

Functions and mappings

- Constructing a mapping diagram from a function machine
- Identifying a linear function

Keywords

You should know

explanation 1a

explanation 1b

- 1** Look at this pair of numbers. 5 and -2

Work these out.

a $5 + -2$ **b** $5 - -2$

c 5×-2 **d** $5 \div -2$

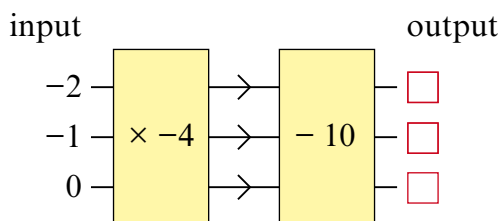
- 2** Add, subtract, multiply and divide each of these pairs of numbers.

a -6 -2 **b** -4 -8

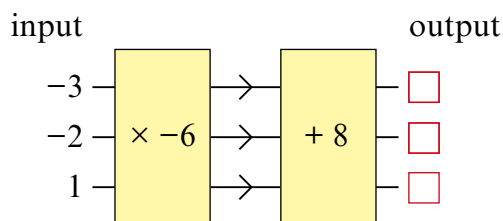
c 9 -3 **d** -10 $+4$

- 3** Copy and complete these function machines.

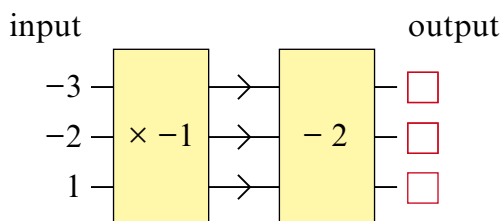
a



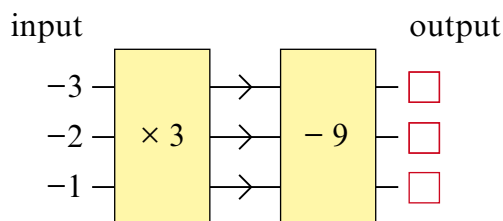
b



c



d



4 Find the output of each function when the input is -8 .

a $x \rightarrow 3x$

b $y = 15 - 2x$

c $x \rightarrow \frac{x}{2} - 1$

d $y = 5x + 4$

explanation 2a

explanation 2b

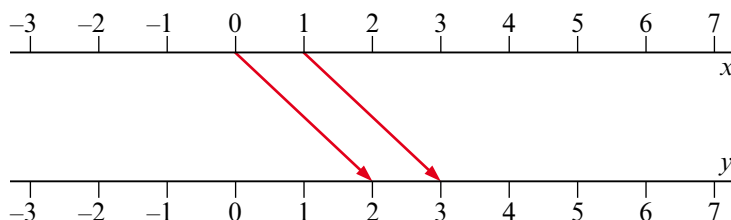
5 Look at this table of values for the function $x \rightarrow 4x + 1$.

Input (x)	-1	0	1	2	3
Output (y)					13

a Copy and complete the table.

b Explain why this is a linear function.

6 Look at this mapping diagram for $y = x + 2$.



a Copy and complete the mapping diagram.

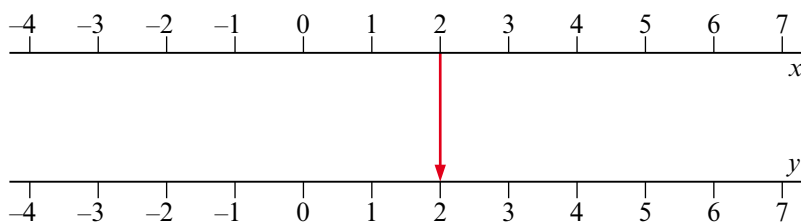
b Describe how the output changes as the inputs increase by 1.

c Explain why this is a linear function.

7 $x \rightarrow 2x - 2$ is a mapping.

a Write the mapping as a function machine.

b Copy and complete the table and the mapping diagram.



Input (x)	Output (y)
-1	
0	
1	
2	2
3	
4	

c Is the function a linear function? Explain your answer.

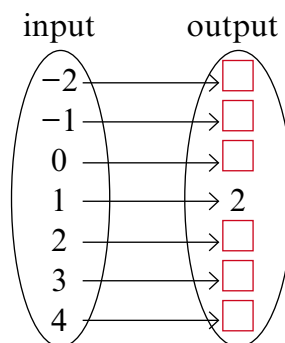
- 8 a** Copy and complete the table for the function $x \rightarrow \frac{x}{2} + 3$.

Input (x)	0	1	2	3	4
Output (y)		3.5			

- b** Describe how the output is changing.
c Is this a linear function? Explain your answer.

- 9** $y = 4 - 2x$ is a mapping.

- a** Copy and complete the mapping diagram.
b Describe how the output changes.
c Explain why $y = 4 - 2x$ is a linear function.



- 10** A linear function maps $2 \rightarrow 5$, as shown in the table.

Input (x)	-2	-1	0	1	2	3	4
Output (y)					5		

Write the linear function that also does the following mappings.
 Copy and complete the table for each function.

- a** $1 \rightarrow 4$ **b** $1 \rightarrow 2$ **c** $3 \rightarrow 3$ **d** $0 \rightarrow 11$

explanation 3a

explanation 3b

- 11 a** Which of these functions are linear? Explain how you know.

- i** $x \rightarrow x(1 + x)$ **ii** $y = 3(x - 2)$
iii $y = (x + 3)^3$ **iv** $x \rightarrow \frac{x + 1}{3}$

- b i** Write three different linear functions that map $1 \rightarrow 1$.
ii For each function, write down the outputs when the input is 2, 3 and 4. Explain how the output pattern shows that the function is linear.
c i Write three different non-linear functions that map $1 \rightarrow 1$.
ii For each function, write down the outputs when the input is 2, 3 and 4. Explain how the output pattern shows that the function is non-linear.