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Inverse and Composite Functions

Grade 7 topic · Higher tier · Edexcel and AQA

How to use this pack
20 questions that get harder as you go. Questions 1–15 (49 marks) build up to the harder Grade 8–9 style questions at the end; aim to 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: 69 marks.

Warm-up

1 f(x) = 5x + 6. Find f(5). **[2 marks]**

Answer _____

2 f(x) = 4x + 2. Find f(3). **[2 marks]**

Answer _____

3 g(x) = x² + 2. Find g(4). **[2 marks]**

Answer _____

4 $f(x) = 3x + 6$. Find $f(-2)$. **[2 marks]**

Answer _____

5 $g(x) = x^2 + 4$. Find $g(-3)$. **[2 marks]**

Answer _____

Core

6 $f(x) = 2x + 2$. Find $f^{-1}(x)$. **[3 marks]**

Answer _____

7 $f(x) = 2x + 5$ and $g(x) = x^2 + 2$. Find $fg(x)$. **[4 marks]**

Answer _____

8 $f(x) = 2x + 7$ and $g(x) = x^2 + 6$. Find $gf(x)$. **[4 marks]**

Answer _____

9 $f(x) = (x + 3)/2$. Find $f^{-1}(x)$. **[3 marks]**

Answer _____

10 $f(x) = 5x + 3$. Find $ff(x)$. **[4 marks]**

Answer _____

Stretch

11 $f(x) = 2x + 2$. Solve $f(x) = 10$. **[3 marks]**

Answer _____

12 $f(x) = 4x + 3$ and $g(x) = x^2$. Solve $fg(x) = 39$. **[5 marks]**

Answer _____

13 $f(x) = 5x + 3$. Show that $f^{-1}(f(x)) = x$. **[4 marks]**

Answer _____

14 f(x) = 2x + 3 and g(x) = x − 3. Find gf(x). **[4 marks]**

Answer _____

15 f(x) = 1/(x − 1). State the value of x that cannot be used and find $f^{-1}(x)$. **[5 marks]**

Answer _____

Challenge

16 f(x) = (2x + 7)/(x − 1), x ≠ 1. Find $f^{-1}(x)$. **[5 marks]**

Answer _____

17 $f(x) = x^2$ for $x \geq 0$. Find $f^{-1}(x)$ and state its domain. **[4 marks]**

Answer _____

18 $f(x) = 2x + 3$ and $g(x) = 5x + 2$. Solve $fg(x) = gf(x)$. **[5 marks]**

Answer _____

19 Explain why the function $f(x) = x^2$ (for all real x) has no inverse function. **[4 marks]**

Answer _____

20 f(x) = 5x + 4. Find f(6). **[2 marks]**

Answer _____