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Function Machines

Grade 2 topic · Foundation and Higher · Edexcel and AQA

How to use this pack
20 questions that get harder as you go. Foundation students: aim for Questions 1–15 (27 marks) and have a go at the rest. Higher students: complete all 20. Show your working on the lines and write your final answer on the answer line, then mark yourself with the answers at the back. Diagrams are not drawn accurately. Total: 45 marks.

Warm-up

1 A function machine does ×3 then +9. The input is 3. Work out the output. **[1 mark]**

Answer _____

2 A function machine does ×4 then +1. The input is 9. Work out the output. **[1 mark]**

Answer _____

3 A function machine does ×7 then +3. The input is 12. Work out the output. **[1 mark]**

Answer _____

4 A function machine does ×3 then +5. The input is 2. Work out the output. **[1 mark]**

Answer _____

5 A function machine does ×2 then +7. The input is 8. Work out the output. **[1 mark]**

Answer _____

Core

6 A function machine does ×4 then −2. The output is 14. Work out the input. **[2 marks]**

Answer _____

7 A function machine does ×3 then −5. The output is 13. Work out the input. **[2 marks]**

Answer _____

8 A function machine does ×5 then −7. The output is 18. Work out the input. **[2 marks]**

Answer _____

9 A function machine does ×3 then −1. The output is 29. Work out the input. **[2 marks]**

Answer _____

10 A function machine does ×6 then −11. The output is 25. Work out the input. **[2 marks]**

Answer _____

Stretch

11 The input x goes through the machine: ×6, then +11. Write an expression for the output. **[2 marks]**

Answer _____

12 The input n goes through the machine: +10, then ×4. Write an expression for the output. **[3 marks]**

Answer _____

13 The input x goes through the machine: ×8, then +10. Write an expression for the output. **[2 marks]**

Answer _____

14 The input n goes through the machine: +5, then ×4. Write an expression for the output. **[3 marks]**

Answer _____

15 The input x goes through the machine: ×3, then +7. Write an expression for the output. **[2 marks]**

Answer _____

Challenge

16 A machine does ×3 then −8. For which input is the output the same as the input? **[4 marks]**

Answer _____

17 A machine does ÷5, then +2, then ×2. The input is 15. Work out the output. **[3 marks]**

Answer _____

18 A machine does ×7, then +2, then ÷2. The input is 14. Work out the output. **[3 marks]**

Answer _____

19 A machine does ×3 then +2. Another machine does +2 then ×3. For input x, work out the difference between the two outputs. Give your answer as an expression. **[4 marks]**

Answer _____

20 Write an expression for the output of the machine: square the input, then ×8, then −5. The input is n. **[4 marks]**

Answer _____