Problem Solving

Solve each inequality. Graph and check your solution.

1. $\frac{c}{4} \geq -1$ 　　2. $\frac{x}{6} < 1$ 　　3. $1 \leq -\frac{x}{2}$ 　　4. $2 < -\frac{p}{4}$

5. $-2 < \frac{y}{2}$ 　　6. $-\frac{x}{3} \geq 0.5$ 　　7. $4 > \frac{2}{3}x$ 　　8. $-5 \leq \frac{5}{2}k$

9. $0 < -\frac{7}{8}x$ 　　10. $\frac{4}{3}y \geq 0$ 　　11. $-\frac{5}{7}x > -5$ 　　12. $6 \geq -\frac{3}{2}d$

13. $-\frac{4}{9} < \frac{2}{3}c$ 　　14. $\frac{3}{4}b \geq -\frac{9}{8}$ 　　15. $-\frac{5}{3}u > \frac{5}{6}$ 　　16. $-\frac{5}{8} > -\frac{5}{6}n$

17. $3t < -9$ 　　18. $4m \geq 8$ 　　19. $10 \leq -2w$ 　　20. $-20 > -5c$

21. $-27 \geq 3z$ 　　22. $-7b > 42$ 　　23. $18d < -12$ 　　24. $-3x \leq 16$

25. $-7 < 2q$ 　　26. $16 > 3.2h$ 　　27. $-1.5d < -6$ 　　28. $3.6 \leq -0.8m$

29. **Fund-Raising** The science club charges $4.50 per car at their car wash. Write and solve an inequality to find how many cars they have to wash to earn at least $300.

30. **Earnings** Suppose you earn $6.15 per hour working part time at a dry cleaner. Write and solve an inequality to find how many full hours you must work to earn at least $100.

Skills

Write four solutions to each inequality.

31. $\frac{x}{2} \leq -1$ 　　32. $\frac{c}{3} \geq -4$ 　　33. $-1 \geq \frac{x}{3}$ 　　34. $0.5 > \frac{1}{2}c$

35. $-\frac{3}{4}q > 4$ 　　36. $1 < -\frac{5}{7}s$ 　　37. $-4.5 \leq -0.9p$ 　　38. $-2.7w \geq 28$

Tell what you must do to the first inequality in order to get the second.

39. $-\frac{c}{4} > 3; c < -12$ 　　　　40. $\frac{n}{5} \leq -2; n \leq -10$

41. $5z > -25; z > -5$ 　　　　42. $\frac{3}{4}b \leq 3; b \leq 4$

43. $-12 < 4a; -3 < a$ 　　　　44. $-b \geq 3.4; b \leq -3.4$

Replace each ■ with the number that makes the inequalities equivalent.

45. $■s > 14; s < -7$ 　　　　46. $■x \geq 25; x \leq -5$

47. $-8u \leq ■; u \geq -0.5$ 　　　　48. $-2a > ■; a < -9$

49. $36 < ■r; r < -3.6$ 　　　　50. $-k \leq ■; k \geq -7.5$

51. **Critical Thinking** If $x \geq y$ and $-x \geq -y$, what can you conclude about x and y?

Estimation Estimate the solution of each inequality.

52. $-2.099r < 4$ 　　53. $3.87j > -24$ 　　54. $20.95 \geq \frac{1}{2}p$ 　　55. $-\frac{20}{39}s \leq -14$

56. Safe Load An elevator like the one at the left can safely lift at most 4400 lb. A concrete block has an average weight of 42 lb. What is the maximum number of concrete blocks that the elevator can lift?

57. Writing Explain how solving the equation $-\frac{t}{3} = 4$ is similar to and different from solving the inequality $-\frac{t}{3} > 4$.

58. Open-Ended Write four different inequalities with $x > 3$ as their solution that you can solve using multiplication or division.

Solve each inequality.

59. $4d \le -28$ 　　**60.** $\frac{y}{4} > 5$ 　　**61.** $2 < -8s$ 　　**62.** $\frac{3}{2}k \ge -45$

63. $0.3y < 2.7$ 　　**64.** $9.4 \le -4t$ 　　**65.** $-h \ge 4$ 　　**66.** $\frac{5}{2}x > 5$

67. $24 < -\frac{8}{3}x$ 　　**68.** $0 < -\frac{1}{6}b$ 　　**69.** $\frac{5}{6} > -\frac{1}{3}p$ 　　**70.** $-0.2m \ge 9.4$

71. $6 < -9g$ 　　**72.** $4n \ge 9$ 　　**73.** $-3.5 < -m$ 　　**74.** $\frac{2}{5}z \ge -1$

75. Michael solved the inequality $-2 > \frac{y}{-3}$ and got $6 < y$. Erica solved the same inequality and got $y > 6$. Are they both correct? Explain.

76. A friend calls you and asks you to meet at a location 3 miles from your home in 20 minutes. You set off on your bicycle after the telephone call. Write and solve an inequality to find the average rates in miles per minute you could ride to be at your meeting place within 20 minutes.

77. a. Error Analysis Kia solved $-15q \le 135$ by adding 15 to each side of the inequality. What mistake did she make?

　　b. Kia's solution was $q \le 150$. She checked her work by substituting 150 for q in the original inequality. Why didn't her check let her know that she had made a mistake?

　　c. Open-Ended Find a number that satisfies Kia's solution but does not satisfy the original inequality.

Reasoning If a, b, and c are real numbers, for which values of a is each statement true?

78. If $c < 0$, then $ac < a$.

79. If $b > c$, then $ab > ac$.

80. If $b > c$, then $a^2b > a^2c$.

81. If $b > c$, then $\frac{b}{a} < \frac{c}{a}$.

82. Packaging Suppose you have a plastic globe that you wish to put into a gift box. The circumference of the globe is 15 in. The edges of cube-shaped boxes are either 3 in., 4 in., 5 in., or 6 in. Write and solve an inequality to find the boxes that will hold the globe. (*Hint:* circumference $= \pi \cdot$ diameter)

83. Tiling a Floor The Sumaris' den floor measures 18 ft by 15 ft. They want to cover the floor with square tiles that are $\frac{9}{16}$ ft^2. Write and solve an inequality to find the least number of tiles they need to cover the floor.