2.1 Practice WITH CalcChat® AND CalcView®

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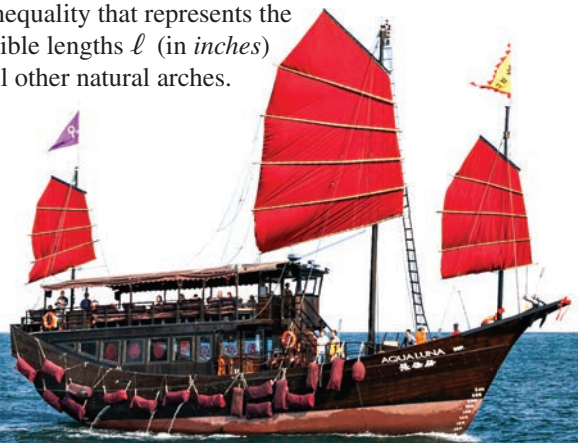
In Exercises 1–8, write the sentence as an inequality. *Example 1*

1. A number x is greater than 3.
2. A number n plus 7 is less than or equal to 9.
3. Fifteen is no more than a number t divided by 5.
4. One-half of a number y is more than 22.
5. The sum of a number v and 6.2 is at least -4.7.
6. Four is no less than the quotient of a number x and 2.1.
7. Three times a number k minus $\frac{5}{3}$ is no more than $\frac{4}{9}$.
8. $-\frac{7}{8}$ is at most the difference of twice a number m and $\frac{5}{4}$.

In Exercises 9–18, tell whether the value is a solution of the inequality. *Example 2*

9. $r + 4 > 8; r = 2$
10. $5 - x < 8; x = -3$
11. $3s \leq 19; s = -6$
12. $17 \geq 2y; y = 7$
13. $-1 > -\frac{x}{2}; x = 3$
14. $\frac{4}{z} \geq 3; z = 2$
15. $20 \leq \frac{10}{2z} + 20; z = 5$
16. $\frac{3m}{6} - 2 > 3; m = 8$
17. $10.4 \geq -2n + 4.6; n = -2.9$
18. $-5q - \frac{7}{4} + 8q < \frac{5}{8}; q = \frac{5}{6}$

19. **MODELING REAL LIFE** The Xianren Bridge is located in Guangxi Province, China. This arch is the world's longest natural arch, with a length of 400 feet. Write an inequality that represents the possible lengths ℓ (in *inches*) of all other natural arches.



20. **DRAWING CONCLUSIONS** The winner of a weight-lifting competition bench-pressed 400 pounds. The other competitors all bench-pressed at least 23 pounds less.

   a. Write an inequality that represents the weights that the other competitors bench-pressed.

   b. Was one of the other competitors able to bench-press 379 pounds? Explain.

OPEN-ENDED In Exercises 21 and 22, describe a real-life situation that can be modeled by the inequality.

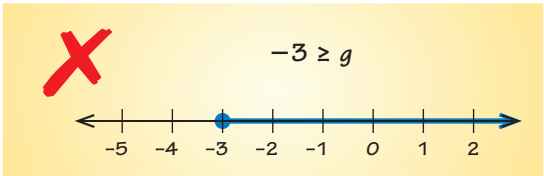
21. $12x \geq 60$
22. $23 + x \leq 31$

In Exercises 23–30, graph the inequality. *Example 3*

23. $x \geq 2$
24. $z \leq 5$
25. $-1 > t$
26. $-2 < w$
27. $v \leq -4.8$
28. $s < \frac{3}{2}$
29. $\frac{1}{4} < p$
30. $r \geq -|5|$

ERROR ANALYSIS In Exercises 31 and 32, describe and correct the error in graphing the inequality.

31.



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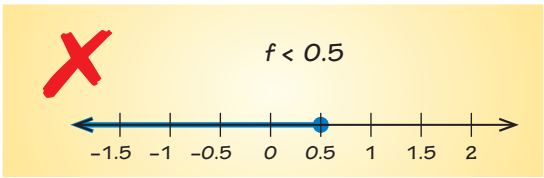
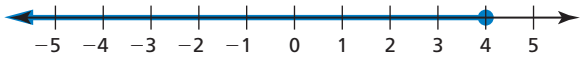


In Exercises 33–38, write and graph an inequality for the given solution set.

33. $\{x \mid x < 7\}$
34. $\{n \mid n \geq -2\}$
35. $\{z \mid 1.3 \leq z\}$
36. $\{w \mid 5.2 > w\}$
37. $\left\{k \mid k \leq \frac{9}{5}\right\}$
38. $\left\{m \mid \frac{3}{8} < m\right\}$

In Exercises 39 and 40, write an inequality that represents the graph.

39.



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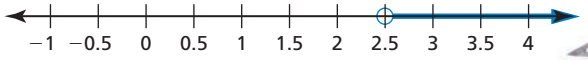
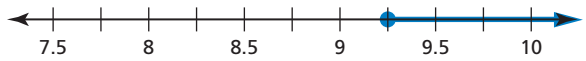


41. MODELING REAL LIFE The graph shows the hourly wage requirement m (in dollars) for employees in a state. Write and interpret an inequality that represents the state's hourly wage requirement.

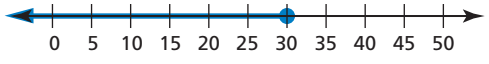
Example 4



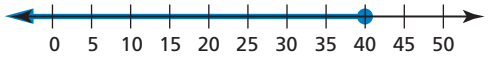
42. MODELING REAL LIFE The graphs show the weight restrictions w (in tons) for vehicles with (a) 2 axles, (b) 3 axles, and (c) 4 axles traveling on state roads. For each type of vehicle, write and interpret an inequality that represents the weight restriction (in pounds).

a.

b.



c.



43. COLLEGE PREP The water temperature of a swimming pool must be no less than 76°F. The temperature is currently 74°F. Which graph shows how much the temperature must increase to meet the requirement? Explain your reasoning.

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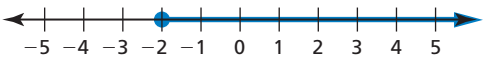

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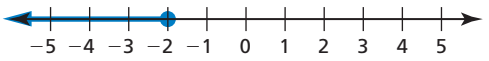

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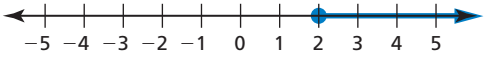

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44. MP PROBLEM SOLVING An elevation more than 18,000 feet above sea level is considered extremely high altitude. Supplementary oxygen is recommended when climbing at extremely high altitudes. A mountaineer plans to climb a mountain with an elevation of 6282 meters. Is supplementary oxygen recommended for the climb? Explain.

In Exercises 45–48, let X and Y represent the populations of two cities, where X is greater than Y. Interpret the inequality and tell whether it is true.

Example 5

45. $2Y > X + Y$

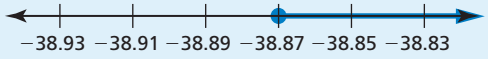
46. $\frac{X + Y}{X} < \frac{X + Y}{Y}$

47. $\frac{Y}{X + Y} < \frac{X}{Y}$

48. $\frac{1}{2}(X - Y) \geq X - \frac{Y}{2}$

49. MP REASONING Complete the inequality $2 \square |x + 5|$ with $<$, $\leq$, $>$, or $\geq$ so that $x = 3$ and $x = -3$ are both solutions of the inequality.

50. HOW DO YOU SEE IT?
The graph represents the known melting points of all metallic elements (in degrees Celsius).

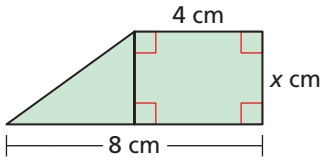


a. Write an inequality represented by the graph.

b. Write an inequality for the set of all numbers *not* represented by the graph. What does the inequality represent in this context?

CONNECTING CONCEPTS In Exercises 51 and 52, write an inequality that represents the missing dimension x.

51. The area is less than 18 square centimeters.



52. The area is greater than or equal to 8 square feet.