1. Nov/2023/Paper_0444/23/No.14
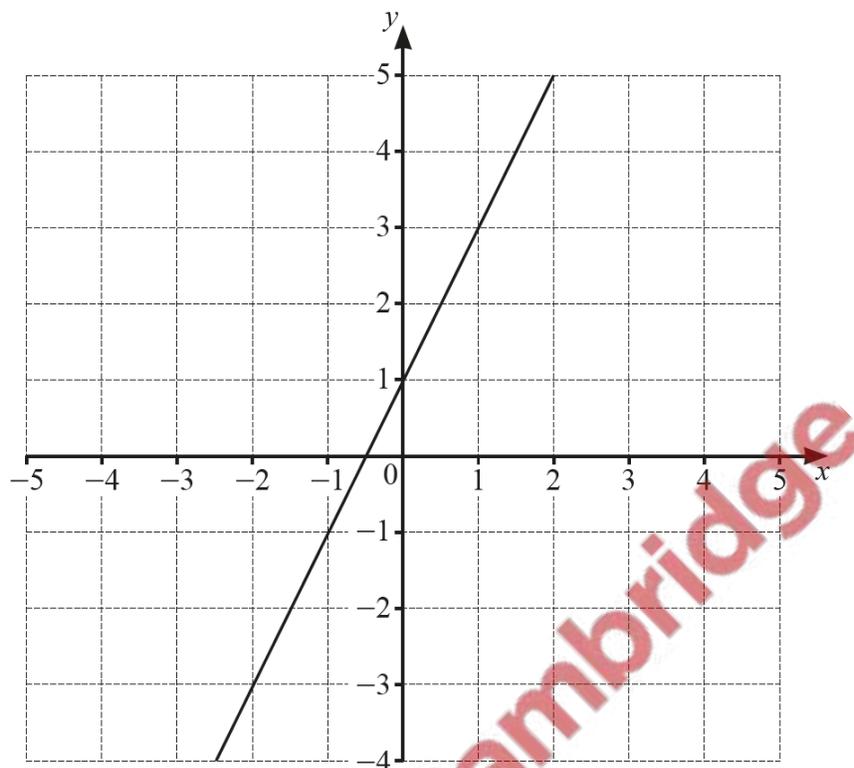
The graph of $y = 2x + 1$ is drawn on the grid.
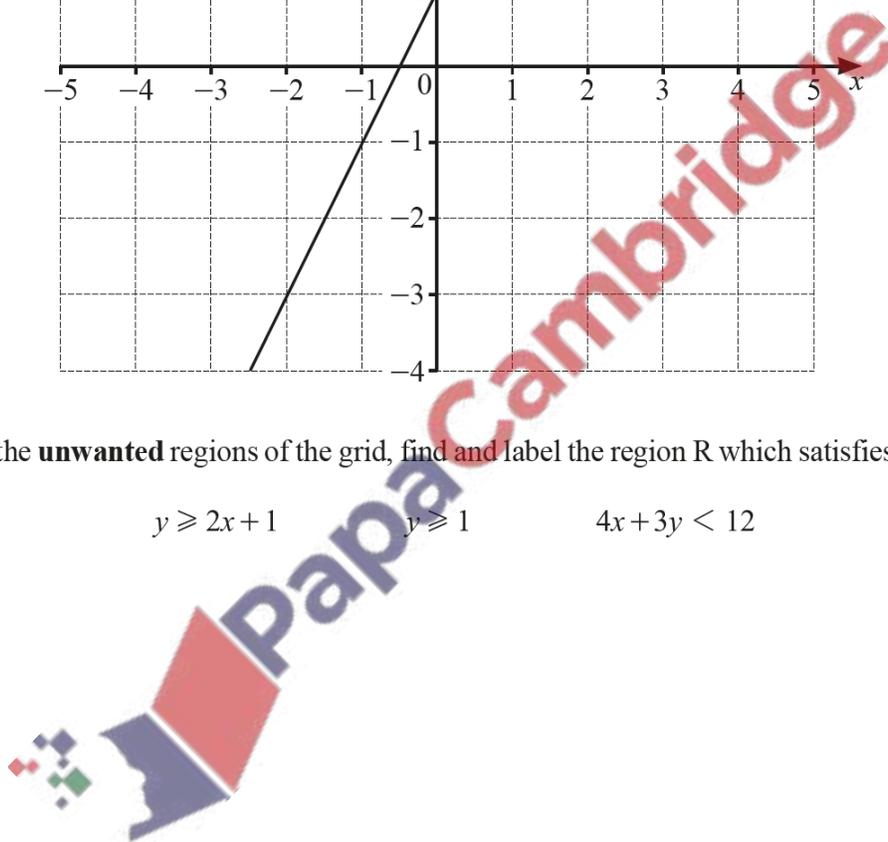

By shading the **unwanted** regions of the grid, find and label the region R which satisfies these inequalities.

$$y \geqslant 2x + 1 \qquad y \geqslant 1 \qquad 4x + 3y < 12 \qquad\qquad [4]$$

2.

$f(x) = 3x - 4$

(a) When the domain of $f(x)$ is $\{0, 5, 7\}$, find the range of $f(x)$.

.... [2]

(b) $f(x)f(x) - f(f(x)) = ax^2 + bx + c$

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

$a = $ ....

$b = $ ....

$c = $ .... [4]
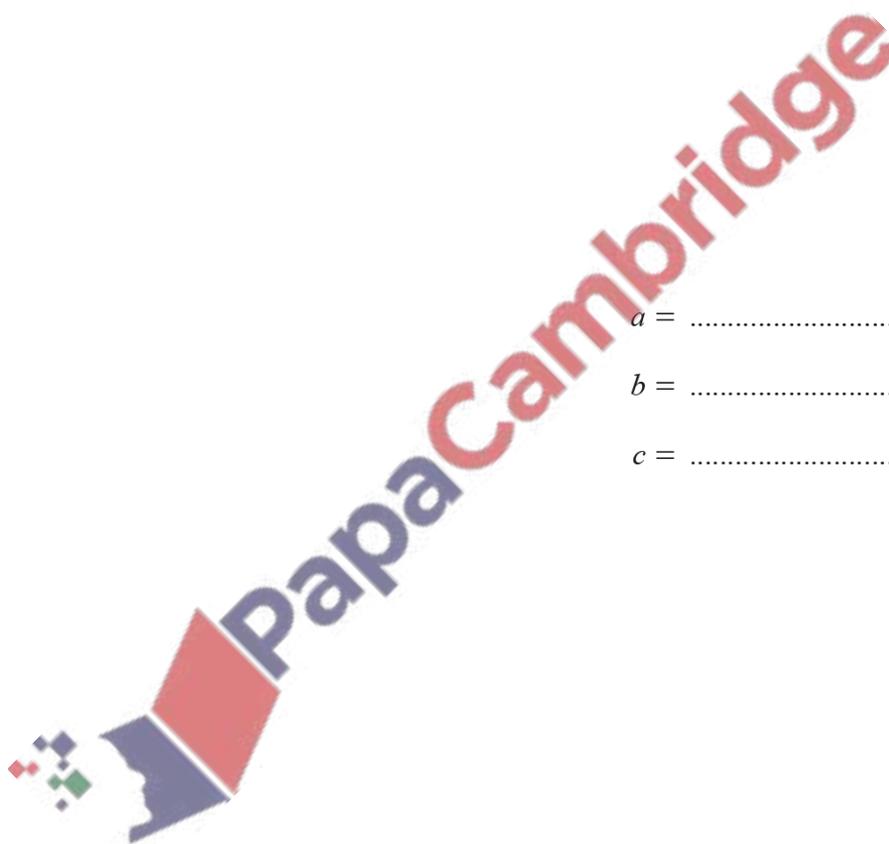
$$f(x) = 5x - 3 \qquad g(x) = 64^x \qquad h(x) = \frac{2}{x+1}, \quad x \neq -1$$

(a) Find the value of

  (i) $f(2)$

.... [1]

  (ii) $g(f(0.5))$.

.... [2]

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

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

(c) Find x when $g(x) = \dfrac{1}{2^5}$.

$x = $ .... [2]

(d) Write as a single fraction in its simplest form $\dfrac{1}{f(x)} - h(x)$.
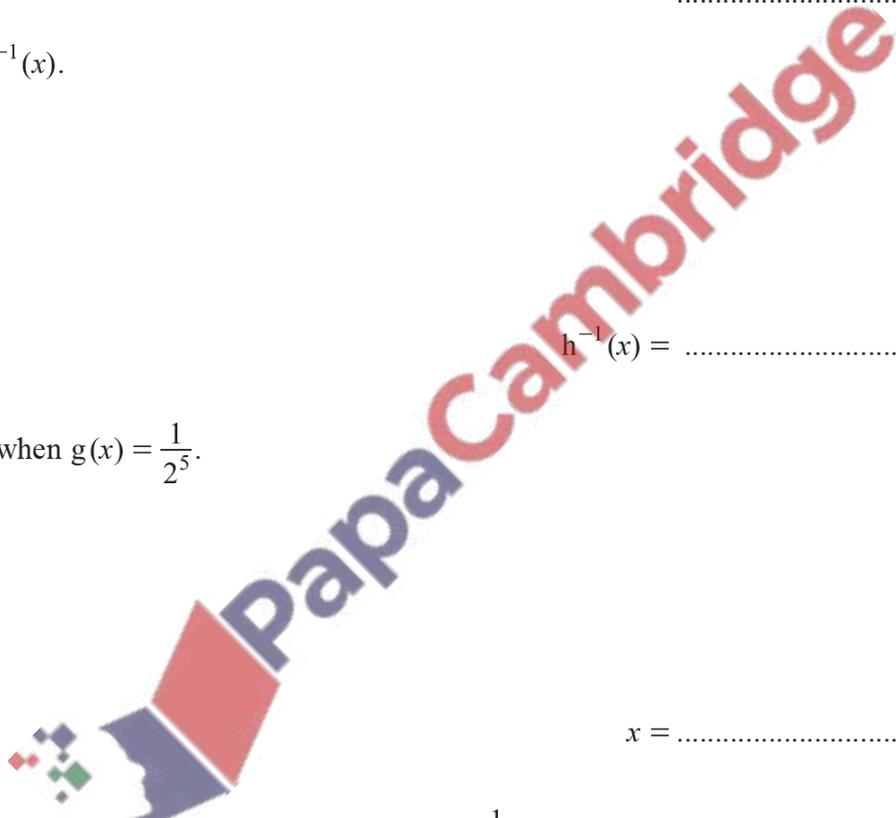
(a) Complete the table of values for $y = 3\cos 2x°$.
Values are given correct to 1 decimal place.

x	0	10	20	30	40	45	50	60	70	80	90
y	3.0	2.8	2.3	1.5	0.5		-0.5		-2.3		-3.0

[3]

(b) Draw the graph of $y = 3\cos 2x°$ for $0 \leqslant x \leqslant 90$.
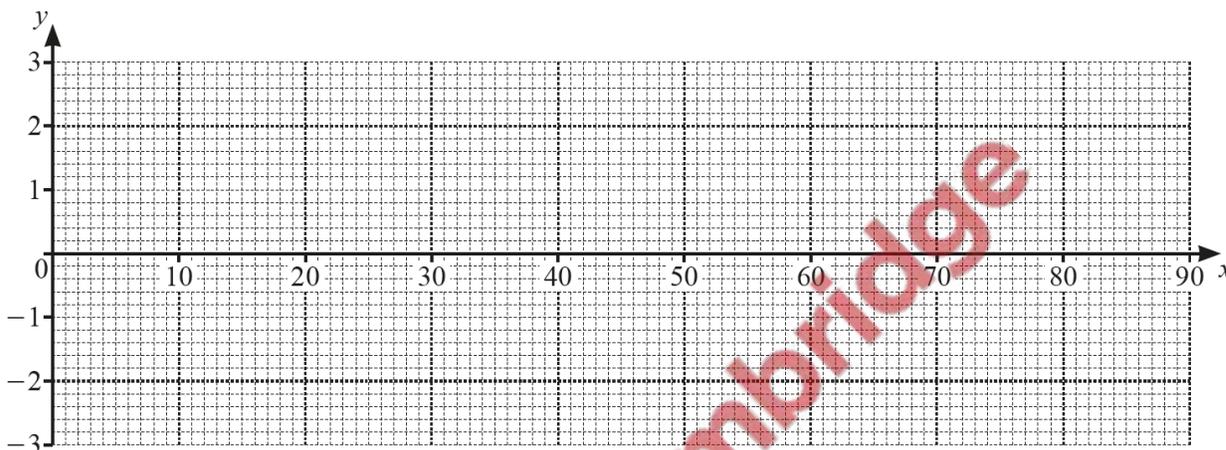
[4]

(c) Use your graph to solve the equation $3\cos 2x° = -2$ for $0 \leqslant x \leqslant 90$.

$x =$ .... [1]

(d) By drawing a suitable straight line, solve the equation $120\cos 2x° = 80 - x$ for $0 \leqslant x \leqslant 90$.

$x =$ .... [3]