

2.1 Exercises

Vocabulary and Core Concept Check

- COMPLETE THE SENTENCE** A mathematical sentence using the symbols $<$, $>$, \leq , or \geq is called a(n) _____.
- VOCABULARY** Is 5 in the solution set of $x + 3 > 8$? Explain.
- ATTENDING TO PRECISION** Describe how to graph an inequality.
- DIFFERENT WORDS, SAME QUESTION** Which is different? Write “both” inequalities.

w is greater than or equal to -7 .

w is no less than -7 .

w is no more than -7 .

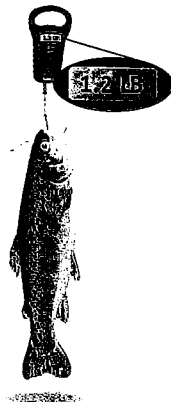
w is at least -7 .

Monitoring Progress and Modeling with Mathematics

In Exercises 5–12, write the sentence as an inequality. (See Example 1.)

- A number x is greater than 3.
- A number n plus 7 is less than or equal to 9.
- Fifteen is no more than a number t divided by 5.
- Three times a number w is less than 18.
- One-half of a number y is more than 22.
- Three is less than the sum of a number s and 4.
- Thirteen is at least the difference of a number v and 1.
- Four is no less than the quotient of a number x and 2.1.

- 13. MODELING WITH MATHEMATICS** On a fishing trip, you catch two fish. The weight of the first fish is shown. The second fish weighs at least 0.5 pound more than the first fish. Write an inequality that represents the possible weights of the second fish.



- 14. MODELING WITH MATHEMATICS** There are 430 people in a wave pool. Write an inequality that represents how many more people can enter the pool.

HOURS

Monday – Friday: 10 A.M. – 6 P.M.

Saturday – Sunday: 10 A.M. – 7 P.M.

Maximum Capacity: 600

In Exercises 15–24, tell whether the value is a solution of the inequality. (See Example 2.)

- $r + 4 > 8$; $r = 2$
- $5 - x < 8$; $x = -3$
- $3s \leq 19$; $s = -6$
- $17 \geq 2y$; $y = 7$
- $-1 > -\frac{x}{2}$; $x = 3$
- $\frac{4}{z} \geq 3$; $z = 2$
- $14 \geq -2n + 4$; $n = -5$
- $-5 \div (2s) < -1$; $s = 10$
- $20 \leq \frac{10}{2z} + 20$; $z = 5$
- $\frac{3m}{6} - 2 > 3$; $m = 8$
- MODELING WITH MATHEMATICS** The tallest person who ever lived was approximately 8 feet 11 inches tall.
 - Write an inequality that represents the heights of every other person who has ever lived.
 - Is 9 feet a solution of the inequality? Explain.

26. **DRAWING CONCLUSIONS** The winner of a weight-lifting competition bench-pressed 400 pounds. The other competitors all bench-pressed at least 23 pounds less.
- Write an inequality that represents the weights that the other competitors bench-pressed.
 - Was one of the other competitors able to bench-press 379 pounds? Explain.

ERROR ANALYSIS In Exercises 27 and 28, describe and correct the error in determining whether 8 is in the solution set of the inequality.

27.

X

$$\begin{aligned} -y + 7 &< -4 \\ -8 + 7 &\stackrel{?}{<} -4 \\ -1 &< -4 \end{aligned}$$

B is in the solution set.

28.

X

$$\begin{aligned} \frac{1}{2}x + 2 &\leq 6 \\ \frac{1}{2}(8) + 2 &\stackrel{?}{\leq} 6 \\ 4 + 2 &\stackrel{?}{\leq} 6 \\ 6 &\leq 6 \end{aligned}$$

B is not in the solution set.

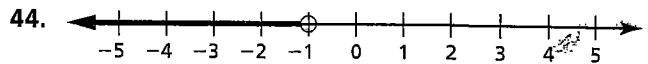
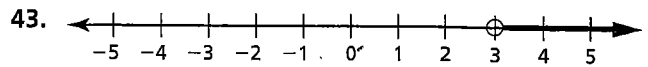
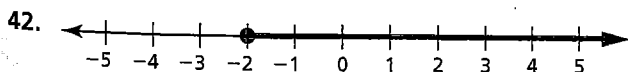
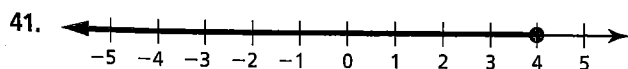
In Exercises 29–36, graph the inequality. (See Example 3.)

- | | |
|-----------------------|-------------------|
| 29. $x \geq 2$ | 30. $z \leq 5$ |
| 31. $-1 > t$ | 32. $-2 < w$ |
| 33. $v \leq -4$ | 34. $s < 1$ |
| 35. $\frac{1}{4} < p$ | 36. $r \geq - 5 $ |

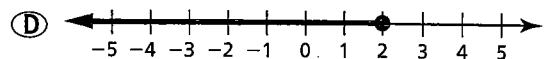
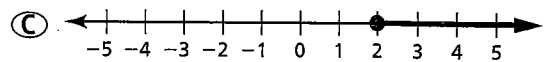
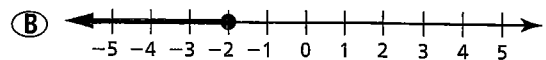
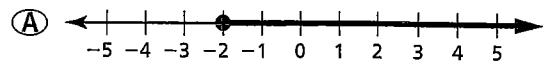
In Exercises 37–40, write and graph an inequality for the given solution set.

- | | |
|-----------------------------|----------------------------|
| 37. $\{x \mid x < 7\}$ | 38. $\{n \mid n \geq -2\}$ |
| 39. $\{z \mid 1.3 \leq z\}$ | 40. $\{w \mid 5.2 > w\}$ |




In Exercises 41–44, write an inequality that represents the graph. (See Example 4.)



45. **ANALYZING RELATIONSHIPS** The water temperature of a swimming pool must be no less than 76°F. The temperature is currently 74°F. Which graph correctly shows how much the temperature needs to increase? Explain your reasoning.



46. **MODELING WITH MATHEMATICS** According to a state law for vehicles traveling on state roads, the maximum total weight of a vehicle and its contents depends on the number of axles on the vehicle. For each type of vehicle, write and graph an inequality that represents the possible total weights w (in pounds) of the vehicle and its contents.

Maximum Total Weights		
		
2 axles, 40,000 lb	3 axles, 60,000 lb	4 axles, 80,000 lb

47. **PROBLEM SOLVING** 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 and graph an inequality that represents the lengths ℓ (in inches) of all other natural arches.

