

Practice and Problem Solving

Assignment Guide

Objective

- Core 1–48
- Extension 49–52

Standardized Test Prep 53–56

Mixed Review 57–72

Error Prevention

Exercises 8, 12, 13, 15 Students should be careful to have  $y$ , not  $x$ , on the left side of each inequality when determining whether to shade above or below the boundary line.

Exercises 43–45 Students' diagrams should make it clear that the solutions of the systems are the points whose coordinates satisfy all three inequalities.

Enrichment 3-3

Teaching 3-3

Practice 3-3

Practice 3-3 Solving Systems of Inequalities

- Graph each system of inequalities by graphing.
- $y > x + 2$
  - $y < x + 2$
  - $y < 3x - 2$
  - $y > 3x - 2$
  - $x + y < 3$
  - $x + y > 3$
  - $x + 2y > 4$
  - $2x - y > 6$
  - $x < 2$
  - $x > 2$
  - $x < -3$
  - $x > -3$
  - $y < |x|$
  - $y < -|x|$
  - $y < |x - 2|$
  - $y < -|x - 2|$

Answer one set having two kinds of notebooks for school. A spiral notebook costs \$1, and a three-ring notebook costs \$2. You must spend at least \$10 on notebooks. The cost of the notebooks can be no more than \$20.

a. Write a system of inequalities to model the situation.

b. Graph and solve the system.

16. A contractor needs no more than 30 carpenters to sign up for two construction sites. The contractor needs at least 10 carpenters on the low cost site and at least 10 carpenters on the high cost site.

a. Write a system of inequalities to model the situation.

b. Graph and solve the system.

Graph each system of inequalities by graphing.

- $y < x + 2$
- $y > x + 2$
- $y < 3x - 2$
- $y > 3x - 2$
- $x + y < 3$
- $x + y > 3$
- $x + 2y > 4$
- $2x - y > 6$
- $x < 2$
- $x > 2$
- $x < -3$
- $x > -3$
- $y < |x|$
- $y < -|x|$
- $y < |x - 2|$
- $y < -|x - 2|$

**A** Practice by Example

**Example 1**  
(page 130)

Tell whether  $(-3, 3)$  is a solution of each system.

- $\begin{cases} y \geq x + 2 \\ 3y < -6x + 6 \end{cases}$  **yes**
- $\begin{cases} y - 2x \leq 1 \\ y < -2x - 2 \end{cases}$  **no**
- $\begin{cases} -2y + x \leq 4 \\ 3y < -9x + 3 \end{cases}$

Solve each system of inequalities by graphing. 4–9. See margin pp. 132–133

- $\begin{cases} y \leq 2x + 2 \\ y < -x + 1 \end{cases}$
- $\begin{cases} y > -2 \\ x < 1 \end{cases}$
- $\begin{cases} y \leq 3 \\ y \leq \frac{1}{2}x + 1 \end{cases}$
- $\begin{cases} y < 2x \\ y \geq -x + 3 \end{cases}$
- $\begin{cases} -2y < 4x + 2 \\ y > x + 2 \end{cases}$
- $\begin{cases} y > x - 5 \\ 3x + y < -2 \end{cases}$
- $\begin{cases} y \leq 3x + 1 \\ -6x + 2y > 5 \end{cases}$
- $\begin{cases} x + 2y \leq 10 \\ x + y \leq 3 \end{cases}$
- $\begin{cases} -x - y \leq 2 \\ y - 2x > 1 \end{cases}$
- $\begin{cases} y > -2x \\ 2x - y \geq 2 \end{cases}$
- $\begin{cases} c \geq d - 3 \\ c < \frac{1}{2}d + 3 \end{cases}$
- $\begin{cases} 2x + y < 1 \\ -y + 3x < 1 \end{cases}$

10–17. See back of book.

16. **Fund-Raising** You want to bake at least 6 and at most 11 loaves of bread for a bake sale. You want at least twice as many loaves of banana bread as nut bread.

- Write a system of inequalities to model the situation.
- Graph the system.

17. **Psychology** A psychologist needs at least 40 subjects for her experiment. She cannot use more than 30 children. Write and graph a system of inequalities.

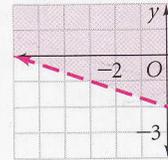
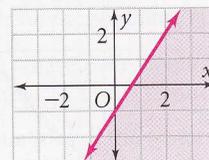
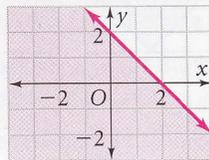
Solve each system of inequalities by graphing. 18–29. See back of book.

- $\begin{cases} y > 4 \\ y < |x - 1| \end{cases}$
- $\begin{cases} y < -\frac{1}{3}x + 1 \\ y > |2x - 1| \end{cases}$
- $\begin{cases} y > x - 2 \\ y \geq |x + 2| \end{cases}$
- $\begin{cases} y \leq -\frac{4}{3}x \\ y \geq -|x| \end{cases}$
- $\begin{cases} 3y < -x - 1 \\ y \leq |x + 1| \end{cases}$
- $\begin{cases} y > -2 \\ y \leq -|x - 3| \end{cases}$
- $\begin{cases} -2x + y > 3 \\ y \leq -|x + 4| \end{cases}$
- $\begin{cases} 5y \geq 2x - 5 \\ y < |x + 3| \end{cases}$
- $\begin{cases} y \geq -3x + 3 \\ y > |x + 2| \end{cases}$
- $\begin{cases} -2y < 4x + 2 \\ y > |2x + 1| \end{cases}$
- $\begin{cases} -x \geq 4 - y \\ y \geq |3x - 6| \end{cases}$
- $\begin{cases} y \leq x - 4 \\ y > |x - 6| \end{cases}$

**B** Apply Your Skills

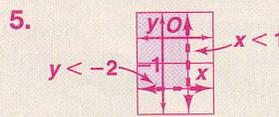
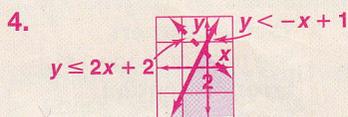
In Exercises 30–39, identify the inequalities A, B, and C for which the given ordered pair is a solution.

- A.  $x + y \leq 2$       B.  $y \leq \frac{3}{2}x - 1$       C.  $y > -\frac{1}{3}x - 2$



- $(0, 0)$  **A, C**
- $(-2, -5)$  **A, B**
- $(-2, 0)$  **A, C**
- $(0, -2)$  **A, B**
- $(-15, 0)$  **A, B**
- $(3, 2)$  **B, C**
- $(2, 0)$  **A, B, C**
- $(-6, 0)$  **A**
- $(4, -1)$  **B, C**
- $(-8, 0)$  **A, B**

pages 132–134 Exercises





**World-World Connection**  
Bake sales are a popular way to raise money.

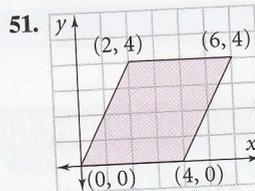
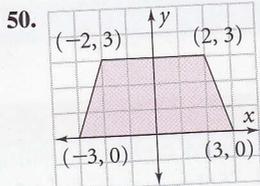
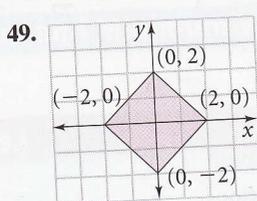
40. **Fund-Raising** Suppose the Student Council has asked you to form a committee to run a bake sale. The committee needs from 7 to 10 members. The number of seniors should be greater than the number of juniors.
- Write a system of inequalities to model the problem.
  - Graph the system and list the combinations of juniors and seniors that may participate in the committee. **a-c. See back of book.**
  - Critical Thinking** Explain why your list in part (b) is finite.
41. **Open-Ended** Write and graph a system of inequalities for which the solution is bounded by a dashed vertical line and a solid horizontal line.

42. **Writing** Explain how you determine where to shade when solving a system of inequalities.  
**41-51. See back of book.**  
**Solve each system of inequalities by graphing.**

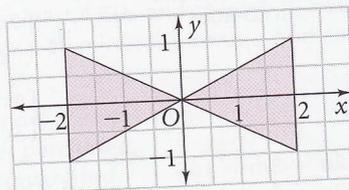
43.  $\begin{cases} x + y < 8 \\ x \geq 0 \\ y \geq 0 \end{cases}$       44.  $\begin{cases} 2y - 4x \leq 0 \\ x \geq 0 \\ y \geq 0 \end{cases}$       45.  $\begin{cases} y \geq -2x + 4 \\ x > -3 \\ y \geq 1 \end{cases}$

46.  $\begin{cases} y \leq \frac{2}{3}x + 2 \\ y \geq |x| + 2 \end{cases}$       47.  $\begin{cases} y < x - 1 \\ y > -|x - 2| + 1 \end{cases}$       48.  $\begin{cases} 2x + y \leq 3 \\ y > |x + 3| - 2 \end{cases}$

**Challenge** **Geometry** Write a system of inequalities to describe each shaded figure.



52. a. Graph the "bowtie" inequality,  $|y| \leq |x|$ .  
b. Write a system of inequalities to describe the graph shown at the right.  
**Answers may vary.**  
**Sample:**  $|y| \leq \frac{1}{2}|x|$   
 $|x| \leq 2$



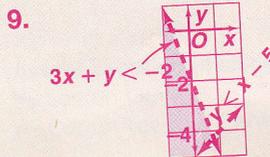
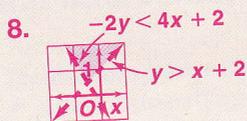
**FCAT Practice**

**Multiple Choice**

53. When you graph Inequality ① at the right, the boundary line should be ? and the shading should be ? the line. **B**
- A. dashed, above    B. dashed, below    C. solid, above    D. solid, below
54. When you graph Inequality ②, the boundary line should be ? and the shading should be ? the line. **H**
- F. dashed, above    G. dashed, below    H. solid, above    I. solid, below
55. What is the x-value of the intersection of the boundary lines? **D**
- A.  $-\frac{7}{3}$     B.  $-\frac{3}{7}$     C.  $\frac{3}{7}$     D.  $\frac{7}{3}$
56. How would you test whether  $(2, -2)$  is a solution of the system?  
**See back of book.**

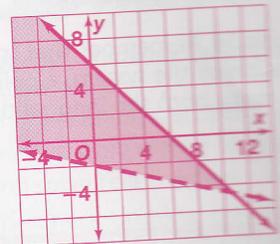
**FCAT Online**  
FCAT Format quiz at [www.PHSchool.com](http://www.PHSchool.com)  
Web Code: aga-0303

**Short Response**

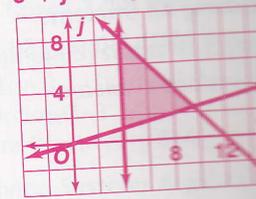


**Lesson Quiz 3-3**

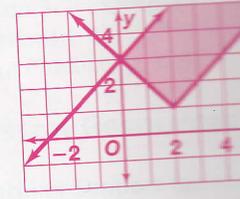
1. Solve the system of inequalities by graphing.
- $$\begin{cases} x + y \leq 6 \\ -x - 4y < 8 \end{cases}$$



2. A 24-hour radio station plays only classical music, jazz, talk programs, and news. It plays at most 12 hours of music per day, of which at least 4 h is classical. Jazz is played at least 25% as much time as classical. Write and graph a system of inequalities.
- Let c = hours for classical and j = hours for jazz.**  
 $c + j \leq 12, c \geq 4, j \geq \frac{1}{4}c$



3. Solve the system of inequalities by graphing.
- $$\begin{cases} y \leq x + 3 \\ y \geq |x - 2| + 1 \end{cases}$$



**Alternative Assessment**

Have students work in pairs. One student writes one inequality and the other student writes one inequality to make a system. They combine their systems and each graphs the system. They check one another's work.

**Lesson 3-2**

Solve each system by elimination or substitution.

57.  $\begin{cases} y = 3x + 1 \\ 2x - y = 8 \end{cases}$  **(-9, -26)**    58.  $\begin{cases} 3x + y = 4 \\ 2x - 4y = 7 \end{cases}$  **( $\frac{23}{14}, -\frac{13}{14}$ )**    59.  $\begin{cases} -x + 5y = \\ 2x - 10y = \end{cases}$  **no solution**  
 60.  $\begin{cases} 2x + 4y = -8 \\ -5x + 4y = 6 \end{cases}$  **(-2, -1)**    61.  $\begin{cases} y - 3 = x \\ 4x + y = -2 \end{cases}$  **(-1, 2)**    62.  $\begin{cases} 2 = 4y - 3 \\ 5x = 2y - 1 \end{cases}$  **( $-\frac{4}{7}, \frac{1}{7}$ )**

**Lesson 2-3**

For each function, y varies directly as x.

63. If  $y = -6$  when  $x = -2$ , find  $y$  when  $x = 3$ . **9**  
 64. If  $y = -8$  when  $x = 2$ , find  $x$  when  $y = 2$ .  **$-\frac{1}{2}$**   
 65. If  $y = 4$  when  $x = 7$ , find  $y$  when  $x = -14$ . **-8**  
 66. If  $y = 9$  when  $x = 15$ , find  $x$  when  $y = 6$ . **10**

**Lesson 1-5**

Solve each equation. Check your answers.

67.  $|2x + 5| = 6$   **$\frac{1}{2}, -\frac{11}{2}$**     68.  $|x + 7| = -2$  **no solution**  
 69.  $3|x - 4| + 1 = 13$  **8, 0**    70.  $-2|x + 1| - 5 = -7 - 2$   
 71.  $\frac{1}{2}|3x + 2| - 3 = 4$   **$-\frac{16}{3}, 4$**     72.  $-|2x + 5| = -3$  **-4, -1**

**Resources**

- For additional practice with a variety of test item formats:
- FCAT Practice, p. 161
  - FCAT Strategies, p. 156
  - FCAT Daily Practice and Strategies Transparencies

**Exercise 56** Remember that to be a solution of the system, a point must make *both* the inequalities true.

**Chapter Checkpoint 1**

To check understanding of Lessons 3-1 to 3-3:

Checkpoint Quiz 1 (p. 134)

**Teaching Resources**

Checkpoint Quiz 1 (also in Prentice Hall Assessment System)

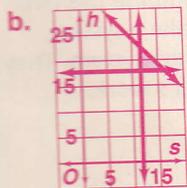
**Reaching All Students**

Reading and Math Literacy 3B

Spanish versions available

**page 134 Checkpoint Quiz 1**

7a.  $\begin{cases} h \geq 18 \\ s \geq 12 \\ s + h \leq 35 \end{cases}$



**Checkpoint Quiz 1**

**TEXT** Instant self-check quiz online and on CD-ROM

Solve each system of equations.

1.  $\begin{cases} 3x + 2y = 6 \\ x - 2y = 10 \end{cases}$  **(4, -3)**    2.  $\begin{cases} 4x + 7y = 28 \\ y = 2x - 14 \end{cases}$  **(7, 0)**  
 3.  $\begin{cases} 4x + 5y = -12 \\ 3x - 4y = 22 \end{cases}$  **(2, -4)**    4.  $\begin{cases} 3y - 2x = 7 \\ 2y - 2 = 4x \end{cases}$  **(1, 3)**

5.  $\begin{cases} 2n + 3m = 158 \\ 2n + 5m = 181 \end{cases}$   
**\$61.75 cost per night**  
**\$11.50 cost per meal**

5. The Village Inn offers two special packages. For two nights and three meals the cost is \$158. For two nights and five meals the cost is \$181. Write and solve a system of linear equations to find the costs per night and per meal.
6. **Smart Shopping** An ordinary refrigerator costs \$489 and has an estimated annual operating cost of \$84. An energy-saving model costs \$599, with an estimated annual cost of \$61. After how many years will the costs to operate the two models be equal? **approximately 4.7826 years**
7. Each week you must do a minimum of 18 hours of homework. Participating in sports requires at least 12 hours per week. You have no more than 30 hours per week in total to devote to these activities. **a-b. See margin.**  
 a. Write a system of inequalities to model the situation.  
 b. Graph and solve the system.

Solve each system of inequalities by graphing. **8-10. See margin.**

8.  $\begin{cases} y \leq -2 \\ y > |x + 1| \end{cases}$     9.  $\begin{cases} 8x + 2y > 5 \\ x + 2y \leq -3 \end{cases}$     10.  $\begin{cases} 4y < 3x \\ y > 2|x| \end{cases}$

