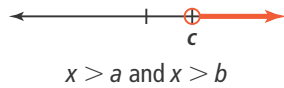


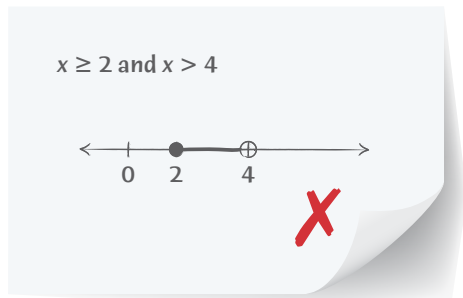


**UNDERSTAND**

10. **Look for Relationships** The compound inequality  $x > a$  and  $x > b$  is graphed below. How is the point labeled  $c$  related to  $a$  and  $b$ ?



11. **Error Analysis** Describe and correct the error a student made graphing the compound inequality  $x \geq 2$  and  $x > 4$ .



12. **Generalize** Suppose that  $a < b$ . Select from the symbols  $>$ ,  $<$ ,  $\geq$ , and  $\leq$ , as well as the words *and* and *or*, to complete the compound inequality below so that its solution is all real numbers.

$$x \square a \square x \square b$$

13. **Higher Order Thinking** Let  $a$  and  $b$  be real numbers.
- If  $a > b$ , how is the graph of  $x > a$  and  $x > b$  different from the graph of  $x > a$  or  $x > b$ ?
  - If  $a < b$ , how is the graph of  $x > a$  and  $x > b$  different from the graph of  $x > a$  or  $x > b$ ?
  - If  $a = b$ , how is the graph of  $x > a$  and  $x > b$  different from the graph of  $x > a$  or  $x > b$ ?

14. **Mathematical Connections** Consider the solutions of the compound inequalities.

$$4 < x < 8 \quad 2 < x < 11$$

Describe each solution as a set. Is one set a subset of the other? Explain your answer.

**PRACTICE**

Write a compound inequality for each graph.

SEE EXAMPLE 1

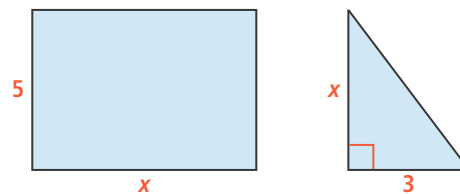
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Solve each compound inequality and graph the solution. SEE EXAMPLES 2 AND 3

- $2x + 5 > -3$  and  $4x + 7 < 15$
- $2x - 5 > 3$  or  $-4x + 7 < -25$
- $2x - 5 > 3$  and  $-4x + 7 < -25$
- $-x + 1 > -2$  or  $6(2x - 3) \geq -6$
- $-x + 1 > -2$  and  $6(2x - 3) \geq -6$
- $-\frac{5}{8}x + 2 + \frac{3}{4}x > -1$  or  $-3(x + 25) > 15$

The value for the area  $A$  of each figure is given. Write and solve a compound inequality for the value of  $x$  in each figure. SEE EXAMPLE 4

25.  $35 \geq A \geq 25$       26.  $9 \leq A \leq 12$



Write a compound inequality to represent each sentence below. SEE EXAMPLE 4

- A quantity  $x$  is at least 10 and at most 20.
- A quantity  $x$  is either less than 10 or greater than 20.
- A quantity  $x$  is greater than 10 and less than 20.

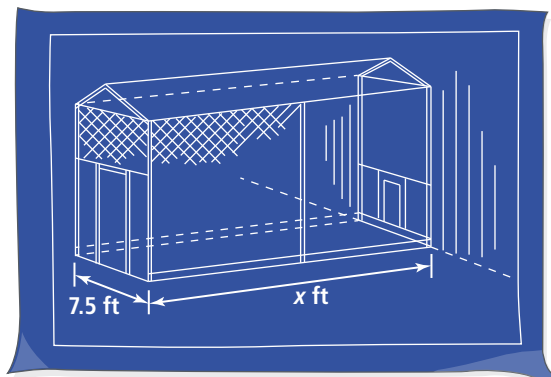
**APPLY**

**30. Reason** Fatima plans to spend at least \$15 and at most \$20 on sketch pads and pencils. If she buys 2 sketch pads, how many pencils can she buy while staying in her price range?



**31. Make Sense and Persevere** A peanut company ships its product in a carton that weighs 20 oz when empty. Twenty bags of peanuts are shipped in each carton. The acceptable weight for one bag of peanuts is between 30.5 oz and 33.5 oz, inclusive. If a carton weighs too much or too little, it is opened for inspection. Write and solve a compound inequality to determine  $x$ , the weights of cartons that are opened for inspection.

**32. Model With Mathematics** Volunteers at an animal shelter are building a rectangular dog run so that one shorter side of the rectangle is formed by the shelter building as shown. They plan to spend between \$100 and \$200 on fencing for the sides at a cost of \$2.50 per ft. Write and solve a compound inequality to model the possible length of the dog run.



**ASSESSMENT PRACTICE**

**33.** Which of the following compound inequalities have the solution  $x < 3$ ? Select all that apply.

- (A)  $3x + 5 < 6$  or  $-2x + 9 > 3$
- (B)  $3x + 5 < 6$  and  $-2x + 9 > 3$
- (C)  $3x - 5 < 10$  and  $-2x + 9 > 3$
- (D)  $3x + 5 < 6$  or  $-2x + 9 < 3$
- (E)  $3x - 5 < 10$  or  $-2x + 9 > 3$

**34. SAT/ACT** What is the solution of  $0.2x - 4 - 2x < -0.4$  and  $3x + 2.7 < 3$ ?

- (A)  $x < -2$
- (B)  $x < 0.1$
- (C)  $x < 1$
- (D)  $x > -2$  and  $x < 0.1$
- (E)  $x > -2$  and  $x < 1$

**35. Performance Task** An animal shelter categorizes donors based on their total yearly donation, as shown in the table.

Donor Category	Total Yearly Donation
Bronze	$< \$100$
Silver	$\geq \$100$ and $< \$500$
Gold	$\geq \$500$ and $< \$1,000$
Platinum	$\geq \$1,000$

**Part A** Keenan donates the same amount each month. Write and solve a compound inequality for the monthly donation that will put him in the Gold category.

**Part B** Libby donated \$50 during the first month of the year. If she makes three additional donations of equal amounts during the year, how much will she need to donate each time to be in the Silver category?

**Part C** Paula originally planned to donate \$50 each month. After reviewing her budget, she decides that she must reduce her planned donation. By what amount can she reduce her original planned monthly donation of \$50 so that she will be in the Silver category?