LESSON 1-6

Success for English Language Learners

Relations and Functions

Steps for Success

Step I To begin, make sure all students understand the lesson opener by using the following procedure.

- Not all students have created a text message on a cell phone. Briefly explain to students, or challenge English Language Learners to explain to other students, the process.

Step II Teach the lesson.

- Have students discuss the definitions of the vocabulary words *relation, domain, range,* and *function*. Have them compare the English phrases and definitions to those in their native language.
- Make sure that students can differentiate between an *input* and an *output*. Have them cite examples. For example, if money is *input* into a soda machine, the machine will *output* soda.
- Posting a mapping diagram for students to refer to may aid students having difficulty with *domain* and *range*.
- Note that an individual may have many *relatives* or *relations*. An element in the domain of a *relation* can be mapped to *many* elements of its range.

Step III Ask English Language Learners to complete the worksheet for this lesson.

- Point out that Example 1 in the student textbook is supported by Problem 1 on the worksheet. Consistently drawing mapping diagrams in this format will reinforce that the domain is mapped to the range.
- Point out that Example 2A in the student textbook is supported by Problem 2 on the worksheet. Point out that, in the mapping diagram for a function, each element in the domain has only one arrow coming from it.
- Think and Discuss supports the worksheet.

Making Connections

- To further reinforce *domain* and *range,* have students note that a *domain* is sometimes considered a home. A bear's domain, or where the bear *comes from,* may be a cave. The bear's *range* may be where the bear *goes to* find food, say a forest. A function's inputs *come from* its domain, and each input *goes to* a value in the range.

Name _____ Date _____ Class _____

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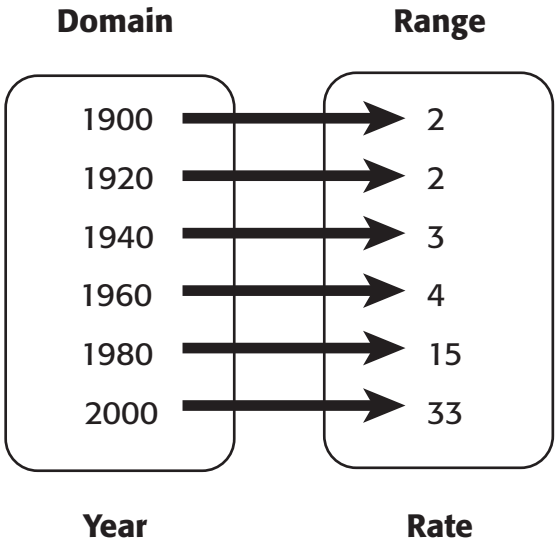
Problem 1

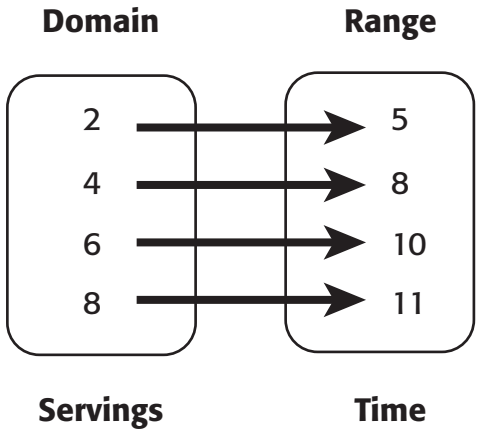
Give the domain and range for the relation shown in the table.



Each year is paired with a rate. The years are the input and the rates are the output. So the years are the *domain* and the rates are the *range.*

Problem 2

Determine whether the relation in the table is a function.



The relation is a *function* because each input has only one output.

Think and Discuss

1. In Problem 1, if the domain is limited to 1900 and 1920, what is the range?

_____

2. In Problem 1, if the domain is limited to 1900 and 1920, is the relation a function?

_____

3. Why is any relation whose range contains only 1 element a function?

_____

Answer Key

CHAPTER 1

Lesson 1-1

1. $0.\overline{6}$, $\sqrt{2}$, 0, $-\frac{5}{2}$, and 0.5129
2. $0.\overline{6}$, $\sqrt{2}$, 0, and 0.5129
3. $0 \in \mathbb{R}$, $\mathbb{Q}$, $\mathbb{Z}$, and W

Lesson 1-2

1. -9 because $-9 + 9 = 0$.
2. 9 because $\frac{1}{9} \cdot 9 = 1$.
3. \$6.20

Lesson 1-3

1. Go through the list of squares or work "outside in."
2. They have equivalent expressions under the radical symbol.
3. Like radicals are similar to like terms and can be combined.

Lesson 1-4

1. altogether, combine groups
2. equal groups, per, fraction
3. Follow the order of operations.

Lesson 1-5

1. $(4x)(4x)(4x)(4x)(4x)$
2. Add 2 to the exponent.
3. Subtract 1 from the exponent.

Lesson 1-6

1. 2
2. Yes. Each input has only one output.
3. Because each input has only one output.

Lesson 1-7

1. x
2. The output is the dependent variable.
3. $b = 7$

Lesson 1-8

1. $(4, 2)$
2. $(5, 1)$
3. The x-coordinate.
4. The y-coordinate.

Lesson 1-9

1. It has the same shape as the data points.
2. The y-value of -3 appears to be about 4.5.
3. Not necessarily. The model is an approximation and the unknown data may not match it.

CHAPTER 2

Lesson 2-1

1. Substitute my answer into the equation and evaluate.
2. Do the same except use the inequality symbol from the equation instead of the equals sign.
3. I should get the same answer if I distribute the 5 then solve.

Lesson 2-2

1. I can check it by substitution.
2. The variable would be in the numerator.
3. Answers may vary.

Lesson 2-3

1. Answers may vary.
2. You would get the same rate of change.
3. Because the problem says it is a line.

Lesson 2-4

1. All equations that represent the line are equivalent.
2. You would get another equivalent equation.