Write a compound inequality that represents each situation. Graph your solution.

1. all real numbers that are between -4 and 6
2. all real numbers that are at least 2 and at most 9
3. The circumference of a baseball is between 23 cm and 23.5 cm.
4. **Tropical Storm** The wind speeds of a tropical storm are at least 40 mi/h but no more than 74 mi/h.

nples 2, 3
(page 162)

Solve each compound inequality. Graph your solution.

5. $-3 < j + 2 < 7$
6. $3 \leq w + 2 \leq 7$
7. $2 < 3n - 4 \leq 14$
8. $7 \leq 3 - 2p < 11$
9. $-2 < -3x + 7 < 4$
10. $1.5 < w + 3 \leq 6.5$
11. $-16 < -3x + 8 < -7$
12. $-1 < 4m + 7 \leq 11$
13. $-9 < -2s - 1 \leq -7$
14. $-\frac{1}{2} < \frac{1}{4}t - \frac{3}{4} < \frac{1}{8}$
15. $3 \geq 4r - 5 \geq -1$
16. $3.2 \geq 2r + 0.2 > -3.8$
17. $12 \leq \frac{14 + 17 + a}{3} \leq 16$
18. $\frac{1}{2} < \frac{3x - 1}{4} < 5$
19. $-2 \leq \frac{5 - x}{3} \leq 2$

ample 4
age 163)

For each situation write and graph an inequality.

20. all real numbers n that are at most -3 or at least 5
21. all real numbers x that are less than 3 or greater than 7
22. all real numbers h less than 1 or greater than 3
23. all real numbers b less than 100 or greater than 300

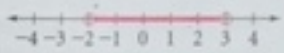
mple 5
ge 163)

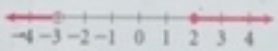
Solve each compound inequality. Graph your solution.

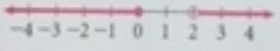
24. $3b - 1 < -7$ or $4b + 1 > 9$
25. $4 + k > 3$ or $6k < -30$
26. $3c + 4 \geq 13$ or $6c - 1 < 11$
27. $6 - a < 1$ or $3a \leq 12$
28. $7 - 3c \geq 1$ or $5c + 2 \geq 17$
29. $5y + 7 \leq -3$ or $3y - 2 \geq 13$
30. $2d + 5 \leq -1$ or $-2d + 5 \leq 5$
31. $5z - 3 > 7$ or $4z - 6 < -10$
32. $x - 5 \geq 0$ or $x + 1 < -2$
33. $-3n < -9$ or $-2n > 10$

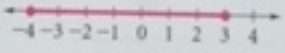
Skills

Write a compound inequality that each graph could represent.

34.


35.


36.


37.


Solve each compound inequality.

38. $3q - 2 > 10$ or $3q - 2 \leq -10$
39. $3 - 2h > 17$ or $5h - 3 > 17$
40. $1 \leq 0.25t \leq 3.5$
41. $25r < 400$ or $100 < 4r$
42. $-20 \leq 3t - 2 < 1$
43. $\frac{3x + 1}{4} - 4 > 3$ or $\frac{3 - 2x}{5} > 3$

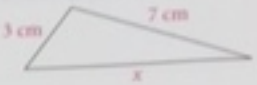
44. **Physical Science** The force exerted on a spring is proportional to the distance the spring stretches from its relaxed position. Suppose you stretch a spring distance d in inches by applying force F in pounds. For a certain spring, $\frac{d}{F} = 0.8$. You apply forces between 25 and 40 pounds, inclusive. Write a compound inequality describing the stretch of the spring.

45. **Reasoning** Describe the solutions of $3x - 8 < 7$ or $2x - 9 > 1$.

46. **Writing** Explain the difference between the words *and* and *or* in a compound inequality.

Geometry **The sum of the lengths of any two sides of a triangle is greater than the length of the third side. The lengths of two sides of a triangle are given. Find the range of values for the possible lengths of the third side.**

Sample 3 cm, 7 cm



Write inequalities for x as the longest side and for 7 cm as the longest side. The length 3 cm cannot be the longest side.

$x + 3 > 7$ and $3 + 7 > x$

$x > 4$ and $10 > x$ **Solve each inequality.**

$4 < x < 10$

The length of the third side is greater than 4 cm and less than 10 cm.

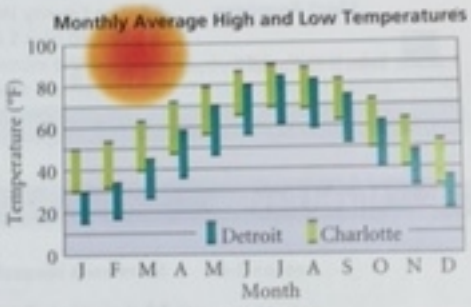
47. 2.5 in., 5 in. **48.** 12 ft, 18 ft **49.** 28 mm, 21 mm **50.** 5 m, 16 m

Meteorology **The graph below shows the average monthly high and low temperatures for Detroit, Michigan, and Charlotte, North Carolina.**

51. Write a compound inequality for Charlotte's average temperature in June.

52. Write a compound inequality for Detroit's average temperature in January.

53. Write a compound inequality for the yearly temperature range for each city.



Source: *Statistical Abstract of the United States*

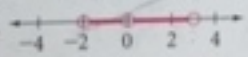
54. Open-Ended Describe a real-life situation that you could represent with the inequality $-2 < x < 8$.

Challenge

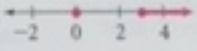
55. Nursing In nursing school, students learn temperature ranges for bath water. Tepid water is approximately 80°F to 93°F, warm water is approximately 94°F to 98°F, and hot water is approximately 110°F to 115°F. Model these ranges on one number line. Label each interval.

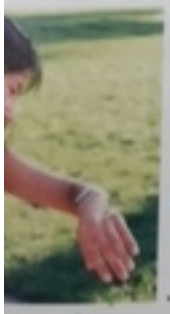
Write a compound inequality that each graph could represent.

56.



57.





Connection

our pulse rate, nber of beats seconds at a t. Multiply this

58. Pulse Rates When you exercise, your pulse rate rises. Recommended pulse rates vary with age and physical condition. For vigorous exercise, such as jogging, the inequality $0.7(220 - a) \leq R \leq 0.85(220 - a)$ gives a target range for pulse rate R (in beats per minute), based on age a (in years).

a. What is the target range for pulse rates for a person 35 years old? Round to the nearest whole number.

b. Your cousin's target pulse rate is in the range between 140 and 170 beats per minute. What is your cousin's age?

59. Find three consecutive even integers whose sum is between 48 and 60.

60. Find three consecutive even integers such that one half of their sum is between 15 and 21.