INVERSE FUNCTIONS

GRADE 8

Examination Practice Questions

You should have:

A ruler, protractor, compasses, a pen, pencil, eraser, calculator.
For some questions, you may need tracing paper.

Instructions

- Use **black** ink or ball-point pen.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- **Calculators may be used.**

Information

- The marks for each question are shown in brackets.
- Use the number of marks for each question as a guide as to how much time to spend on each question. As a rough guide, you can multiply the number of marks by 1.2 to see how many minutes you should spend on a question.
- Questions been carefully compiled from or modelled on a variety of past papers and will generally get more challenging as the document progresses. Some of the later questions will go beyond the core grade level for this topic.

Advice

- Read each question carefully before you start to answer it.
- Don’t forget to have fun.
- Check your answers at the end.

Q1. AtoZrevision.com

The functions f and g are such that
$\mathrm{f}(x) = 3x - 1$ and
$\mathrm{g}(x) = x^2 + 4$

Find $\mathrm{f}^{-1}(x)$

.....

(2 marks)

Q2. AtoZrevision.com

The functions f and g are defined as

$f(x) = \frac{1}{2}x + 4$

$g(x) = \frac{2x}{x+1}$

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

.....

(3 marks)

Q3. AtoZrevision.com

g is the function with domain $x \geq -3$ such that $g(x) = x^2 + 6x$

Express the inverse function g^{-1} in the form $g^{-1}(x)$

.....

(3 marks)

Q4. AtoZrevision.com

$$f(x) = 2x - 3$$
$$g(x) = \frac{x}{3x+1}$$

Express the inverse function g^{-1} in the form $g^{-1}(x)$

.....

(3 marks)

Q5. AtoZrevision.com

The functions f and g are defined as

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

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

……

(3 marks)

Q6. AtoZrevision.com

$f: x \to 2x^2 + 1 \quad g: x \to \frac{2x}{x-1}$ where x ≠ 1

Express the inverse function g^{-1} in the form $g^{-1}: x \to$

……

(3 marks)

Q7. AtoZrevision.com

The function g is such that $g(x) = 2x^2 - 20x + 9$ where $x \geq 5$.

Express the inverse function g^{-1} in the form $g^{-1}(x)$

.....

(4 marks)

Q8. AtoZrevision.com

For all values of x

$f(x) = (x + 1)^2$ and $g(x) = 2(x - 1)$

Find $g^{-1}(7)$.

.....

(2 marks)

Q9. AtoZrevision.com

f and g are functions such that

$f(x) = \frac{12}{\sqrt{x}}$ and $g(x) = 3(2x + 1)$

Find $g^{-1}(6)$

.....

(2 marks)

Q10. AtoZrevision.com

The function f is given by $f(x) = 2x^3 - 4$

Find the value of $f^{-1}(50)$

.....

(2 marks)

Q11. AtoZrevision.com

The functions g and h are such that

$$g(x) = \sqrt[3]{2x - 5} \qquad h(x) = \frac{1}{x}$$

Find $hg^{-1}(x)$
Give your answer in terms of x in its simplest form.

.....

(3 marks)

Q12. AtoZrevision.com

The functions f and g are such that

$$f(x) = 3x^2 + 1 \quad \text{where } x > 0$$

$$g(x) = \frac{4}{x^2} \quad \text{where } x > 0$$

The function h is such that $h = (fg)^{-1}$

Find $h(x)$

.....

(4 marks)

Q13. AtoZrevision.com

Two functions, f and g are defined as

$$f: x \to 1 + \frac{1}{x} \qquad \text{where } x > 0$$

$$g: x \to \frac{x+1}{2} \qquad \text{where } x > 0$$

Given that $h = fg$
express the inverse function h^{-1} in the form $h^{-1}: x \to$

.....

(4 marks)

Q14. AtoZrevision.com

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

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

.....

(3 marks)

Q15. AtoZrevision.com

The function g is defined as

$g : x \to 5 + 6x - x^2$ with domain $\{x : x \geq 3\}$

Given that $g^{-1} : x \to 3 + \sqrt{14 - x}$
State the domain of g^{-1}

.....

(1 mark)

Q16. AtoZrevision.com

The functions g and h are given as: $g(x) = x^2 - 1$ and $h(x) = e^x + 1$

Suggest a domain for g such that g^{-1} exists.

.....

(1 mark)

The function f is such that $f(x) = 5 + 6x - x^2$ for $x \leq 3$

Find the range of values of x for which $f^{-1}(x)$ is positive.

.....

(5 marks)

The function f is defined as

$$f(x) = \frac{\sqrt{x^2+k^2}}{x}$$

Where $x > 0$ and where k is a positive number.

Find the value of p for which $f^{-1}(p) = k$.

.....

(3 marks)

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

Solve the equation $gf(x) = g^{-1}(x)$

.....

(5 marks)

The function f and g are such that

$$f(x) = 5x + 3 \qquad g(x) = ax + b \qquad \text{where } a \text{ and } b \text{ are constants.}$$

$$g(3) = 20 \qquad \text{and} \qquad f^{-1}(33) = g(1)$$

Find the value of a and the value of b.

……

(5 marks)