Functions

0580

Objectives:

Student Name: _____

Grade: 10

1 – (0580/21_Summer_2020_Q14) – *Functions*

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

$fg(x) = 20x + p$

Find the value of p.

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

(b) $h(x) = \frac{5x - 1}{3}$

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

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

2 – (0580/21_Winter_2020_Q17) – *Functions*

(a) $f(x) = 3x^2 + a$ where a is an integer.
$f(-2) = 19$

Find the value of a.

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

(b) $g(x) = 2x + 7$ $h(x) = 3x - 8$

(i) Find $gh(x)$ in its simplest form.

..... [2]

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

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

3 – (0580/22_Summer_2021_Q18) – *Functions*

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

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

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

4 – (0580/22_Winter_2021_Q20) – *Functions*

$f(x) = 2^{x-3}$ $g(x) = 2x - 1$ $h(x) = \frac{5}{x-4}$

(a) Find ff(6).

..... [2]

(b) Find $g^{-1}g(x+21)$.

..... [1]

(c) Find x when $f(x) = h(84)$.

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

5 – (0580/22_Summer_2022_Q19) – *Functions*

$$f(x) = 7x - 8 \qquad g(x) = \frac{4}{x} + 5 \qquad h(x) = 2^x + 1$$

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

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

(b) Find the value of x when $h(x) = g\left(\frac{1}{3}\right)$.

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

6 – (0580/23_Summer_2022_Q19) – *Functions*

$\mathrm{f}(x) = kx^2$ $\mathrm{g}(x) = \frac{1}{x}$ $\mathrm{h}(x) = \frac{7x-2}{5}$ $\mathrm{j}(x) = \frac{3-10x}{14}$

(a) $\mathrm{f}(-5k) = 675$

Find the value of k.

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

(b) Find $\mathrm{gh}(x)$.

..... [1]

(c) Find $\mathrm{h}^{-1}(x) + \mathrm{j}(x)$.
Give your answer in its simplest form.

..... [4]

7 – (0580/22_Winter_2022_Q17) – *Functions*

$$f(x) = x^2 \qquad g(x) = \frac{x+5}{2} \qquad h(x) = 7x - 3$$

(a) Find $f(-3)$.

..... [1]

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

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

(c) Solve $gf(x) = hh^{-1}(63)$ where $x > 0$.

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

8 – (0580/23_Winter_2022_Q19) – *Functions*

$$f(x) = 5x - 3,\ x > 1$$

$$g(x) = \frac{10}{x-2},\ x \neq 2$$

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

..... [2]

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

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

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

..... [1]

9 – (0580/22_Summer_2023_Q14) – *Functions*

$$f(x) = 5x + 2$$

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

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

10 – (0580/23_Summer_2023_Q20) – *Functions*

$f(x) = 6x - 7$ $\quad\quad$ $g(x) = x^{-3}$

(a) Find $f(x+2)$.
Give your answer in its simplest form.

..... [2]

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

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

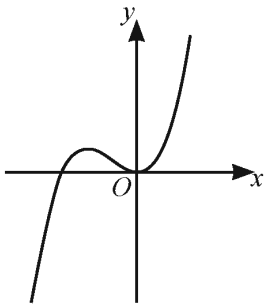
(c) Find x when $g(x) = f(22)$.

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

11 – (0580/22_Summer_2024_Q22) – *Functions*

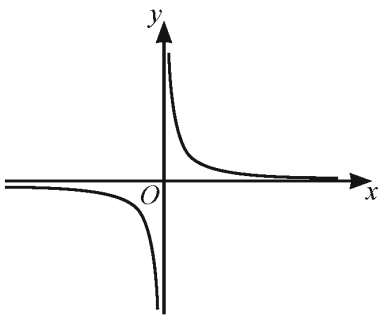
(a) For each sketch, put a ring around the correct type of function shown.

(i)



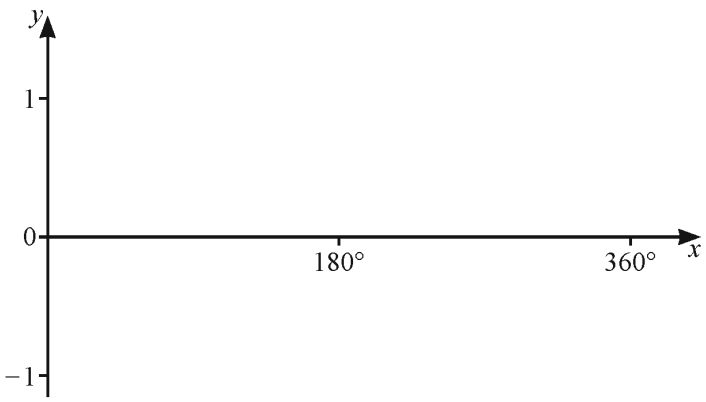
linear cubic quadratic reciprocal exponential [1]

(ii)



linear cubic quadratic reciprocal exponential [1]

(b) **(i)** On the grid, sketch the curve $y = \sin x$ for $0° \leqslant x \leqslant 360°$.



[2]

(ii) Solve the equation $\sin x + 0.4 = 0$ for $0° \leqslant x \leqslant 360°$.

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

12 – (0580/23_Summer_2024_Q20) – *Functions*

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

(a) Find x when $f(x) = 245$.

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

(b) Find x when $f^{-1}(x) = 7$.

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

13 – (0580/21_Winter_2024_Q18) – *Functions*

$g(x) = 4^{x+3}$

(a) Find x when $g(x) = 1$.

..... [1]

(b) Find $g^{-1}\left(\frac{1}{16}\right)$.

..... [2]

1 – (0580/21_Summer_2020_Q14) – *Functions*

(a)	$[p =] -13$	**2**	**M1** for $4(5x - 4) + 3$ or better
(b)	$\frac{3x+1}{5}$	**3**	**M2** for $x = \frac{3y+1}{5}$, $5y = 3x + 1$ or $y - \frac{1}{5} = \frac{3x}{5}$ **M1** for $x = \frac{5y-1}{3}$, $3y = 5x - 1$ or $y + \frac{1}{3} = \frac{5x}{3}$

2 – (0580/21_Winter_2020_Q17) – *Functions*

(a)	$[a =] 7$	**2**	**M1** for $3(-2)^2 + a = 19$ or better
(b)(i)	$6x - 9$ or $3(2x - 3)$ final answer	**2**	**M1** for $2(3x - 8) + 7$ or better
(b)(ii)	$\frac{x-7}{2}$ final answer	**2**	**M1** for a correct first step $x = 2y + 7$ or $y - 7 = 2x$ or $\frac{y}{2} = x + \frac{7}{2}$

3 – (0580/22_Summer_2021_Q18) – *Functions*

	$[x =] -2.1$ oe	**4**	**M3** for $x^2 + 10x = x^2 - 21$ or better OR **M1** for $(x + 1 + 4)^2 - 25$ or better **M1** for $x^2 - 25 + 4$ or better If 0 scored **SC1** for answer $-\frac{11}{6}$ oe

4 – (0580/22_Winter_2021_Q20) – *Functions*

(a)	32	**2**	**M1** for f(6) = 8 or $\text{ff}(x) = 2^{\left(2^{x-3}\right)-3}$ oe
(b)	$x + 21$	**1**	
(c)	-1	**2**	**M1** for $\frac{1}{16}$ oe or 2^{-4} oe

5 – (0580/22_Summer_2022_Q19) – *Functions*

(a)	$\frac{x+8}{7}$ final answer	**2**	**M1** for $x = 7y - 8$ or $y + 8 = 7x$ or $\frac{y}{7} = x - \frac{8}{7}$
(b)	4	**2**	**M1** for $4 \div \frac{1}{3} + 5$ oe or better

6 – (0580/23_Summer_2022_Q19) – *Functions*

(a)	3	**2**	**M1** for $k(-5k)^2 = 675$ or better
(b)	$\frac{5}{7x-2}$ final answer	**1**	
(c)	$\frac{1}{2}$ or 0.5	**4**	**B3** for answer $\frac{7}{14}$ OR **B2** for $\frac{5x+2}{7}$ or **M1** for correct first step for $h^{-1}(x)$ e.g. $x = \frac{7y-2}{5}$ $5y = 7x - 2$ $y + \frac{2}{5} = \frac{7x}{5}$ **M1FT** for $\frac{2(5x+2)}{14} + \frac{3-10x}{14}$ oe with common denominator

7 – (0580/22_Winter_2022_Q17) – *Functions*

(a)	9	**1**	
(b)	$2x - 5$ final answer	**2**	**M1** for correct first step e.g. $x = \frac{y+5}{2}$ or $2y = x + 5$ or $y - \frac{5}{2} = \frac{x}{2}$ or better
(c)	11	**3**	**M1** for $\frac{x^2+5}{2}$ **M1** for $hh^{-1}(63) = 63$ soi

8 – (0580/23_Winter_2022_Q19) – *Functions*

(a)	$\frac{2}{x-1}$ final answer	**2**	**M1** for $\frac{10}{5x-3-2}$ or better
(b)	$\frac{10}{x} + 2$ or $\frac{10+2x}{x}$ final answer	**3**	**M2** for $y - 2 = \frac{10}{x}$ or $x = \frac{10+2y}{y}$ oe or $yx = 10 + 2x$ oe or **M1** for $x = \frac{10}{y-2}$ or $y(x-2) = 10$ oe or better
(c)	$x - 1$	**1**	

9 – (0580/22_Summer_2023_Q14) – *Functions*

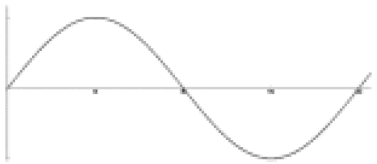
$\frac{x-2}{5}$ oe final answer	**2**	**M1** for a correct first step $x = 5y + 2$ or $y - 2 = 5x$ or $\frac{y}{5} = x + \frac{2}{5}$

10 – (0580/23_Summer_2023_Q20) – *Functions*

(a)	$6x + 5$ cao final answer	**2**	**M1** for $6(x + 2) - 7$ oe
(b)	$\frac{x+7}{6}$ or $\frac{x}{6} + \frac{7}{6}$ final answer	**2**	**M1** for $x = 6y - 7$ or $y + 7 = 6x$ or $\frac{y}{6} = x - \frac{7}{6}$
(c)	$\frac{1}{5}$ or 0.2	**2**	**M1** for $x^{-3} = 6 \times 22 - 7$ or better

11 – (0580/22_Summer_2024_Q22) – *Functions*

(a)(i)	cubic	**1**	
(a)(ii)	reciprocal	**1**	

(b)(i)	correct sine curve sketch through (0, 0), (180, 0) and (360, 0) 	**2**	**M1** for correct sine curve shape through the origin
(b)(ii)	203.6 and 336.4	**3**	**B2** for one correct or **M1** for $\sin x = -0.4$ oe If 0 or M1 scored, **SC1** for two reflex angles with a sum of 540 or two non-reflex angles with a sum of 180

12 – (0580/23_Summer_2024_Q20) – *Functions*

(a)	5	**2**	**M1** for $3^x + 2 = 245$
(b)	2189	**2**	**M1** for $x = f(7)$ or $3^7 + 2$

13 – (0580/21_Winter_2024_Q18) – *Functions*

(a)	–3	**1**	
(b)	–5	**2**	**M1** for $\frac{1}{4^2}$ or 4^{-2}