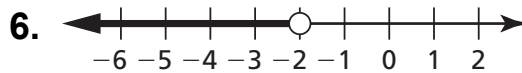
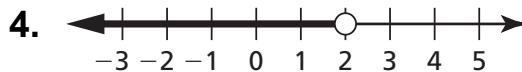
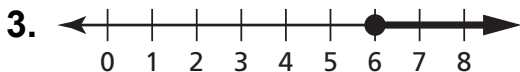
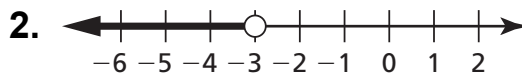
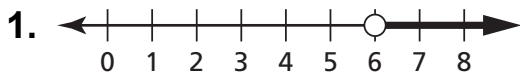


## 2.5 Start Thinking

The local zoo waives its entry fee for children under age 3 and for senior citizens age 65 and older. Write two separate inequalities for this situation and graph them on the same number line. How could you describe the customers the zoo charges an entry fee for?

## 2.5 Warm Up

Write an inequality that is represented by the graph.



## 2.5 Cumulative Review Warm Up

Solve the equation. Check your solution.

1.  $6 = \frac{z}{-5} + 4$

2.  $\frac{h - 5}{6} = 1$

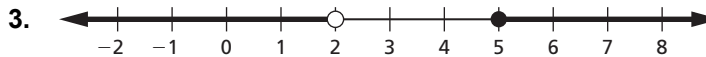
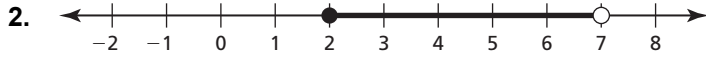
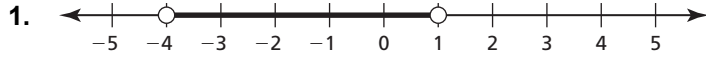
3.  $9y - 2y = 42$

4.  $15v - 9v - 15 = 81$

5.  $4c + 9 - c = -15$

## 2.5 Practice A

In Exercises 1–3, write a compound inequality that is represented by the graph.



In Exercises 4–6, write the sentence as an inequality. Graph the inequality.

4. A number  $t$  is less than 5 and greater than 3.
5. A number  $m$  is less than  $-3$  or greater than or equal to 1.
6. A number  $s$  is at least  $-2$  or less than  $-6$ .
7. You are purchasing a new refrigerator. To fit in the space, the width of the refrigerator cannot be more than 42 inches. To meet your storage requirements, the width of the refrigerator must be at least 36 inches. Write a compound inequality that represents this range.

In Exercises 8–13, solve the inequality. Graph the solution.

8.  $3 < x + 4 \leq 10$
9.  $15 > -5t \geq -10$
10.  $-4 \geq 8 - 4q \geq -12$
11.  $h + 7 < 5$  or  $-9h < -45$
12.  $-11 > m + 4$  or  $2m \geq -16$
13.  $3w + 2 < 5$  or  $-w + 8 \leq 2$
14. A bike shop rents bikes with heights ranging from 18 inches to 26 inches. The shop says the height of the bike should be about 0.6 times a cyclist's leg length. Write and solve a compound inequality that represents the leg lengths of the cyclists the shop does *not* provide bikes for.

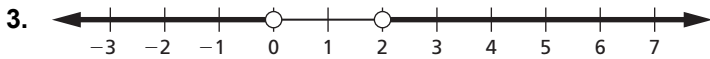
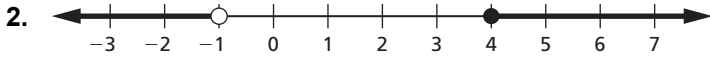
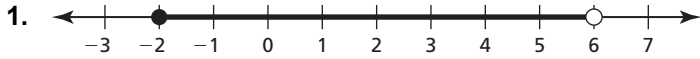
In Exercises 15–18, solve the inequality. Graph the solution, if possible.

15.  $24 < -5t + 4 < 16$
16.  $3p - 2 \geq 4$  or  $7p > -28$
17.  $-n + 5 \leq 9$  and  $n + 3 > 8$
18.  $a - 6 \leq 3$  or  $3a + 2 > 8$

# 2.5

## Practice B

In Exercises 1–3, write a compound inequality that is represented by the graph.



In Exercises 4 and 5, write the sentence as an inequality. Graph the inequality.

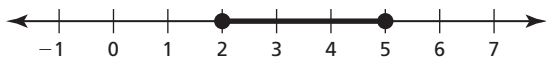
4. A number  $d$  is less than or equal to 2 and greater than or equal to  $-2$ .
5. A number  $m$  is no less than  $-1$  or less than or equal to  $-5\frac{1}{3}$ .

In Exercises 6–11, solve the inequality. Graph the solution.

6.  $-2 \geq 10 - 3g \geq -8$
7.  $-4 < 2p + 8 < 18$
8.  $-13 > q + 2$  or  $5q \geq -15$
9.  $15 < -v - 8$  or  $3v + 4 \geq 10$
10.  $-6 < \frac{1}{3}(6y + 12) < 14$
11.  $42 < 6(3 - k)$  or  $\frac{1}{2}(14k - 8) \geq 10$
12. A tuxedo rental shop rents tuxedos with sleeve lengths from 20 inches to 40 inches. The shop says the length of the sleeves should be about 1.2 times a person's arm length. Write and solve a compound inequality that represents the arm lengths of people the shop does *not* provide tuxedos for.

In Exercises 13–16, solve the inequality. Graph the solution, if possible.

13.  $8w - 5 > 12w + 3$  or  $3 > -\frac{3}{4}w + 9$
14.  $2t - 15 < 3t - 17$  and  $t - 13 < -19$
15.  $3d + 17 \leq 11$  or  $-4d + 4 < -3d + 24$
16.  $4x - 9 < 9x + 6 < 4x + 16$
17. Write a real-life story that can be modeled by the graph.



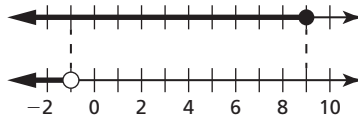
**2.5****Enrichment and Extension****Special Cases of Compound Inequalities**

**Example:** Solve the compound inequality, graph the solution, and then state the solution in interval notation:  $2x < x - 1$  and  $10 \geq 2(x + 4)$ .

$$2x < x - 1 \text{ and } 10 \geq 2(x - 4)$$

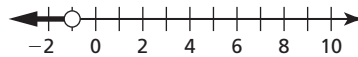
$$x < -1 \text{ and } 5 \geq x - 4$$

$$x < -1 \text{ and } x \leq 9$$



The graphs only overlap at  $x < -1$ .

So, the answer is only  $x < -1$ .



Interval Notation:  $(-\infty, -1)$

**Solve the compound inequality, graph the solution, and state the solution in interval notation, if possible.**

1.  $9x - 5 - 4x \geq 3x + 5$  or  $2(3x + 1) \geq 5x$
2.  $6x + 2 \leq 5x + 1$  and  $8 \geq 4(x - 1)$
3.  $5 \leq -2x + 3 < 1$
4.  $2x + 5 > x + 9$  or  $\frac{3x - 2}{4} \geq 4$
5.  $5x + 3 < 4(x + 1)$  or  $2x - 5 \geq 6x - 11 - 3x$
6.  $\frac{7x - 5}{3} \geq 3$  and  $3x + 1 \geq 4x - 1$

# 2.5 Puzzle Time

## What Was The Name Of Jupiter's Big Pet Dog?

Write the letter of each answer in the box containing the exercise number.

**Write the sentence as an inequality. Graph the inequality.**

- A number  $x$  is less than *or* equal to 4 *and* greater than  $-1$ .
- A number  $x$  is less than 0 *or* at least 3.
- A number  $x$  is less than 8 *and* greater than *or* equal to 5.

**Solve the inequality. Graph the solution.**

- $9 < x + 4 \leq 12$
- $-5x - 12 < 13$  *or*  $-6x + 8 > 50$
- $-3 \leq 2x - 3 \leq 3$
- $-4x + 7 > -13$  *or*  $3x + 2 \geq 26$
- $9x - 13 < -22$  *or*  $-8x + 7 \leq -25$
- $71 > -8x + 15 > -25$
- $24 < 3x - 6 < 36$
- $2x - 15 < 7$  *or*  $-3x < -51$
- A local department store advertised that its clearance items had prices that were at least \$3 *and* no more than \$8. Write and solve an inequality that represents the prices of clearance items, and graph the inequality.

**Answers**

**E.**  $5 \leq x < 8$ ;

**T.**  $x < 5$  *or*  $x \geq 8$ ;

**T.**  $10 < x < 14$ ;

**E.**  $-1 < x \leq 4$ ;

**S.**  $x < -7$  *or*  $x > -5$ ;

**R.**  $x < -1$  *or*  $x \geq 4$ ;

**G.**  $x < 11$  *or*  $x > 17$ ;

**O.**  $x < 0$  *or*  $x \geq 3$ ;

**A.**  $0 \leq x \leq 3$ ;

**P.**  $-7 < x < 5$ ;

**D.**  $5 < x \leq 8$ ;

**R.**  $3 \leq x \leq 8$ ;

11	8	3	6	10		12	1	4		5	9	2	7
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