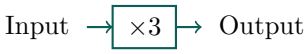
Function Machines and Inverse Operations

GCSE Mathematics • **Foundation Tier** • Grades 1–3 • Non-calculator

Name: _____ Class: _____ Total: _____ / 54

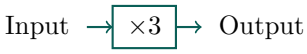
Show all your working. Marks are given for correct method as well as the final answer.

1. Work out the output when the input is 6. **[1 mark]**



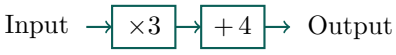
Answer: _____

2. Work out the input when the output is 21. **[2 marks]**



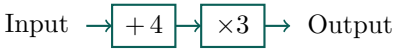
Answer: _____

3. Work out the output when the input is 5. **[2 marks]**



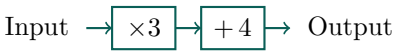
Answer: _____

4. Work out the output when the input is 5. **[2 marks]**



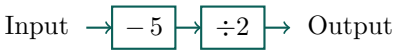
Answer: _____

5. Work out the input when the output is 31. **[3 marks]**



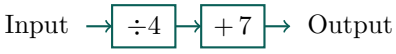
Answer: _____

6. Work out the input when the output is 8. **[3 marks]**



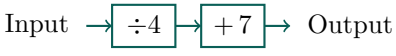
Answer: _____

7. Work out the output when the input is 20. **[2 marks]**



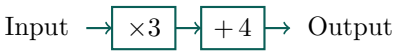
Answer: _____

8. Work out the input when the output is 10. **[3 marks]**



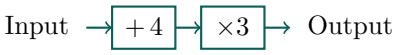
Answer: _____

9. Write down an expression for the output when the input is x. **[2 marks]**



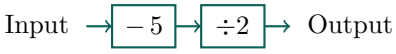
Answer: _____

10. Write down an expression for the output when the input is x. **[2 marks]**



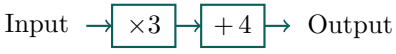
Answer: _____

11. Write down an expression for the output when the input is n. **[2 marks]**



Answer: _____

12. Write down the inverse operations, in order, for this machine. **[2 marks]**



Answer: _____

13. Use a function machine to solve $4x + 7 = 31$. **[3 marks]**

Answer: _____

14. Use a function machine to solve $\frac{x}{3} - 2 = 5$. **[3 marks]**

Answer: _____

15. Use a function machine to solve $2(x - 3) = 14$. **[3 marks]**

Answer: _____

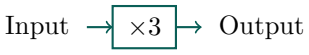
16. A machine doubles a number then subtracts 9. The output is 13. Work out the input. **[3 marks]**

Answer: _____

17. A machine has a single box $\times 5$. Explain why the output is always a multiple of 5 for whole-number inputs. **[2 marks]**

Answer: _____

18. This machine is used twice: the output of the first is fed into a second identical machine.



(a) Work out the final output for an input of 4. **[2 marks]**

(b) Write an expression for the final output when the input is x. **[2 marks]**

Answer: _____

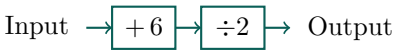
19. A two-step machine turns 4 into 19 and 7 into 34.

(a) The first box is $\times 5$. Work out the second box. **[3 marks]**

(b) Work out the output when the input is 10. **[2 marks]**

Answer: _____

20. A machine adds 6 then divides by 2.



(a) Write an expression for the output when the input is x. **[2 marks]**

(b) Work out the input that gives an output equal to the input. **[3 marks]**

Answer: _____

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