LESSON MAKER PRO

# Find the Machine

*Use input and output pairs to find one rule.*

**GRADE 3 · 3.A.1.2**

**3.A.1.2** "Describe the rule (limited to a single operation) for a pattern from an input/output table or function machine involving addition, subtraction, or multiplication."

NAME _____ DATE _____

## ONE RULE FOR EVERY ROW

A function machine changes each input into an output. Look for one addition, subtraction, or multiplication rule that works for every row.

**WORKED EXAMPLE**

What rule changes each input to an output?

| Input | Output |
|---|---|
| 31 | 48 |
| 32 | 49 |
| 33 | 50 |

1. 48 is 17 more than 31.
2. 32 + 17 = 49.
3. 33 + 17 = 50.

**Answer: Add 17.**

## PRACTICE 4 problems

**1** Describe the rule: 1 → 6, 3 → 8, 5 → 10.

**ANSWER** _____

**2** Describe the rule: 12 → 8, 14 → 10, 16 → 12.

**ANSWER** _____

**3** Describe the rule: 2 → 6, 4 → 12, 6 → 18.

**ANSWER** _____

**4** Describe the rule: 1 → 4, 3 → 12, 5 → 20.

**ANSWER** _____

## APPLY IT Show your work

**1** A game gives the same number of points each round. Describe the rule from rounds to points.

| Rounds | Points |
|---|---|
| 2 | 8 |
| 3 | 12 |

**ANSWER** _____

**2** You trade tickets for a prize. Describe the rule from tickets before the trade to tickets left.

| Before | Left |
|---|---|
| 18 | 15 |
| 16 | 13 |

**ANSWER** _____

## CHALLENGE One step up

What is the rule? Find the missing input and explain how you know.

| Input | Output |
|---|---|
| 5 | 20 |
| 7 | 28 |
| ___ | 36 |

WORK SPACE AND ANSWER

**ANSWER KEY**

# Find the Machine

**GRADE 3 · 3.A.1.2**

## PART 1 · PRACTICE

| # | PROBLEM | ANSWER |
|---|---|---|
| 1 | Describe the rule: 1 → 6, 3 → 8, 5 → 10. | **Add 5.** |
| 2 | Describe the rule: 12 → 8, 14 → 10, 16 → 12. | **Subtract 4.** |
| 3 | Describe the rule: 2 → 6, 4 → 12, 6 → 18. | **Multiply by 3.** |
| 4 | Describe the rule: 1 → 4, 3 → 12, 5 → 20. | **Multiply by 4.** |

## PART 2 · APPLY IT

1. **Multiply by 4.** Each round earns 4 points: 2 times 4 = 8 and 3 times 4 = 12.
2. **Subtract 3.** Each output is 3 less than its input, so the prize costs 3 tickets.

## CHALLENGE

**Multiply the input by 4. The missing input is 9 because 9 times 4 = 36.**

Accept equivalent wording such as “add 5 each time” when it clearly describes how each input becomes its output.