

Algebra I

Lesson 1.4

Write Equations and Inequalities

Warm-Up

A family gets a postcard inviting them to become members at The Toledo Zoo. If they choose to become members the annual membership will cost \$50, and then a cost of only \$2 for each ticket when they go.

- (a) Write an expression to represent the total cost to become members if the family plans on buying t tickets during the year.

$$50 + 2t$$

- (b) If the family does not get a membership there is no annual fee, but each ticket costs \$8. Write an expression for the total cost of buying t tickets if the family does not join.

$$8t$$

- (c) The family plans on buying 12 tickets during the year. Would it be better to pay for the membership or not? Answer with a complete sentence and **show all work that leads to your answer!**

MEMBERSHIP

$$50 + 2(12)$$

$$\$74$$

NO MEMBERSHIP

$$8(12)$$

$$\$96$$

They should get a membership for only 12 tickets.

Symbol	Meaning	In Other Words
=	is equal to	the same as
<	is less than	fewer than
≤	is less than or equal to	at most, no more than
>	is greater than	more than
≥	is greater than or equal to	at least, no less than

Example 1. Write Equations and Inequalities

Write an equation or inequality.

Verbal Sentence

- (a) The sum of twice a number r and 3 is 11.
- (b) The quotient of a number n and 2 is at most 16.
- (c) A number q is at least 5 and less than 17.

Equation or Inequality

$$2r + 3 = 11$$

$$\frac{n}{2} \leq 16$$

$$17 > q \geq 5$$

$$5 \leq q < 17$$

Example 2. Check Possible Solutions

Check whether 5 is a solution to the equation or inequality.

(a) $24 - 3d = 9$

$$24 - 3(5) = 9$$

$$24 - 15 = 9$$

$$9 = 9 \checkmark$$

Yes, 5 is a solution

(b) $3x + 4 = 18$

$$3(5) + 4 = 18$$

$$15 + 4 = 18$$

$$19 \neq 18$$

NO

(c) $2z - 7 \leq 3$

$$2(5) - 7 \leq 3$$

$$10 - 7 \leq 3$$

$$3 \leq 3 \checkmark$$

Yes, 5 is a solution

(d) $4 + 3p > 19$

$$4 + 3(5) > 19$$

$$4 + 15 > 19$$

$$19 > 19$$

NO

Example 3. Use Mental Math to Solve an Equation

Solve each equation using mental math.

(a) $y + 8 = 13$

(b) $a - 6 = 3$

(c) $8c = 32$

(d) $\frac{h}{7} = 4$

$y = 5$

$a = 9$

$c = 4$

$h = 28$

Example 4. Solve a Multi-Step Problem

Sarah enrolled in a guitar class. The enrollment fee was \$25. She paid a total of \$70 for the enrollment fee and three lessons.

- (a) Write an
- ^{equation}
- ~~expression~~
- to determine the cost of the three lessons.

$70 = 25 + 3l$

- (b) Use your answer to part (a) and mental math to find the cost of each lesson.

\$45 For 3 Lessons

\$15 For 1 Lesson

- (c) Write an expression to find the total cost if taking
- L
- lessons.

$25 + 15L$

- (d) Use your expression from part (c) to find the total cost be is she paid the enrollment fee and took ten lessons.

$25 + 15(10)$
 $\$175$

It would cost \$175
For 10 Lessons**Example 5. Write and Check a Solution to an Inequality**

Some math teachers form a band called The Mathematicians and try to earn money by making CDs of their music and selling them online. The band wants to make no less than \$600. If they are sure they can sell 54 CDs for \$15 each, will they make their goal?

$15c \geq 600$

$15(54) \geq 600$

$= 810 \geq 600$ TRUE

Yes, they will make
\$810.**Assignment:** Pages 24 - 25 (2 - 12, 18 - 24, 30, 32, 40) even**Review:**

Evaluate the expression.

1. $3^3 - 12 \div 4$

2. $10^2 \div 4 + 6$

3. $10^2 \div (4 + 6)$

4. $\frac{9 \cdot 7^2}{5 + 8^2 - 6}$

5. $3 + 7(3.5 \div 5)$

6. $2 + 21 \div 3 - 6$

Use mental math to solve the equation.

7. $x + 7 = 13$

8. $3y = 21$

9. $8t - 1 = 23$