y > 4 - x$

26. $x > 1$
 $y > x$

27. $x + y \leq 1$
 $x - y \leq -1$

28. $x - y \geq 2$
 $2x + y \geq 4$

19. $y > 0$
 $x + y > 1$

20. $x < 0$
 $x + y > 1$

17. $-x + 2y < 5$
 $2x + y > 0$
 $3x - y < 5$

18. $4x + 3y \leq 16$
 $-x + y > -4$
 $6x + y \geq 10$

21. $x < 0$
 $y > 0$
 $x + y > 1$

$x + 2y \leq 3$
 $-3x + y < 5$
 $-3x + 8y \geq -23$

23. $x > 2$
 $y > -1$
 $x + y < 3$

Exercises 49–54 Linear Programming Find the minimum and maximum values of the objective function subject to the given constraints. (Hint: First draw a diagram showing the feasible set and use the linear programming theorem.)

49. Objective function: $T = 48x + 56y + 120$
 $x + y \geq 4, y \leq 2x + 1, 4x + y \leq 13$

50. Objective function: $T = 36x + 73y - 16$
 $x \geq 1, y \leq x, y \geq 3x - 8$

51. Objective function: $T = 67x + 35y$
 $y \leq 2, y \leq 2x, y \geq x - 4$

52. Objective function: $T = 65x + 124y - 200$
 $x + y \geq 3, y \leq 2x, 4x + y \leq 12$

53. Objective function: $T = 84x + 73y - 78$
 $x \geq 0, y \geq 0, x - 3y + 14 \geq 0, 5x + 2y \leq 32,$
 $4x + 5y \geq 12$

54. Objective function: $T = 47x + 56y - 24$
 $x - 3y + 11 \geq 0, 4x + y \leq 21, 3x + 4y \geq 6$

Exercises 55–58 Applied Inequalities

- 55.** A concert is to be presented in an auditorium that has a seating capacity of 800. The price per ticket for 200 of the seats is \$6, and \$3 each for the remaining 600 seats. The total cost for putting on the concert will be \$2100. Draw a graph to show the various possible pairs of numbers of \$6 and \$3 tickets that must be sold for the concert to avoid financial loss.
- 56.** A rancher wants to purchase some lambs and goats—at least five lambs and at least four goats—but cannot spend more than \$800. Each lamb costs \$80, and goats cost \$50 each. How many of each can the rancher buy? Draw a graph to list all possible pairs, keeping in mind that lambs and goats come in whole numbers.
- 58.** A fish cannery packs tuna in two ways, chunk style and solid pack. Limits on storage space and customer demand lead to these constraints:

The total number of cases produced per day must not exceed 3000.

The number of cases of chunk style must be at least twice the number of cases of solid pack.

At least 600 cases of solid pack must be produced each day.

How many cases of each type can be produced per day if all constraints are to be satisfied? Draw a graph of the solution set and show the coordinates of the corner points.