



Inverse and Composite Functions Exam Practice

Q1. Here is a function: $f(x) = 5x - 9$

a) Work out the value of $f(-4)$

(1 mark)

b) Work out the value of $f^{-1}(46)$

(2 marks)

Q2. Here is a function: $g(x) = \sqrt{x} + 3$

a) Work out the value of $g(144)$

(1 mark)

b) What is the input when the output value of the function is 72 ?

(2 marks)

Q3. Let f and g be the functions: $f(x) = x^2 - 3$ and $g(x) = x + 7$

a) Work out the value of $fg(-2)$

(1 mark)

b) Work out the value of $gf(6)$

(1 mark)

c) Find the expression corresponding to $gf(x)$

(2 marks)

Q4. A function is defined by $g(x) = ax + b$ where a and b are numbers to be found. Given that $g(3) = 10$ and $g(8) = 12$, find the value of a and b .

(3 marks)

Q5. Let $f(x)$, $g(x)$ be defined by $f(x) = 3x + 2$ and $g(x) = x^2 + 7$ such that $fg(a) = 71$. Find the possible values of a .

(3 marks)

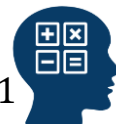
Q6. Let $f(x)$, $g(x)$ be defined by $f(x) = x^2$ and $g(x) = 3x + 2$ such that

a) Find an expression for $fg(x)$.

(2 marks)

b) Solve $fg(x) = g(f(x))$, leaving your answer in surd form.

(4 marks)

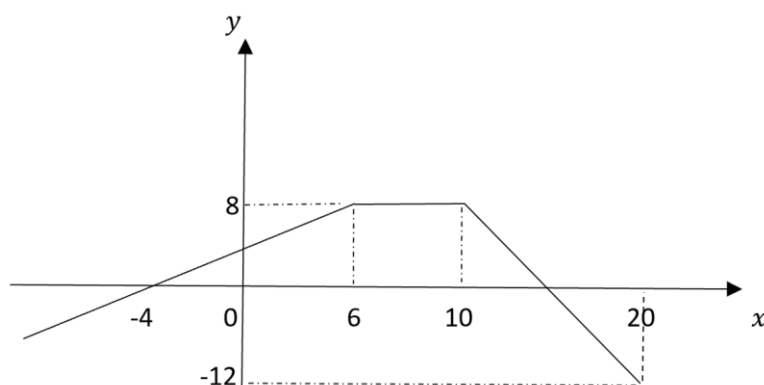


Q7. Let $f(x)$ be defined by $f(x) = \frac{1}{x+1}$ together with the restriction $x \neq -1$

a) Show that $ff(x) = \frac{x+a}{x+b}$, where a and b are numbers to be found. (4 marks)

b) State the necessary restriction on the input values to $ff(x)$. (1 mark)

Q8. Rob does a quick sketch of a function $f(x)$, composed of three lines. He does not have time to label all the numbers on the x and y axes. Just using the information which he has provided:



a) State the value of $f(7)$ (1 mark)

b) Work out the value of $ff(-4)$, giving your answer as a fraction in its simplified form. (4 marks)

c) Find the values of $f^{-1}(0)$ (3 marks)

Applied Mixed Practice Problems

Q9. A scientist models the volume (cm^3) of gas G produced by a chemical reaction over time T after the start of the experiment (in seconds). She does this using the formula,

$$G = 35\sqrt{T - 50} + 100, \text{ where } T \geq 50 \text{ seconds}$$

(i) Explain why the condition $T \geq 50$ is necessary. (1 mark)

(ii) Use the model to predict the volume of gas after $2\frac{1}{4}$ minutes, giving your answer to the nearest cm^3 . (2 marks)

(iii) Find the time when there will be 0.15 litres of gas, giving your answer to the nearest second.

(4 marks)