Write your name, centre number and candidate number in the boxes below.

Surname	Other names

Centre number | | | | | |

Candidate number | | | | |

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Functions

Time allowed: 1 hour 15 minutes

Subject code **0580**

Mathematics

Questions from Paper 2 and Paper 4

You must have: a ruler marked in centimetres and millimetres, a protractor, compasses, a pen, an HB pencil and an eraser.
You may use a calculator.

Total marks

/ 60

Instructions

- Answer every question in the space provided on this paper.
- Write in black or dark blue ink. Pencil may be used for diagrams and graphs.
- Fill in your name, centre number and candidate number above.
- Show your working: a correct method can earn marks even if the answer is wrong.
- Unless a question says otherwise, give answers that are not exact to 3 significant figures, and angles in degrees to 1 decimal place.

Information

- This paper has 10 questions worth 60 marks in total.
- The marks for each question or part are shown in brackets, for example [3].

Advice

- Read every question through once before you write anything.
- Use the marks in brackets to judge how long to spend on each part.
- If you finish early, go back and check your working.

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Print at 100% (Actual size) so diagrams keep their real measurements.

1 $f(x) = 2x + 3$

Find $f(1 - x)$ in its simplest form.

..... [2]

Functions Click for more variations

2 $f(x) = x^3 + 1$

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

$f^{-1}(x) =$ ..... [2]

Functions Click for more variations

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3 $f(x) = 7^{x-4}$

Find the value of x when

(a) $f(x) = 1$

$x =$ ..... [1]

(b) $f^{-1}(x) = 1$.

$x =$ ..... [2]

(a) Fractional and negative indices (b) Functions Click for more variations

4 $f(x) = 5x - 3$ $g(x) = x^2 + 6x + 1$

Find $gf(x)$.
Give your answer in its simplest form.

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..... [3]

Functions Click for more variations

5 $f(x) = x^2 - 25$ $g(x) = x + 4$

Solve $fg(x+1) = gf(x)$.

$x =$ ..... [4]

Functions Click for more variations

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6 $f(x) = 7 + 3x$ $g(x) = x^4$ $h(x) = 3^x$

(a) $h(3x) = k^x$

Find the value of k.

$k =$ ..... [2]

(b) Find the value of x when $f(x) = g(2)$.

$x =$ ..... [2]

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

$f^{-1}(x) =$ ..... [2]

(a) Functions (b) Functions (c) Functions Click for more variations

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7 $f(x) = 3x - 4$ $g(x) = 4x + 1$

(a) Find $f(-2)$.

..... [1]

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

$f^{-1}(x) =$ ..... [2]

(c) $fg(x) = ax + b$

Find the value of a, and the value of b.

$a =$ ..... $b =$ ..... [2]

(d) Simplify.

$$\frac{2}{f(x)} - \frac{5}{g(x)}$$

Give your answer as a single fraction in terms of x.

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..... [3]

(a) Functions (b) Functions (c) Functions (d) Adding and subtracting algebraic fractions

Click for more variations

8 $f(x) = 3 - 2x$ $g(x) = \frac{4}{x},\ x \neq 0$ $h(x) = 4^x$

(a) Find f(5).

..... [1]

(b) Find gh(3).

..... [2]

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

$f^{-1}(x) =$ ..... [2]

(d) Show that $hf(x) = \frac{64}{16^x}$.

[3]

(e) Find the value of x when $h(x) = g(0.5)$.

$x =$ ..... [2]

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(a) Functions (b) Functions (c) Functions (d) Functions (e) Fractional and negative indices

Click for more variations

9 $f(x) = \frac{21}{2x-1}$, $x \neq \frac{1}{2}$ $g(x) = 3x+4$

(a) Find

(i) g(2)

..... [1]

(ii) gf(−1)

..... [2]

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

$f^{-1}(x) =$ ..... [3]

(b) Solve $f(x) = g(x)$.

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$x =$ ..... or $x =$ ..... [5]

(a)(i) Functions (a)(ii) Functions (a)(iii) Functions (b) Solving equations with algebraic fractions

Click for more variations

10 $f(x) = 2x - 1$ $g(x) = x^2 + 2x$ $h(x) = 4^x$ $j(x) = 2^x$

(a) Find the value of

(i) h(3),

..... [1]

(ii) fh(3).

..... [1]

(b) Solve the equation $gf(x) = 0$.

$x =$ ..... or $x =$ ..... [4]

(c) $p^{-1}(x) = f(x)$

Find $p(x)$.

..... [2]

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(d) $\mathrm{h}(x)\mathrm{j}(x) = \dfrac{1}{\sqrt{2}}$

Find the value of x.

$x =$ ..... [3]

(a)(i) Functions (a)(ii) Functions (b) Functions (c) Functions (d) Fractional and negative indices

Click for more variations

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