



# EXAM PAPERS PRACTICE

## GCSE Edexcel Math 1MA1 Functions

### Answers

*"We will help you to  
achieve A Star "*



**Answer 1**

f and g are functions such that

$$f(x) = \frac{2}{x^2} \quad \text{and} \quad g(x) = 4x^3$$

(a) Find  $f(-5)$

$$\begin{aligned} f(-5) &= \frac{2}{(-5)^2} \\ &= \frac{2}{25} \end{aligned}$$



**Answer 2**

$$f(x) = 3x^2 - 2x - 8$$

Express  $f(x + 2)$  in the form  $ax^2 + bx$

$$\begin{aligned} f(x+2) &= 3(x+2)^2 - 2(x+2) - 8 \\ &= 3(x+2)(x+2) - 2(x+2) - 8 \\ &\quad \text{F O I L} \\ &= 3[x^2 + 2x + 2x + 4] - 2x - 4 - 8 \\ &= 3x^2 + 6x + 6x + 12 - 2x - 4 - 8 \\ &= 3x^2 + 10x + 0 \\ &= \underline{3x^2 + 10x} \end{aligned}$$



**Answer 3**

(b) Find  $gf(x)$   
Simplify your answer.

$$gf(x) = g(f(x))$$

$$g(f(x)) = g(3x-2)$$

$$= \frac{10}{3x-2+2}$$

$$= \frac{10}{3x}$$





**Answer 4**

$g$  is a function such that

$$g(x) = \sqrt{x-1} \quad x \geq 1$$

(b) Find  $fg(x)$

Give your answer as simply as possible.

$$fg(x) = f(g(x))$$

$$f(g(x)) = f(\sqrt{x-1})$$

$$= \frac{1}{(\sqrt{x-1})^2 + 1}$$

$$= \frac{1}{\cancel{x-1} + \cancel{1}}$$

$$\underline{\underline{fg(x) = \frac{1}{x}}}$$



Answer 5

(b) Express the inverse function  $f^{-1}$  in the form  $f^{-1}(x) = \dots$

FINDING AN INVERSE FUNCTION  $f^{-1}(x)$

- WRITE  $y = \dots$
- SWAP  $x$  AND  $y$
- REARRANGE TO  $y = \dots$
- WRITE  $f^{-1}(x) = \dots$

$$y = \frac{x-6}{2}$$
$$2 \times x = \frac{y-6}{2} \times 2$$
$$2x = y - 6$$
$$+6 \quad +6$$
$$2x + 6 = y$$

$$f^{-1}(x) = \underline{2x + 6}$$



**Answer 6**

- (d) Express the function  $gf$  in the form  $gf(x) = \dots$   
Give your answer as simply as possible.

$$gf(x) = g(f(x))$$

$$g(f(x)) = g\left(\frac{x-6}{2}\right)$$

$$= \sqrt{\frac{x-6}{2} - 4}$$

$$= \sqrt{\frac{x-6-8}{2}}$$

$$\underline{\underline{gf(x) = \sqrt{\frac{x-14}{2}}}}$$



**Answer 7**

(b) Express the inverse function  $f^{-1}$  in the form  $f^{-1}(x) =$

$$\begin{aligned} y &= 2x + 5 \\ x &= 2y + 5 \\ \frac{x-5}{2} &= \frac{2y}{2} \end{aligned} \quad \rightarrow \quad \begin{aligned} y &= \frac{x-5}{2} \\ \underline{\underline{f^{-1}(x) = \frac{x-5}{2}}} \end{aligned}$$

$g$  is the function  $g(x) = x^2 - 25$

FINDING AN INVERSE FUNCTION  $f^{-1}(x)$

- WRITE  $y = \dots$
- SWAP  $x$  AND  $y$
- REARRANGE TO  $y = \dots$
- WRITE  $f^{-1}(x) = \dots$



**Answer 8**

- (d) (i) Find  $gf(x)$   
Give your answer as simply as possible.

$$\rightarrow gf(x) = g(f(x))$$

$$\begin{aligned} gf(x) &= g(f(x)) = g(2x+5) \\ &= (2x+5)^2 - 25 \\ &= 4x^2 + 20x + 25 - 25 \\ &= \underline{4x^2 + 20x} \end{aligned} \quad \left| \begin{array}{l} (2x+5)(2x+5) \\ F \quad O \quad I \quad L \\ = 4x^2 + 10x + 10x + 25 \\ = 4x^2 + 20x + 25 \end{array} \right.$$

- (ii) Solve  $gf(x) = 0$

$$4x(x+5) = 0$$

$$4x = 0 \text{ so } \underline{x = 0}$$

$$\text{or } x + 5 = 0 \text{ so } \underline{x = -5}$$



**Answer 9**

The function  $f$  is such that

$$f(x) = 4x - 1$$

(a) Find  $f^{-1}(x)$

$$y = 4x - 1$$

$$x \leftrightarrow y \quad x = 4y - 1$$

$$\frac{x+1}{4} = \frac{4y}{4}$$

$$y = \frac{x+1}{4}$$

$$\underline{\underline{f^{-1}(x) = \frac{x+1}{4}}}$$

FINDING AN INVERSE  
FUNCTION  $f^{-1}(x)$

- WRITE  $y = \dots$
- SWAP  $x$  AND  $y$
- REARRANGE TO  $y = \dots$
- WRITE  $f^{-1}(x) = \dots$



**Answer 10**

The functions  $f$  and  $g$  are such that

$$f(x) = 3(x - 4) \quad \text{and} \quad g(x) = \frac{x}{5} + 1$$

(a) Find the value of  $f(10)$

$$\begin{aligned} f(10) &= 3(10 - 4) \\ &= 3 \times 6 \\ &= \underline{\underline{18}} \end{aligned}$$



**Answer 11**

(c) Show that  $ff(x) = 9x - 48$

$$\begin{aligned}ff(x) &= f(f(x)) = 3(f(x) - 4) \\ &= 3(3(x - 4) - 4) \\ &= 3(3x - 12 - 4) \\ &= 3(3x - 16) \\ &= \underline{\underline{9x - 48}}\end{aligned}$$





Answer 12

(b) Solve  $gf(a) = 3$   $\rightarrow$   $g(f(a))$

$$g\left(\frac{2}{a}\right) = 3$$

$$\cancel{\frac{2}{a}} \times \frac{\cancel{\frac{2}{a}} + 1}{\cancel{\frac{2}{a}}} = 3 \times \frac{2}{a}$$

$$\cancel{a} \times \frac{2}{\cancel{a}} + 1 \times \cancel{a} = \frac{6}{\cancel{a}} \times \cancel{a}$$

$$\begin{array}{r} 2 + a = 6 \\ -2 \qquad -2 \end{array}$$

$$\underline{\underline{a = 4}}$$



**Answer 13**

$$f(x) = \sqrt{x-6}$$

(a) Find  $f(10)$

$$\begin{aligned} f(10) &= \sqrt{10-6} \\ &= \sqrt{4} \\ &= \underline{2} \end{aligned}$$

↖ SET OF  
INPUT VALUES



**Answer 14**

(c) Find  $g(2)$

$$\underline{g(2) = 7}$$



**Answer 15**

(e) One of the solutions of  $g(x) = k$ , where  $k$  is a number, is  $x = 1$

Find the other solutions.

Give your answers correct to 1 decimal place.

DRAW  $y = g(x)$  (DONE ON GRAPH ALREADY)

Ans  $y = k$

So  $x = \underline{\underline{-0.8}}$        $x = \underline{\underline{3.8}}$