2.7 Function Machines and Inverse Operations: 30-minute Pack

Calculators not allowed · about 30 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Find the input when a machine does: multiply by 4 then add 6, and the output is 26.

(2)

2 A machine does: add 12 then multiply by 1. Find the input that gives output 25. Explain the inverse step you use.

(2)

3 Challenge: A machine does: multiply by 2, add 3, multiply by 4. The final output is 44. Work backwards to find the original input. Show each inverse step clearly.

(4)

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4 A function machine does: multiply by 5. For each input, write the output.

(a) Input 3 **(1)**

(b) Input 7 **(1)**

(c) Input -2 **(1)**

5 I think of a number, m. I subtract 8 and then divide the result by 7. Write an expression for the result.

(2)

6 Solve a - 10 = -16

(1)

7 Solve 9n + 13 = -50

(2)

8 A function machine is shown.
input -> [- 4] -> [x 8] -> output
The input is 8. Work out the output.

(2)

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9 Work backwards: a machine does add 6, then multiply by 3. The final output is 30. What was the original input?

(2)

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10 A car park charges according to a two-step rule: it doubles the number of hours parked, then adds a fixed £2 booking fee, to give the total charge in pounds. A driver is charged £14. Form the calculation needed and find how many hours they parked for.

(3)

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Mark scheme · 2.7 Function Machines and Inverse Operations: 30-minute Pack

Question 1

inverse steps attempted: 26 - 6 = 20 then 20 / 4 = 5	M1
5 cao	A1

Answer: **5**

Question 2

use inverse: input = output - 12 or recognise multiply by 1 does not change number	M1
13 cao	A1

Answer: **13**

Question 3

first inverse step: 44 / 4 = 11	M1
second inverse step: 11 - 3 = 8	M1
third inverse step: 8 / 2 = 4	M1
4 cao	A1

Answer: **4**

Question 4

(a) 15 cao	B1

(a) Answer: **15**

(b) 35 cao	B1

(b) Answer: **35**

(c) -10 cao	B1

(c) Answer: **-10**

Question 5

one correct operation applied to the letter, eg a product or a sum	M1
(m - 8) ÷ 7 oe cao	A1

Answer: **(m - 8) ÷ 7**

Question 6

a = -6 cao	B1

Answer: **a = -6**

Question 7

correct first step (undoing the + or - or reordering)	M1
n = -7 cao	A1

Answer: **n = -7**

Question 8

first operation applied correctly (4)	M1
32 cao	A1

Answer: **32**

Question 9

correctly reverses the last step first, e.g. 30 / 3 = 10	M1
4 cao	A1

Answer: **4**

Question 10

reverses the booking fee correctly, e.g. 14 - 2 = 12	M1
reverses the doubling correctly, e.g. 12 / 2 = 6	M1
6 hours cao	A1

Answer: **6 hours**

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