Solve each inequality. Check your solution.

1. $4d + 7 \leq 23$

2. $5m - 3 > -18$

3. $-4x - 2 < 8$

4. $5 - 3n \geq -4$

5. $8 \leq -12 + 5q$

6. $5 \leq 11 + 3h$

7. $-7 \leq 5 - 4a$

8. $10 > 29 - 3b$

9. $5 - 9c > -13$

Write and solve an inequality.

10. On a trip from Virginia to Florida, the Sampson family wants to travel at least 420 miles in 8 hours of driving. What must be their average rate of speed?

11. Geometry The perimeter of an isosceles triangle is at most 27 cm. One side is 8 cm long. Find the possible lengths of the two congruent sides.

12. You want to solve an inequality containing the expression $-3(2x - 3)$. The next line in your solution would rewrite this expression as $\underline{?}$.

Solve each inequality.

13. $2(j - 4) \geq -6$

14. $-(6b - 2) > 0$

15. $-2(h + 2) < -14$

16. $-3 \leq 3(5x - 16)$

17. $25 > -(4y + 7)$

18. $4(w - 2) \leq 10$

19. $-3(c + 4) - 2 > 7$

20. $-2(r - 3) + 7 \geq 8$

21. $16 \leq 4 - 3(n - 13)$

22. $3w + 2 < 2w + 5$

23. $3t + 7 \geq 5t + 9$

24. $4d + 7 \geq 1 + 5d$

25. $5 - 2n \leq 3 - n$

26. $2k - 3 \leq 5k + 9$

27. $3s + 16 > 6 + 4s$

28. $6p - 1 > 3p + 8$

29. $3x + 2 > -4x + 16$

30. $2 - 3m < 4 + 5m$

31. $4d + 5 < -4d - 3$

32. $4 - 5y \geq 8 - y$

33. $2k + 6 \leq 4 + 5k$

34. $-3(v - 3) \geq 5 - 4v$

35. $3q + 6 \leq -5(q + 2)$

36. $3(2 + r) \geq 15 - 2r$

37. $9 + x < 7 - 2(x - 3)$

38. $2(m - 8) < -8 + 3m$

39. $2v - 4 \leq 2(3v - 6)$

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

40. $8 - 4s > 16; -4s > 8$

41. $\frac{2}{3}g + 7 \geq 9; \frac{2}{3}g \geq 2$

42. $2y - 5 > 9 + y; y > 14$

43. $-8 > \frac{r}{-5} - 2; 30 < r$

44. $4j + 5 \geq 23 + 3j; j \geq 18$

45. $2(q - 3) < 9 - 3q; q < 3$

46. a. Solve $5t + 4 \leq 8t - 5$ by gathering the variable terms on the left side and the constant terms on the right side of the inequality.

b. Solve $5t + 4 \leq 8t - 5$ by gathering the constant terms on the left side and the variable terms on the right side of the inequality.

c. Compare the results of parts (a) and (b).

Write and solve an inequality for each of the following statements.

Sample Four times the sum of x and 10 is less than 20.

$4(x + 10) < 20$

$x + 10 < 5$ **Divide each side by 4.**

$x < -5$ **Subtract 10 from each side.**

47. Six minus the sum of r and 3 is less than 15.

48. One half the difference of t and six is less than or equal to four.

49. Three times the quantity z plus 2 is greater than 12.

50. Writing Suppose a friend is having difficulty solving $2.5(p - 4) > 3(p + 2)$. Explain how to solve the inequality, showing all necessary steps and identifying the properties you would use.

51. a. Mental Math Like equations, some inequalities are true for all values of the variable, and some inequalities are not true for any values of the variable. Determine whether each inequality is *always* true or *never* true.

i. $4s + 6 \geq 6 + 4s$ **ii.** $3r + 5 > 3r - 2$ **iii.** $4(n + 1) < 4n - 3$

b. Critical Thinking How can you tell whether an inequality is always true or never true without solving?

52. Expenses The sophomore class is planning a picnic. The cost of a permit to use a city park is $250. To pay for the permit, there is a fee of $.75 for each sophomore and $1.25 for each guest who is not a sophomore. Two hundred sophomores plan to attend. Write and solve an inequality to find how many guests must attend for the sophomores to pay for the permit.

53. Health Care Systolic blood pressure is the higher number in a blood pressure reading. It is measured as your heart muscle contracts. The formula $P \leq \frac{1}{2}a + 110$ gives the normal systolic blood pressure P based on age a.

a. At age 20, does 120 represent a maximum or a minimum normal systolic pressure?

b. Find the normal systolic blood pressure for a 50-year-old person.

Match each inequality with its graph below.

54. $-2x - 2 > 4$

55. $2 - 2x > 4$

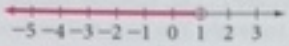
56. $2x + 2 > 4$

57. $2x + 2 > 4x$

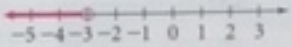
58. $2x - 2 > 4$

59. $-2(x - 2) > 4$

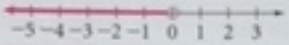
A.



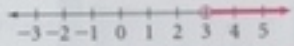
B.



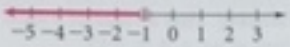
C.



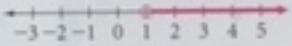
D.



E.



F.



60. Open-Ended Write two different inequalities that you can solve by adding 5 and multiplying by −3. Solve each inequality.

Solve each inequality.

61. $\frac{4}{3}r - 3 < r + \frac{2}{3} - \frac{1}{3}r$

62. $4 - 2m \leq 5 - m + 1$

63. $-2(0.5 - 4s) \geq -3(4 - 3.5s)$

64. $\frac{1}{2}n - \frac{1}{8} \geq \frac{3}{4} + \frac{5}{6}n$

65. $-(8 - s) < 0$

66. $3.8 - k \leq 5.2 - 2k$

67. $10 > 3(2n - 1) - 5(4n + 3)$

68. $3(3r + 1) - (r + 4) \leq 13$

69. $2(3x + 7) > 4(7 - 2x)$

70. $4(a - 2) - 6a \leq -9$

71. $4(3m - 1) \geq 2(m + 3)$

72. $17 - (4k - 2) \geq 2(k + 3)$

73. $2n - 3(n + 3) \leq 14$

74. $5x - \frac{1}{2}(3x + 8) \leq -4 + 3x$

75. $5a - 2(a - 15) < 10$

76. $5c + 4(c - 1) \geq 2 + 5(2 + c)$

77. Business Mandela is starting a part-time word-processing business out of his home. He plans to charge $15 per hour. The table at the right shows his expected monthly business expenses. Write and solve an inequality to find the number of hours he must work in a month to make a profit of at least $600.

Expense	Cost
Equipment rental	$490
Materials	$45
Business phone	$65

78. Commission Joleen is a sales associate in a clothing store. Each week she earns $250 plus a commission equal to 3% of her sales. This week her goal is to earn no less than $460. Write and solve an inequality to find the dollar amount of the sales she must have to reach her goal.