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Topical Worksheets for Cambridge IGCSE™

Mathematics (0580)

Functions

1st edition, for examination until 2025

1 $\mathrm{h}(x) = \dfrac{5x - 1}{3}$

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

$\mathrm{h}^{-1}(x) =$ ..... [3]

[Total: 3]

2 $\mathrm{f}(x) = 3x - 5 \quad \mathrm{g}(x) = 2^x$

(a) Find $\mathrm{fg}(3)$.

..... [2]

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

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

[Total: 4]

3 $f(x) = 4x + 3 \quad g(x) = 5x - 4$

$fg(x) = 20x + p$

Find the value of p.

$p =$ ..... [2]

[Total: 2]

4 $f(x) = 2x + 3$

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

..... [2]

[Total: 2]

5 $f(x) = 7x - 2 \quad g(x) = x^2 + 1 \quad h(x) = 3^x$

(a) Find $gh(2)$.

..... [2]

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

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

(c) $\text{gg}(x) = ax^4 + bx^2 + c$

Find the values of a, b and c.

$a =$ .....

$b =$ .....

$c =$ ..... [3]

(d) Find x when $\text{hf}(x) = 81$.

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

[Total: 10]

6 $\text{f}(x) = \dfrac{3}{x+2}$, $x \neq -2$ $\text{g}(x) = 8x - 5$ $\text{h}(x) = x^2 + 6$

(a) Work out $\text{g}\left(\dfrac{1}{4}\right)$.

..... [1]

(b) Work out $\mathrm{ff}(2)$.

..... [2]

(c) Find $\mathrm{gg}(x)$, giving your answer in its simplest form.

..... [2]

(d) Find $\mathrm{g}^{-1}(x)$.

$\mathrm{g}^{-1}(x) =$ ..... [2]

(e) Write $\mathrm{g}(x) - \mathrm{f}(x)$ as a single fraction in its simplest form.

..... [3]

(f) **(i)** Show that $\text{hg}(x) = 19$ simplifies to $16x^2 - 20x + 3 = 0$.

[3]

(ii) Use the quadratic formula to solve $16x^2 - 20x + 3 = 0$.
Show all your working and give your answers correct to 2 decimal places.

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

[Total: 17]

7 $\text{f}(x) = 7 + 3x \quad \text{g}(x) = x^4 \quad \text{h}(x) = 3^x$

(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]

[Total: 6]

8 $h(x) = ax^2 + 1$

Find the value of a when $h(-2) = 21$.

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

[Total: 2]

9 $f(x) = x^3$ $g(x) = 5x + 2$

(a) Find $gf(x)$.

..... [1]

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

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

[Total: 3]

10 $\mathrm{f}(x) = 3x + 4 \quad \mathrm{g}(x) = 2x - 1 \quad \mathrm{h}(x) = 3^x$

(a) Find $\mathrm{g}\left(\frac{1}{2}\right)$.

..... [1]

(b) Find $\mathrm{fh}(-1)$.

..... [2]

(c) Find $\mathrm{g}^{-1}(x)$.

$\mathrm{g}^{-1}(x) =$ ..... [2]

(d) Find $\mathrm{ff}(x)$ in its simplest form.

..... [2]

(e) Find $(\mathrm{f}(x))^2$ in the form $ax^2 + bx + c$.

..... [2]

(f) Find x when $\mathrm{h}^{-1}(x) = \mathrm{g}(2)$.

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

[Total: 11]

11 $\mathrm{f}(x) = 5 - 2x \qquad \mathrm{g}(x) = x^2 + 8$

(a) Calculate ff(−3).

..... [2]

(b) Find

(i) g(2x),

..... [1]

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

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

[Total: 5]

12 $\mathrm{f}(x) = 2x - 3 \quad \mathrm{g}(x) = x^2 + 1$

(a) Find $\mathrm{gg}\,(2)$.

..... [2]

(b) Find $\mathrm{g}\,(x+2)$, giving your answer in its simplest form.

..... [2]

(c) Find x when $\mathrm{f}\,(x) = 7$.

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

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

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

[Total: 8]

13 $\mathrm{f}\,(x) = 8 - 3x \quad \mathrm{g}\,(x) = \dfrac{10}{x-1},\ x \neq -1 \quad \mathrm{h}\,(x) = 2^x$

Find

(a) $\mathrm{hf}\left(\frac{8}{3}\right)$,

..... [2]

(b) $\mathrm{gh}\,(-2)$,

..... [2]

(c) $\mathrm{g}^{-1}\,(x)$,

$\mathrm{g}^{-1}\,(x)$ = ... [3]

(d) $\mathrm{f}^{-1}\mathrm{f}\,(5)$.

..... [1]

[Total: 8]

14 $\mathrm{f}(x) = 7 - x$ $\mathrm{g}(x) = 4x + 2$ $\mathrm{h}(x) = 15 - x^2$

(a) Find ff(2).

..... [2]

(b) Find gf(x) in its simplest form.

..... [2]

(c) Find h($2x$) in its simplest form.

..... [2]

[Total: 6]

15 $\mathrm{h}(x) = x^x, x > 0$

(a) Calculate $\mathrm{h}(0.3)$.
Give your answer correct to 2 decimal places.

..... [2]

(b) Find x when $\mathrm{h}(x) = 256$.

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

[Total: 3]

16 $f(x) = 3x + 5 \quad g(x) = x^2$

(a) Find $g(3x)$.

Answer(a) ..... [1]

(b) Find $f^{-1}(x)$, the inverse function.

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

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

Answer(c) ..... [2]

[Total: 5]

17 $f(x) = 5 - 3x$

(a) Find f(6).

Answer(a) ..... [1]

(b) Find f(x + 2).

Answer(b) ..... [1]

(c) Find ff(x), in its simplest form.

Answer(c) ..... [2]

(d) Find $f^{-1}(x)$, the inverse of f(x)

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

[Total: 6]