

Lesson 110 ALGEBRA

Input and output – number rules shown as a table

WHAT THIS LESSON TEACHES

A number machine follows one rule for every number that goes in. The number going in is the input and the number coming out is the output. Read the pairs to spot the rule.

- Put 4 into an 'add 3' machine and 7 comes out.
- Input 5, rule 'multiply by 2', output 10.

MODEL THIS ON THE BOARD

FINDING A HIDDEN RULE

- 1 The table shows in 1 → out 4 and in 2 → out 5.
- 2 $1 + 3 = 4$ and $2 + 3 = 5$, so the rule is add 3.
- 3 Use the rule: $3 + 3 = 6$, so out is 6.

In	1	2	3
Out	4	5	

DISCUSSION STARTER

REFLECT Once you spotted a rule, did you test it on another row before filling the gaps?

ANSWER KEY

- a) add 5
 b) add 5 → outs 8, 11, 14, 5
 c) 8, 11, 14, 5
 Q1: 12
 Q2: 11
 Q3: 16

Q4: 9, 18, 27, 0

Q5: add 7

- a) Always — $5 + 3 = 8$.
 b) Never — The rule stays the same, but different inputs give different outputs.
 c) Always — $2 \times 3 = 6$ and $3 \times 3 = 9$.
 d) Never — Rules can be +, −, × or ÷.

EXTENSION SHEET · STRETCH ANSWERS

- S1: $\times 2 + 4$
 S2: $\times 6 + 6$
 S3: 129
 S4: $\times 3 + 8$

S5: $\times 5 + 4$

Investigation: Invent a secret rule — open-ended; scan pupils' working for valid solution paths rather than a single answer.