

Reasoning and Problem Solving

Step 2: Find a Rule – Two Step

National Curriculum Objectives:

Mathematics Year 6: (6A1) [Express missing number problems algebraically](#)

Mathematics Year 6: (6A2) [Use simple formulae](#)

Differentiation:

Questions 1, 4 and 7 (Problem Solving)

Developing Find the missing two-step function in order to calculate an output. Use of whole numbers only.

Expected Find the missing two-step function in order to calculate an output. Use of all four operations and where an input or output may be a decimal number or a negative number.

Greater Depth Find the missing two-step function in order to calculate an output. Use of all four operations where an input or output may be a decimal number, a negative number, fraction or a mixed number. Functions may include decimal numbers.

Questions 2, 5 and 8 (Reasoning)

Developing Explain whether a statement is true or false. Use of whole numbers only.

Expected Explain whether a statement is true or false. Use of all four operations and where an input or output may be a decimal number or a negative number.

Greater Depth Explain whether a statement is true or false. Use of all four operations where an input or output may be a decimal number, a negative number, fraction or a mixed number. Functions may include decimal numbers.

Questions 3, 6 and 9 (Problem Solving)

Developing Calculate the original input using the clues and functions provided. Use of whole numbers only.

Expected Calculate the original input using the clues and functions provided. Use of all four operations and where an input or output may be a decimal number or a negative number.

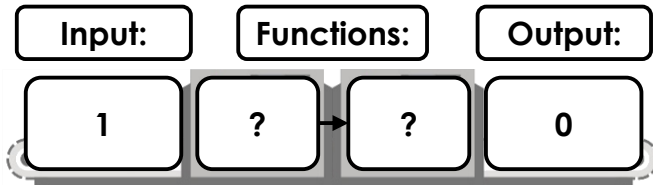
Greater Depth Calculate the original input using the clues and functions provided. Use of all four operations where an input or output may be a decimal number, a negative number, fraction or a mixed number. Functions may include decimal numbers.

More [Year 6 Algebra](#) resources.

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Find a Rule – Two Step

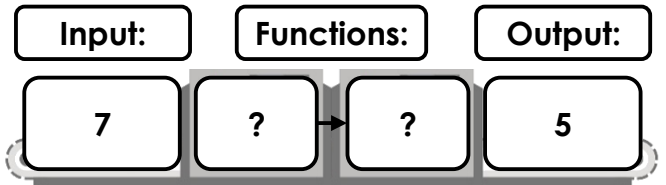
1a. Insert two functions that could be used to make the function machine correct.



PS

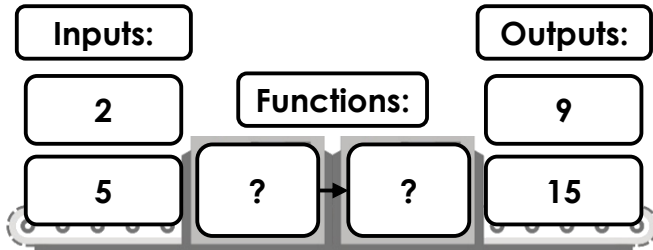
Find a Rule – Two Step

1b. Insert two functions that could be used to make the function machine correct.



PS

2a. True or false? Explain your answer. Suggest what the functions could be.



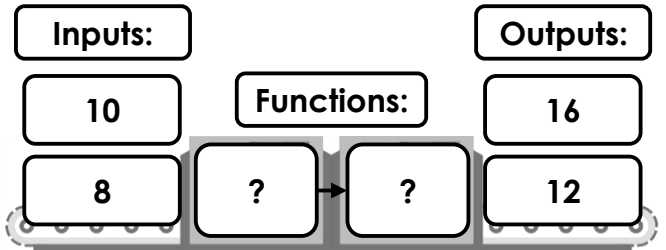
Jeanie

I think that the function is $+ 16$ and then $\div 2$ because $2 + 16$, then $\div 2$ is 9.



R

2b. True or false? Explain your answer. Suggest what the functions could be.



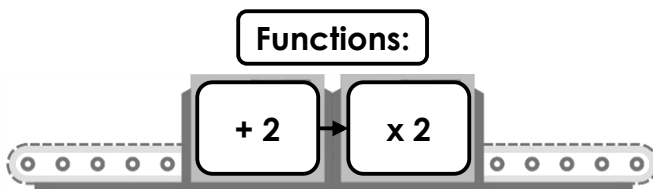
Boris

I think that the function is $\div 2$ and then $+ 11$ because $10 \div 2$, then $+ 11$ is 16.



R

3a. Fatima is using this function machine.



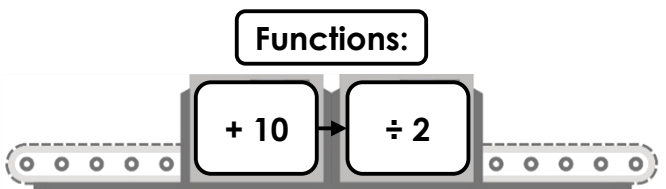
She puts an input into the function machine to generate an output. She then puts that output into the machine as an input. She now has the output of 16.

What was Fatima's original input?



PS

3b. Jude is using this function machine.



He puts an input into the function machine to generate an output. He then puts that output into the machine as an input. He now has the output of 9.

What was Jude's original input?

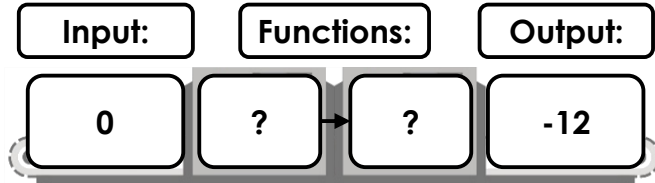


PS

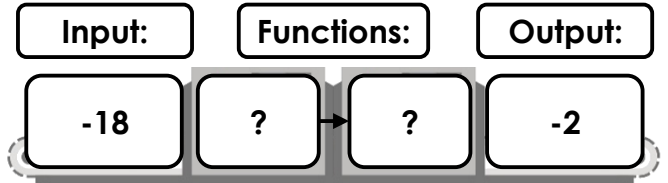
Find a Rule – Two Step

Find a Rule – Two Step

4a. Insert two functions that could be used to make the function machine correct.



4b. Insert two functions that could be used to make the function machine correct.

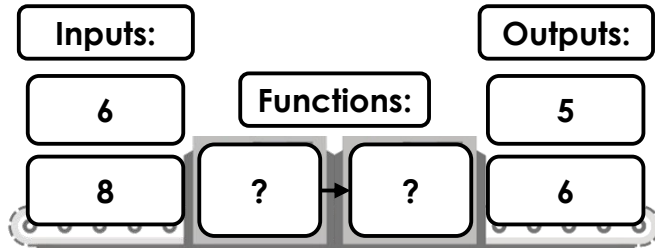


PS



PS

5a. True or false? Explain your answer. Suggest what the functions could be.



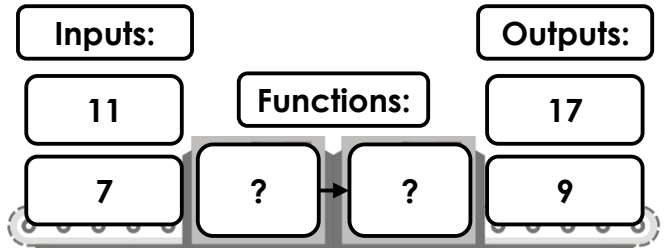
Henryk

I think that the function is $\div 3$ and then add 3 because $6 \div 3$, then $+ 3$ is 5.



R

5b. True or false? Explain your answer. Suggest what the functions could be.



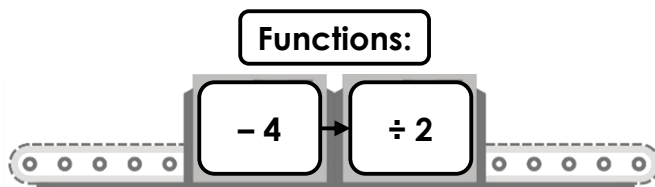
Luanne

I think that the function is $+ 11$ and then $\div 2$ because $7 + 11$, then $\div 2$ is 9.



R

6a. Eesa is using this function machine.



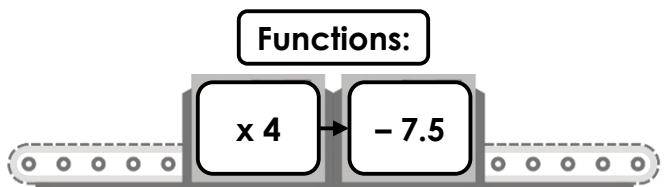
He puts an input into the function machine to generate an output. He then puts that output into the machine as an input. He now has the output of 1.5.

What was Eesa's original input?



PS

6b. Jake is using this function machine.



He puts an input into the function machine to generate an output. He then puts the output back into the machine. He now has the output of 10.5.

What was Jake's original input?

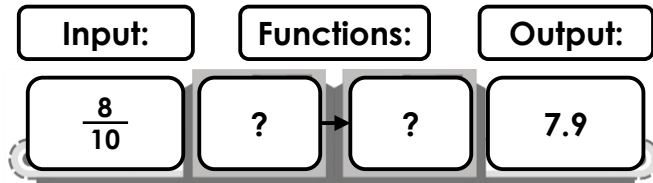


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Find a Rule – Two Step

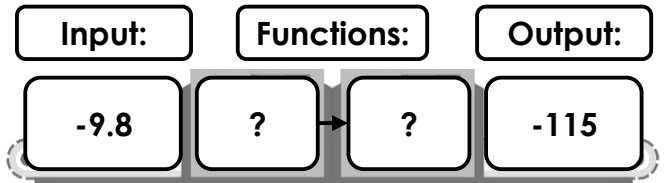
Find a Rule – Two Step

7a. Insert two functions that could be used to make the function machine correct.



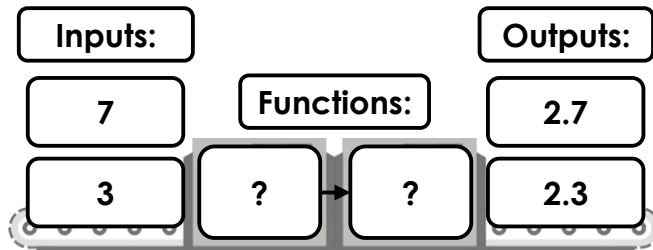
PS

7b. Insert two functions that could be used to make the function machine correct.



PS

8a. True or false? Explain your answer. Suggest what the functions could be.

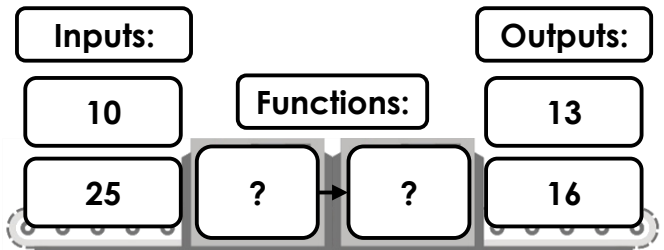


I think that the function is $\times 2$ and then $- 3.7$ because 3×2 , then $- 3.7$ is 2.3.



R

8b. True or false? Explain your answer. Suggest what the functions could be.

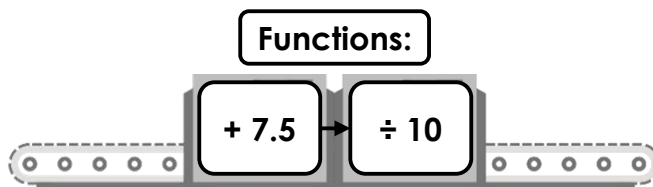


I think that the function is $\times 2$ and then $- 7$ because 10×2 , then $- 7$ is 13.



R

9a. Jaiden is using this function machine.



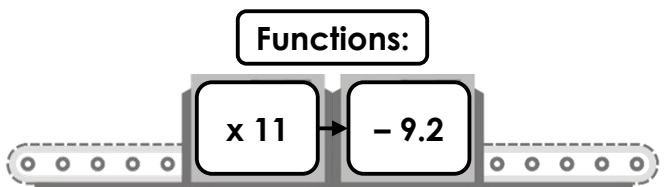
He puts an input into the function machine to generate an output. He then puts that output into the machine as an input. He now has the output of 0.875.

What was Jaiden's original input?



PS

9b. Lucy is using this function machine.



She puts an input into the function machine to generate an output. She then puts that output into the machine as an input. She now has the output of 252.6.

What was Lucy's original input?



PS

Reasoning and Problem Solving Find a Rule – Two Step

Developing

- 1a. Various answers, for example: $+1$; -2
2a. False. This doesn't work for an input of 5 to give an output of 15. The function could be $x \times 2$, $+ 5$.
3a. 1

Expected

- 4a. Various answers, for example: -3 ; $x \times 4$
5a. False. This doesn't work for an input of 8 to give an output of 6. The function could be $+ 4$, $\div 2$ or $\div 2$, $+ 2$.
6a. 18

Greater Depth

- 7a. Various answers, for example: $+ 15$; $\div 2$
8a. False. This doesn't work for an input of 7 to give an output of 2.7. The function could be $+ 20$, $\div 10$.
9a. 5

Reasoning and Problem Solving Find a Rule – Two Step

Developing

- 1b. Various answers, for example: -6 ; $+4$
2b. False. This doesn't work for an input of 8 to give an output of 12. The function could be -2 , $x \times 2$ or $x \times 2$, -4 .
3b. 6

Expected

- 4b. Various answers, for example: $+10$; $\div 4$.
5b. False. This doesn't work for an input of 11 to give an output of 17. The function could be $x \times 2$, -5 .
6b. 3

Greater Depth

- 7b. The missing functions are $x \times 10$, -17 . If the input is 30, the output will be 283.
8b. False. This doesn't work for an input of 25 to give an output of 16. The function could be $\div 5$, $+ 11$.
9b. 3