## Student Guide

### Questions 1–6 (SG pp. 208–210)

**1.*** Doubling Machine

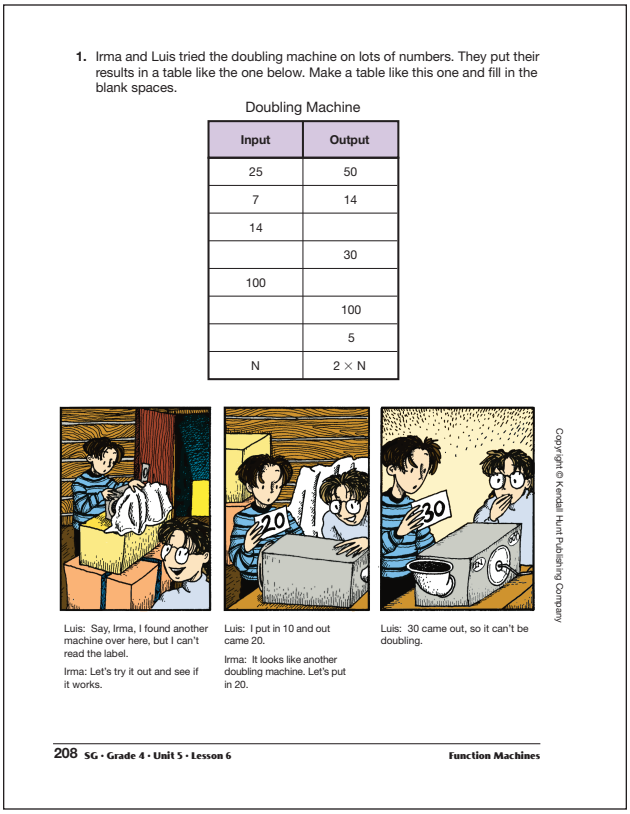
| Input | Output |
|---|---|
| 25 | 50 |
| 7 | 14 |
| 14 | *28* |
| *15* | 30 |
| 100 | *200* |
| *50* | 100 |
| *2.5* | 5 |
| *N* | $2 \times N$ |

**2.*** Mystery Machine

| Input | Output |
|---|---|
| 10 | 20 |
| 20 | 30 |
| 5 | 15 |
| 17 | 27 |
| *35* | 45 |
| 25 | *35* |
| 0 | *10* |
| *29* | 39 |
| *N* | *N* + 10 |

**3.** It adds 10 to the input number.

**4.** Subtract 10 from the output number.



1. Irma and Luis tried the doubling machine on lots of numbers. They put their results in a table like the one below. Make a table like this one and fill in the blank spaces.

Doubling Machine

| Input | Output |
|---|---|
| 25 | 50 |
| 7 | 14 |
| 14 | |
| | 30 |
| 100 | |
| | 100 |
| | 5 |
| N | 2 × N |



Luis: Say, Irma, I found another machine over here, but I can't read the label.

Irma: Let's try it out and see if it works.

Luis: I put in 10 and out came 20.

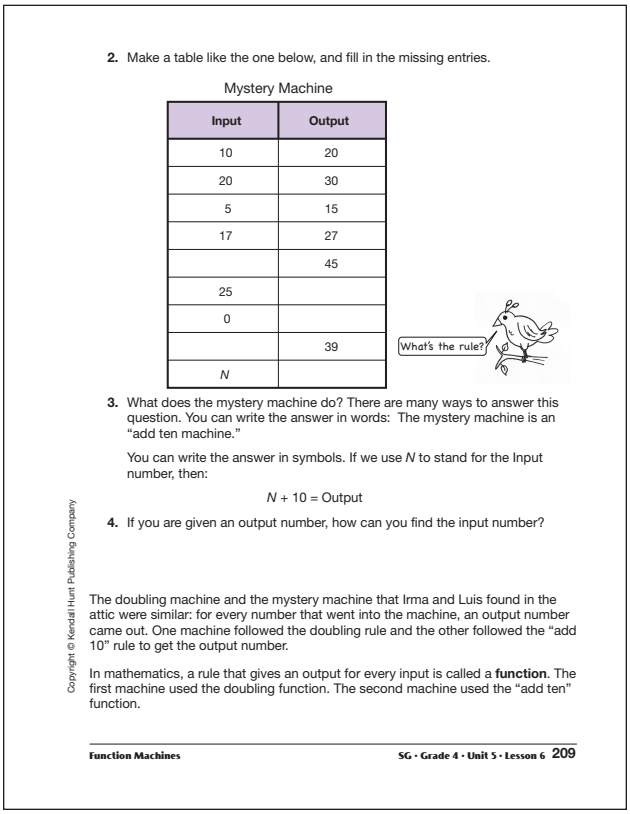
Irma: It looks like another doubling machine. Let's put in 20.

Luis: 30 came out, so it can't be doubling.

Copyright © Kendall Hunt Publishing Company

208 SG • Grade 4 • Unit 5 • Lesson 6 Function Machines

***Student Guide* - Page 208**



2. Make a table like the one below, and fill in the missing entries.

Mystery Machine

| Input | Output |
|---|---|
| 10 | 20 |
| 20 | 30 |
| 5 | 15 |
| 17 | 27 |
| | 45 |
| 25 | |
| 0 | |
| | 39 |
| *N* | |



3. What does the mystery machine do? There are many ways to answer this question. You can write the answer in words: The mystery machine is an "add ten machine."

You can write the answer in symbols. If we use *N* to stand for the Input number, then:

*N* + 10 = Output

4. If you are given an output number, how can you find the input number?

The doubling machine and the mystery machine that Irma and Luis found in the attic were similar: for every number that went into the machine, an output number came out. One machine followed the doubling rule and the other followed the "add 10" rule to get the output number.

In mathematics, a rule that gives an output for every input is called a **function**. The first machine used the doubling function. The second machine used the "add ten" function.

Copyright © Kendall Hunt Publishing Company

Function Machines SG • Grade 4 • Unit 5 • Lesson 6 209

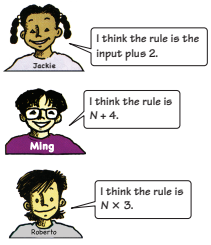
***Student Guide* - Page 209**

***Answers and/or discussion are included in the lesson.**

Copyright © Kendall Hunt Publishing Company

**5.** Look at the function table below. The students in Mrs. Dewey's class are trying to find the rule.

| Input | Output |
|---|---|
| 1 | 3 |
| 2 | 6 |
| 5 | 15 |
| 6 | 18 |
| 10 | 30 |
| *N* | |

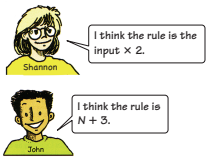



**A.** Test each student's rule. Do you agree with Jackie, Ming, or Roberto? Why or why not?

**B.** Choose three input numbers, then find the three output numbers using the rule you found in Question 5A.

**6.** The students in Mrs. Dewey's class are trying to find the rule for the function table below.

| Input | Output |
|---|---|
| 2 | 5 |
| 3 | 6 |
| 5 | 8 |
| 10 | 13 |
| *N* | |




**A.** Test each student's rule. Do you agree with Shannon or John? Why or why not?

**B.** Choose three input numbers, then find the three output numbers using the rule you found in Question 6A.

Use the *Function Tables* pages in your *Student Activity Book* to practice working with functions.

Copyright © Kendall Hunt Publishing Company



***Student Guide* - Page 210**

**5. A.*** I agree with Roberto because if you multiply every input number by 3 you get the output number.

**B.*** Answers will vary.

**6. A.** I agree with John because when I tried Shannon's rule with 2, then 2 × 2 did not equal 5. But, John's rule worked for all the input numbers.

**B.** Answers will vary.

Copyright © Kendall Hunt Publishing Company

***Answers and/or discussion are included in the lesson.**