



## Inverse and Composite Functions Exam Practice

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

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

Answer: \_\_\_\_\_  
(1 mark)

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

Answer: \_\_\_\_\_  
(2 marks)



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

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

Answer: \_\_\_\_\_  
(1 mark)

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

Answer: \_\_\_\_\_  
(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  $fg(-2)$

Answer: \_\_\_\_\_  
(1 mark)

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

Answer: \_\_\_\_\_  
(1 mark)

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

Answer: \_\_\_\_\_  
(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  $b$ .

Answer: \_\_\_\_\_  
(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  $a$ .

Answer: \_\_\_\_\_  
(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  $fg(x)$ .

Answer: \_\_\_\_\_  
(2 marks)

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

Answer: \_\_\_\_\_  
(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.

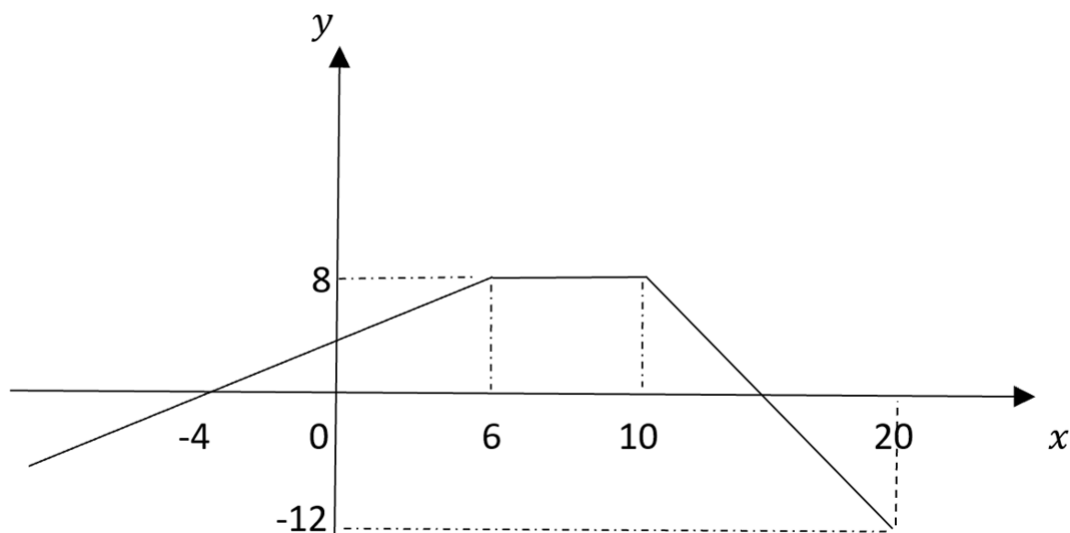
Answer: \_\_\_\_\_  
(4 marks)

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

Answer: \_\_\_\_\_  
(1 mark)



Q8. A sketch of a function  $f(x)$ , composed of three lines, is shown below.



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

Answer: \_\_\_\_\_  
(1 mark)

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

Answer: \_\_\_\_\_  
(1 mark)

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

Answer: \_\_\_\_\_  
(2 marks)



### Applied Mixed Practice Problems

Q9. A scientist models the volume ( $\text{cm}^3$ ) 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.

Answer: \_\_\_\_\_  
(1 mark)

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

Answer: \_\_\_\_\_  
(2 marks)

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

Answer: \_\_\_\_\_  
(4 marks)