2.2 Start Thinking

When making a purchase, it is important to have more money than the cost of the merchandise. Suppose you have a $20 bill and have already placed bread, eggs, and cereal into your cart. How could you represent the amount of money you have left to spend on milk with an inequality?

2.2 Warm Up

Solve the equation.

1. $x + 1 = 0$ **2.** $y - 3 = 0$ **3.** $x - 3 = 3$

4. $x + 1 = -1$ **5.** $a + 5 = -15$ **6.** $x - 5 = 2$

2.2 Cumulative Review Warm Up

Solve the equation.

1. $|x - 7| = 6$ **2.** $|3 - x| = 7$

3. $|4x + 1| = 2$ **4.** $|4x + 3| = 5$

5. $|m - 4| = 6$ **6.** $|q + 9| = 13$

Name _____ Date _____

In Exercises 1–3, tell which number you would add to or subtract from each side of the inequality to solve it.

1. $h + 3 < 8$

2. $p - 5 \geq 2$

3. $-3 > n - 1$

In Exercises 4–12, solve the inequality. Graph the solution.

4. $t - 3 > -2$

5. $4 < p - 2$

6. $2 \geq h - 5$

7. $v - 5 > -9$

8. $p + 3 \leq 4$

9. $-7 < 7 + t$

10. $6 + k > 5$

11. $12 \leq r + 5$

12. $w - (-4) < 8$

In Exercises 13–16, write the sentence as an inequality. Then solve the inequality.

13. A number minus 2 is greater than -10.

14. A number plus 7 is at most 4.

15. The difference of a number and 6 is less than 1.

16. Eight is greater than or equal to the sum of a number and 3.

17. You and your friend are planning to walk across an old bridge. The bridge can hold at most 1000 pounds. The total weight of the people currently on the bridge is 675 pounds. You weigh 156 pounds.

   a. Write and solve an inequality that represents how much your friend can weigh within the limits of the bridge.

   b. Your friend weighs 182 pounds. Can you and your friend both walk on the bridge? Explain.

18. The school baseball record for no-hitter innings is 112 in a season. This year's team currently has 87 no-hitter innings. What are the possible numbers of additional no-hitter innings the team can achieve to match or break the school record in a season?

19. Which of the following inequalities are equivalent to the inequality $5 < -y + b$, where b is a constant? Select all that apply. Justify your answer.

   a. $5 + y + b < 0$

   b. $y < b - 5$

   c. $b - 5 > y$

   d. $b - 5 < y$

Name_____   Date _____

2.2   Practice B

In Exercises 1–9, solve the inequality. Graph the solution.

1. $w + 6 \le 2$

2. $m - 3 > -6$

3. $4 < 4 + s$

4. $7 \le x + 15$

5. $p - (-3) > 10$

6. $q + 6 - 5 > 4$

7. $3 - 11 + t > -2$

8. $4 \le 6a - 4a - 2$

9. $22 + (-9c) + 10c < 5 + 1$

In Exercises 10–13, write the sentence as an inequality. Then solve the inequality.

10. A number plus 10 is less than 34.

**11.** A number minus 8 is at least 14.

12. The sum of a number and 7 is less than 15.

13. Nine is less than or equal to the difference of a number and 1.

14. You order a new pair of running shoes from a website that offers free shipping on orders of $75 or more. Your shoes cost $69.95.

   a. Write and solve an inequality that represents how much more you must spend to get free shipping.

   b. The cost of shipping your shoes is $7.79. Would you purchase another item in order to get free shipping? Explain.

In Exercises 15 and 16, write and solve an inequality to find the possible values of *x*.

15. Perimeter < 37.8 meters
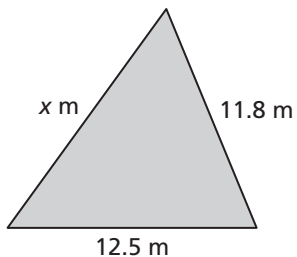
16. Perimeter ≤ 24.1 centimeters
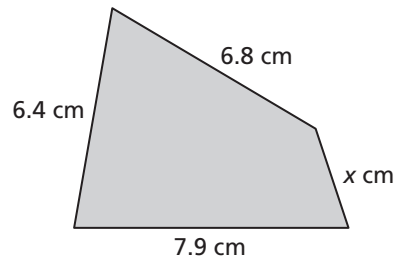
17. Write and solve an inequality that represents the numbers that are *not* solutions of each inequality.

   a. $x - 7 \le -10$

   b. $x + 3 > 2.5$

2.2 **Enrichment and Extension**

Explore Positive and Negative Variables

In Exercises 1–4, simplify the expression. Justify your answer with the Properties of Addition and Multiplication.

1. $-x + 6 + x - a + a$

2. $1 + (1 - p) + p - 1$

3. $-a - b - c + a + b + c$

4. $4 - b + 2 - (3 - b)$

5. Simplify the expression $-x - y - z - 1 + 1 + z + y + x$ assuming all variables are positive integers.

6. In Exercise 5, assume all variables are negative. Will this change the answer? Explain.

7. In Exercise 5, assume the variables are both positive and negative integers. Will this change the answer? Explain.

8. Is it possible to write an expression that would be simplified differently if the variables are either positive or negative?

9. Is a^2 always equivalent to $-a^2$? Why, or why not? Give an example.

10. Is a^2 always equivalent to $(-a)^2$? Why, or why not? Give an example.

Name_____ Date _____

2.2 Puzzle Time

Where Did The Granite Go On Saturday Night?

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

Solve the inequality.

1. $x + 12 < -4$

2. $-3 \geq x - 11$

3. $x - 6 < -7$

4. $2 \geq x - 1$

5. $x + 9 < 10$

6. $12 + x > 8$

7. $x - (-14) \geq 30$

8. $x - 22 + 16 < -3$

9. $5 > x - (-5)$

10. $7 - 26 + x \geq -11$

11. $36 \leq 6x - 5x - 16$

Write the sentence as an inequality. Then solve the inequality.

12. A number x plus 24 is greater than 23.

13. A number x minus 5 is at least -4.

14. The sum of a number x and 19 is less than or equal to 35.

15. The monthly minutes on your cell phone can add up to no more than 700 minutes. You have used 648 minutes. Write and solve an inequality that represents how many more minutes that you can use during the rest of the month.

16. The side lengths of a triangle are 11.3 centimeters, 14.7 centimeters, and x centimeters. The perimeter of the triangle is less than 44 centimeters. Write and solve an inequality to find the possible values of x.

Answers

T. $x \geq 16$

L. $x < 0$

T. $x < 3$

Y. $x > -4$

H. $x \geq 8$

O. $x \leq 3$

A. $x \leq 8$

L. $x < 1$

A. $x < -16$

E. $x < -1$

T. $x \geq 52$

L. $x + 24 > 23; x > -1$

C. $x + 648 \leq 700; x \leq 52$

S. $x - 5 \geq -4; x \geq 1$

R. $x + 11.3 + 14.7 < 44; x < 18$

B. $x + 19 \leq 35; x \leq 16$

11	4		7	10	3		15	16	6	13	8	1	9		14	2	5	12