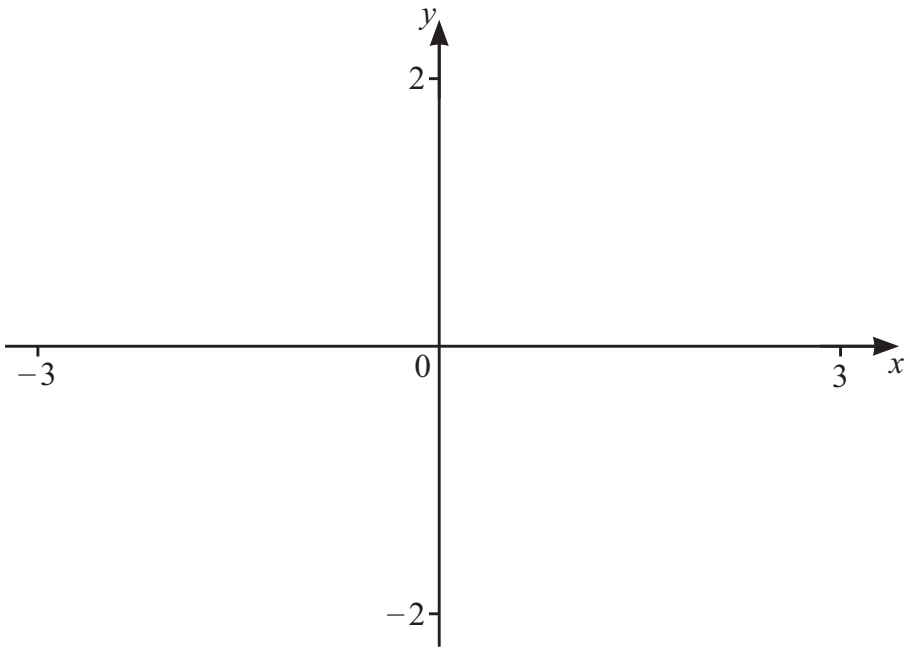
1. Question | 0607 Feb-March 2025 P4 V2 Q8

8



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

(a) On the diagram, sketch the graph of $y = f(x)$ for values of x between -3 and 3. [2]

(b) Solve $f(x) < x^2 + x - 1$.

..... [4]

2. Question | 0607 Feb-March 2025 P4 V2 Q13

13 $f(x) = 4x - 2$ $g(x) = (x+1)^2$

(a) Find $f(3)$.

..... [1]

(b) Find $fg(x)$.
Simplify your answer.

..... [2]

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

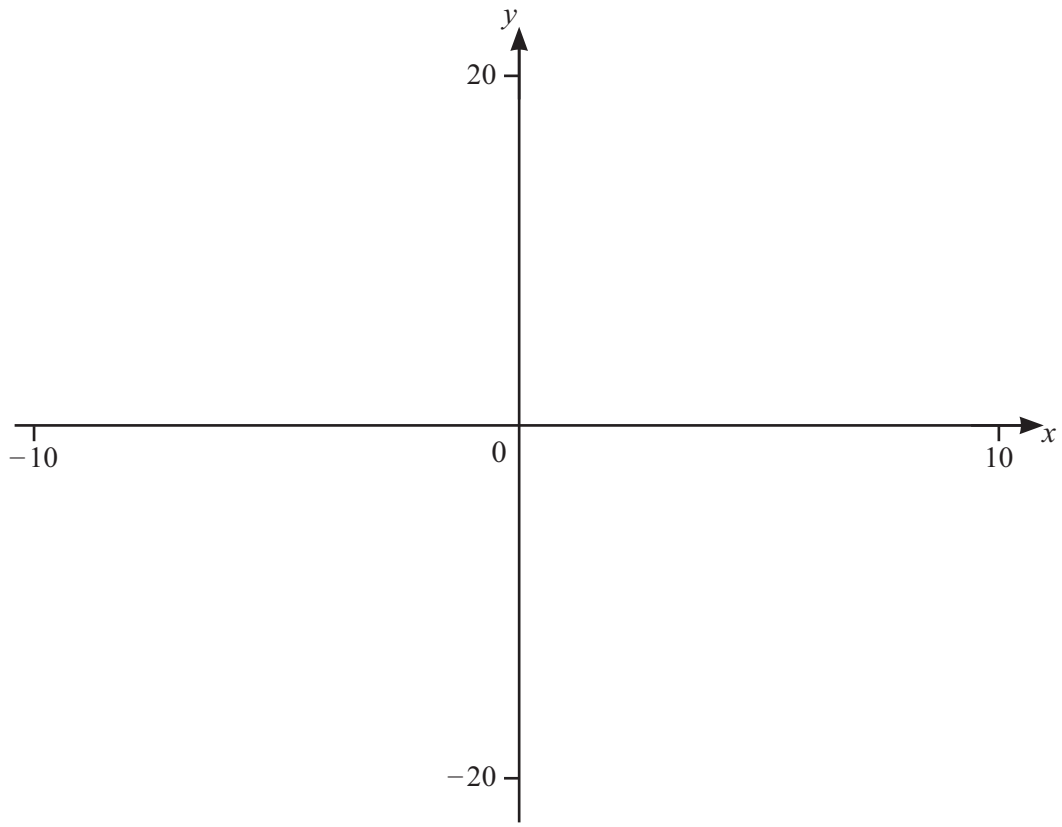
$f^{-1}(x) =$ ..... [2]

(d) Find $ff^{-1}(5)$.

..... [1]

3. Question | 0607 May-June 2025 P4 V1 Q11

11



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

(a) Sketch the graph of $y = f(x)$ for values of x between -10 and 10. [3]

(b) Find the coordinates of the local minimum.

(..... , ...) [2]

(c) Write down the equations of the asymptotes to the graph of $y = f(x)$ that are parallel to the y-axis.

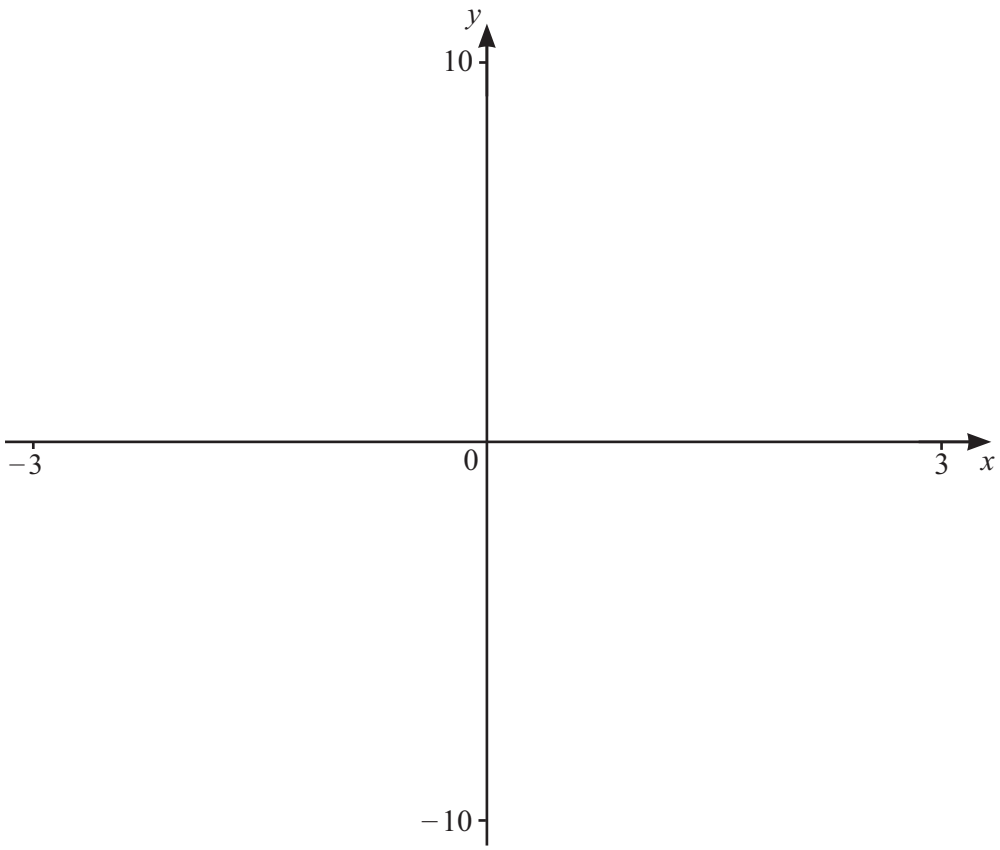
..... [2]

(d) Solve $f(x) > x + 7$.

..... [4]

4. Question | 0607 May-June 2025 P4 V2 Q11

11



$$f(x) = \frac{4x-3}{2x+1}$$

(a) **(i)** Sketch the graph of $y = f(x)$ for values of x between -3 and 3. [3]

(ii) Write down the equations of the 2 asymptotes of the graph of $y = f(x)$.

..... , ... [2]

(iii) Write down the coordinates of the points where the graph crosses the axes.

(..... , ...)

(..... , ...) [2]

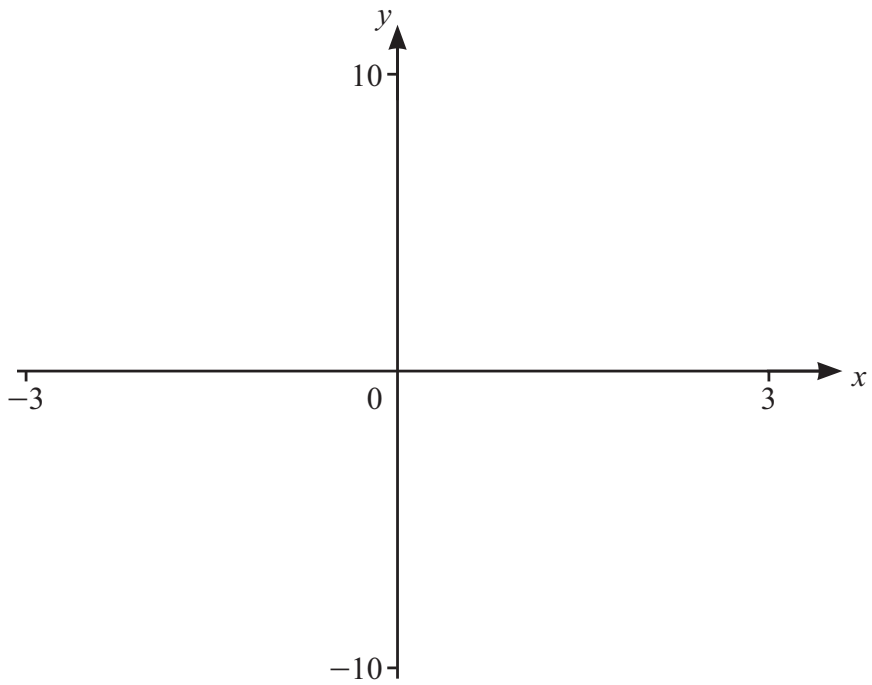
(b) Solve the inequality.

$$\frac{4x-3}{2x+1} > 2-x$$

..... [4]

5. Question | 0607 May-June 2025 P4 V3 Q8

8



$\mathrm{f}(x) = \frac{3}{x} - x^2$

(a) On the diagram, sketch the graph of $y = \mathrm{f}(x)$ for values of x between -3 and 3. [3]

(b) Find the zero of $\mathrm{f}(x)$.

..... [1]

(c) Find the equation of the asymptote to the graph.

..... [1]

(d) Find the coordinates of the local maximum point.

(..... , ...) [2]

(e) The equation $\mathrm{f}(x) = k$ has one solution.

Find the range of values of k.

..... [1]

6. Question | 0607 May-June 2025 P4 V3 Q17

17 $f(x) = 3 - 2x$ $g(x) = 1 - 5x$

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

..... [1]

(b) Find x when $f(x) = 6$.

..... [2]

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

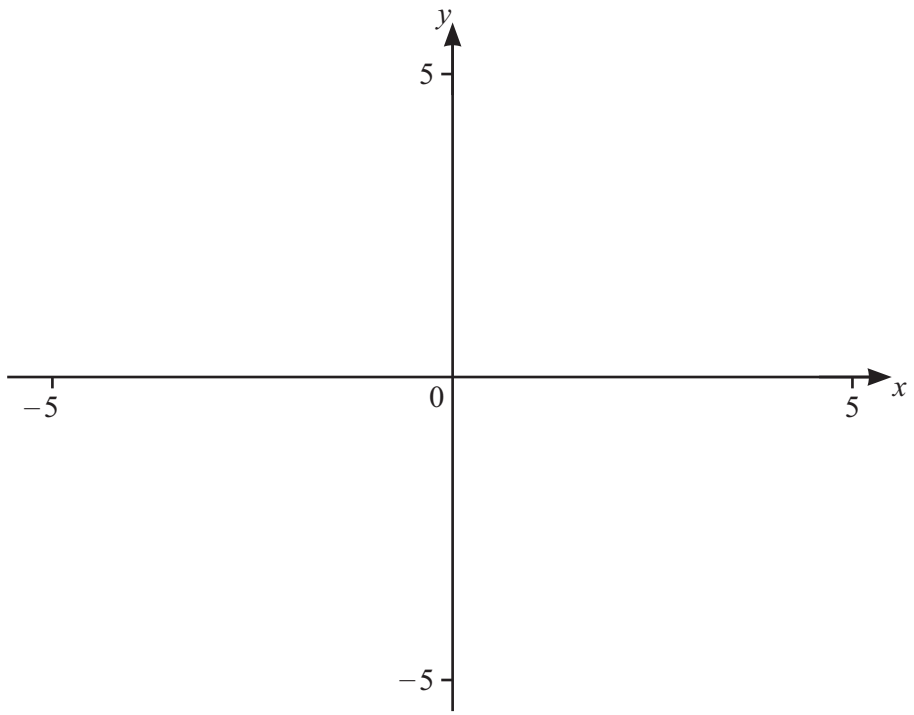
..... [2]

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

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

7. Question | 0607 Oct-Nov 2025 P4 V1 Q8

8



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

(a) On the diagram, sketch the graph of $y = f(x)$ for values of x between -5 and 5. [3]

(b) Find the coordinates of the local minimum.

(..... , ...) [2]

(c) Solve $f(x) = 3$.

..... [2]

(d) Write down a value of k for which $f(x) = k$ has only one solution.

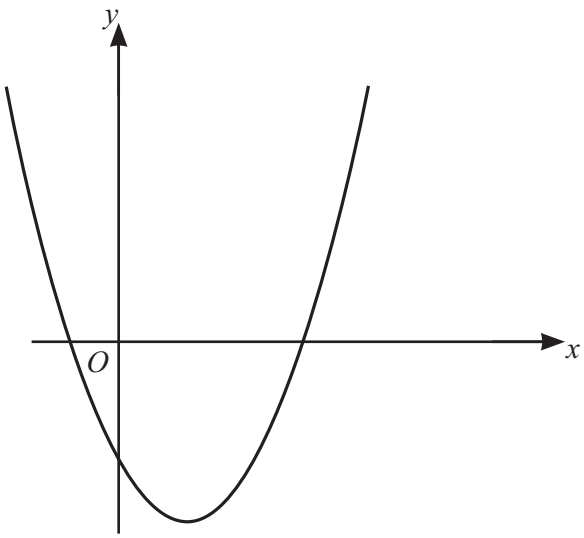
..... [1]

(e) Find the range of values of k for which $f(x) = k$ has no solutions.

..... [2]

8. Question | 0607 Oct-Nov 2025 P4 V1 Q15

15



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The diagram shows a sketch of the graph of a quadratic function $y = \mathrm{f}(x)$.
The graph passes through $(-1, 0)$, $(3, 0)$ and $(0, -6)$.

(a) Find $\mathrm{f}(x)$.

$\mathrm{f}(x) =$ ..... [3]

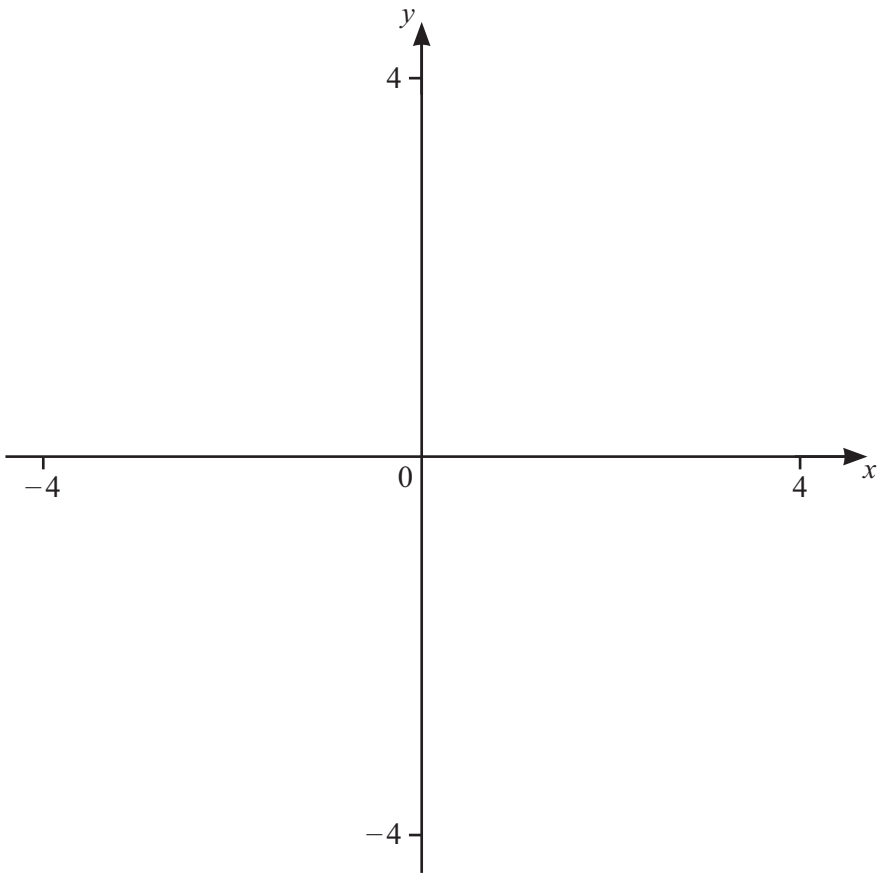
(b) The graph of $y = \mathrm{f}(x)$ is mapped onto the graph of $y = \mathrm{g}(x)$ by a translation vector $\begin{pmatrix} 1 \\ 0 \end{pmatrix}$.

Find $\mathrm{g}(x)$ in terms of x.

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

9. Question | 0607 Oct-Nov 2025 P4 V2 Q8

8



(a) $f(x) = \dfrac{1}{(2x-1)(x+1)} - 1$

(i) On the diagram, sketch the graph of $y = f(x)$ for values of x between -4 and 4. [3]

(ii) Write down the x-intercepts.

..... [2]

(iii) Write down the equations of the asymptotes parallel to the y-axis.

..... [2]

(b) $g(x) = 0.5(x+1)$

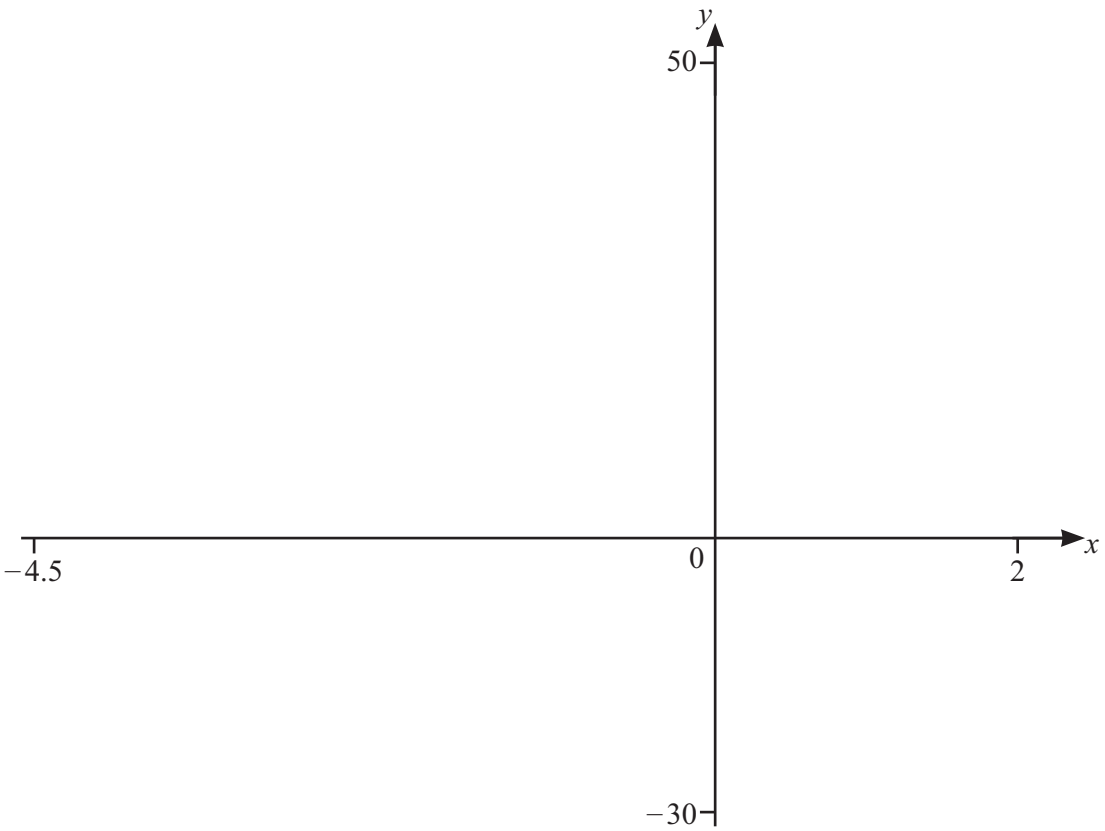
On the diagram, sketch the graph of $y = g(x)$ for values of x between -4 and 4. [1]

(c) Solve the inequality $f(x) \geqslant g(x)$.

..... [3]

10. Question | 0607 Oct-Nov 2025 P4 V3 Q4

4



$\mathrm{f}(x) = x^4 + 4x^3$ for values of x between -4.5 and 2.

(a) On the diagram, sketch the graph of $y = \mathrm{f}(x)$. [2]

(b) Write down the zeros of $\mathrm{f}(x)$.

..... [2]

(c) Write down the coordinates of the local minimum point.

(..... , ...) [1]

(d) The equation $\mathrm{f}(x) = k$ has no solutions.

Find the range of values of k.

..... [1]

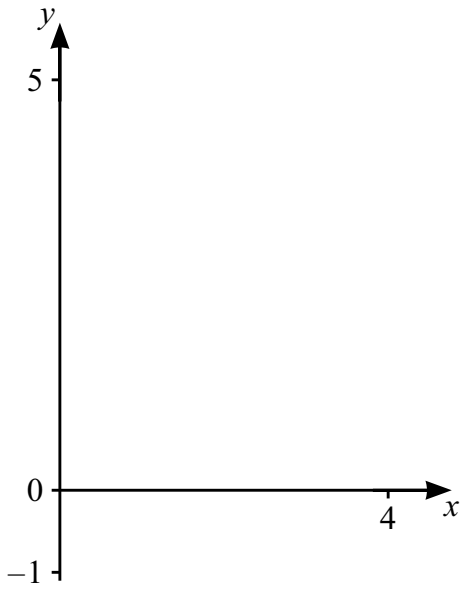
(e) Solve the equation $\mathrm{f}(x) = 20 + 10x$.

..... [3]

(f) **(i)** On the diagram, sketch the line $x = -2$. [1]

(ii) Shade and label the region R where $x \leqslant -2$, $y \geqslant \mathrm{f}(x)$ and $y \leqslant 20 + 10x$. [1]

2



$f(x) = 5 - 1.25x$ $g(x) = 1.5x - 1$

(a) On the diagram, sketch the graph of $y = f(x)$ for $0 \leqslant x \leqslant 4$. [2]

(b) On the diagram, sketch the graph of $y = g(x)$ for $0 \leqslant x \leqslant 4$. [2]

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

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

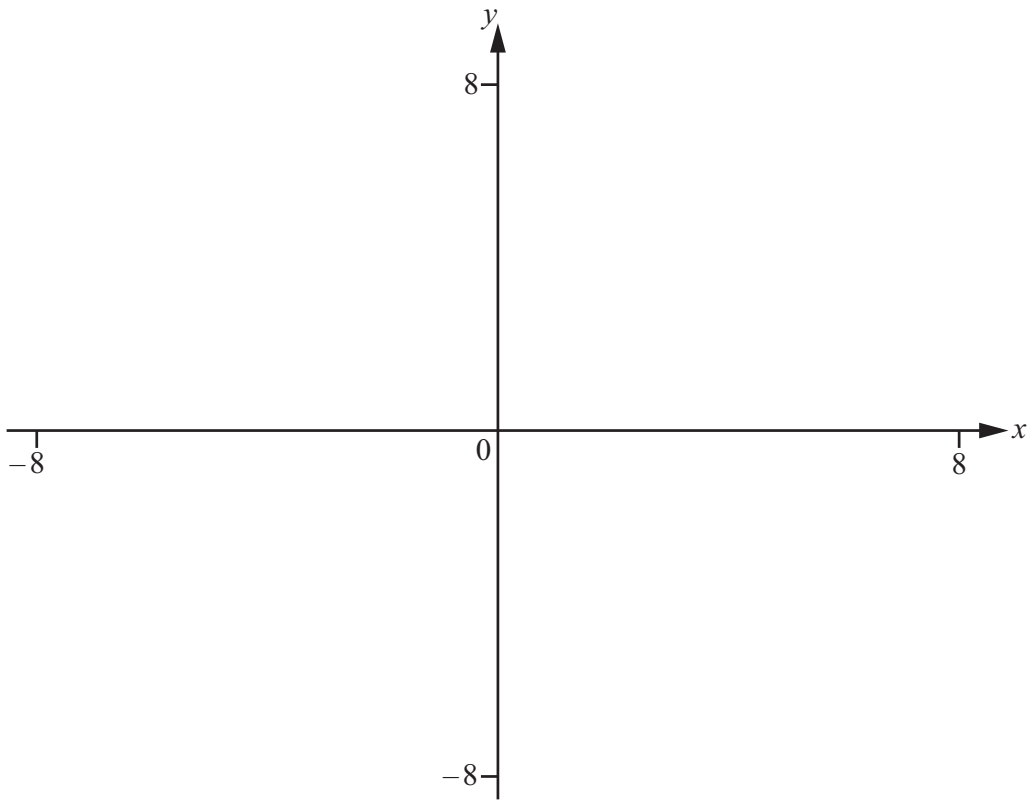
16 $\log(3x) = 3$

Find the value of x.

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

13. Question | 0607 Feb-March 2026 P4 V2 Q10

10



$$f(x) = \frac{2x}{x^2 + x - 12}$$

(a) Sketch the graph of $y = f(x)$ for values of x between -8 and 8. [3]

(b) Write down the equations of the 3 asymptotes to the graph.

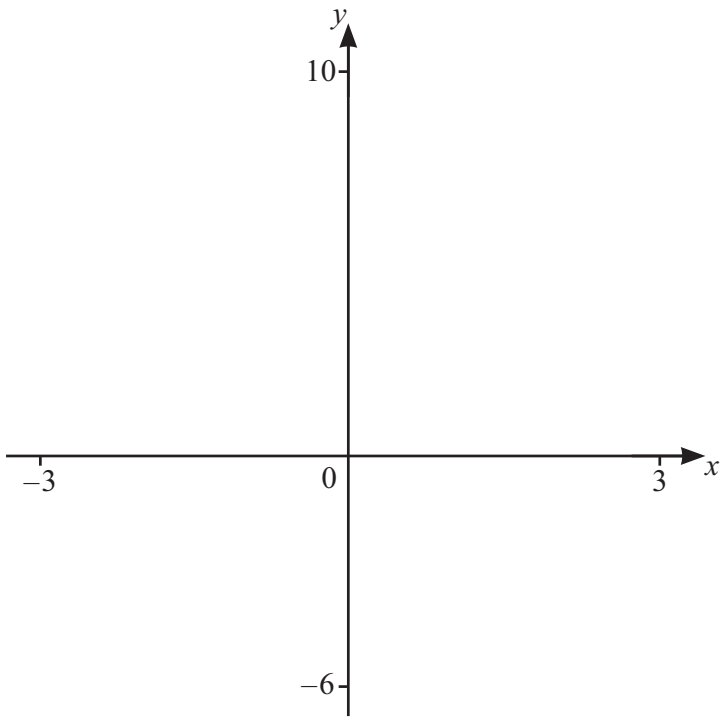
..... , ... , ... [3]

(c) Solve the inequality $f(x) > 3$.

..... [3]

14. Question | 0607 May-June 2026 P4 V1 Q6

6



$f(x) = 0.5x^3 - 2x + 2$

(a) On the diagram, sketch the graph of $y = f(x)$ for values of x between -3 and 3. [2]

(b) Solve $f(x) = -1$.

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

15. Question | 0607 May-June 2026 P4 V1 Q7

7 **(a)** $\mathrm{f}(x) = 3x - 2$

(i) Find $\mathrm{f}(-1)$.

..... [1]

(ii) Solve $\mathrm{ff}(x) = 46$.

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

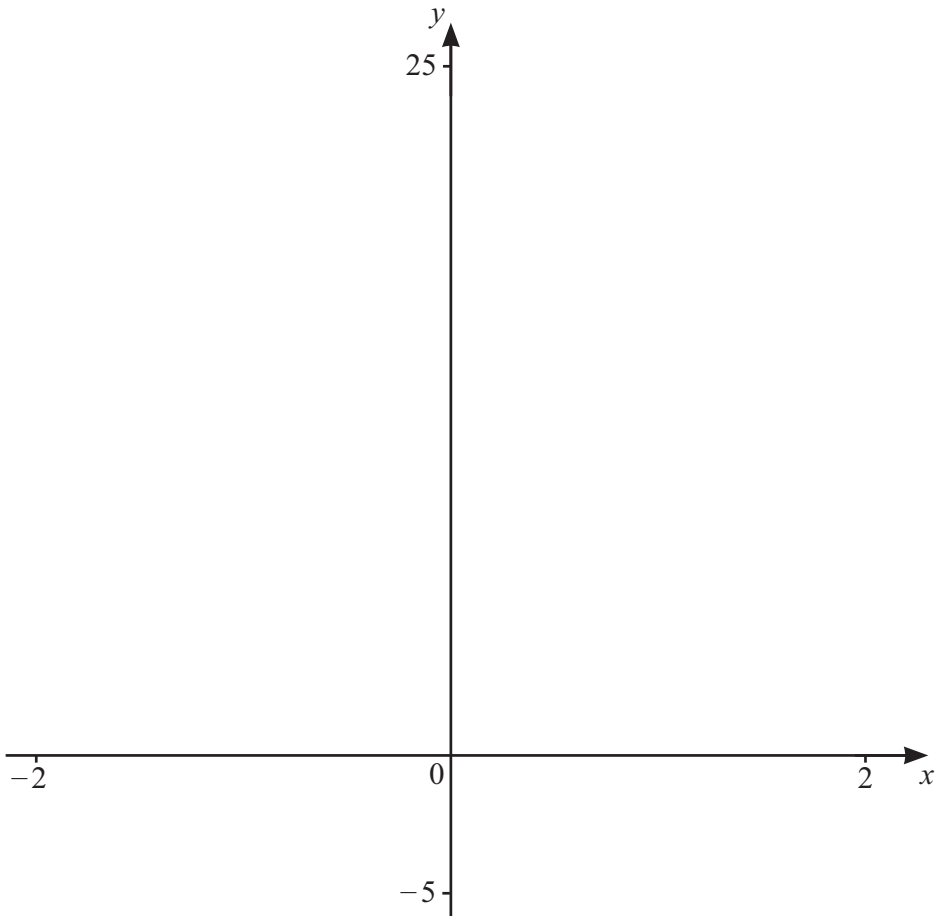
(b) $\mathrm{g}(x) = x^2 + 1 \quad \text{for } x \geqslant 0$

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

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

16. Question part 1/2 | 0607 May-June 2026 P4 V2 Q5

5



$$f(x) = \frac{5}{x^2} + \frac{1}{x^3}, \quad x \neq 0$$

(a) On the diagram, sketch the graph of $y = f(x)$ for values of x between -2 and 2. [3]

(b) Find the zero of $f(x)$.

..... [1]

(c) Find the coordinates of the local maximum point.

(..... , ...) [2]

(d) The equation $f(x) = k$ has one solution.

Find the range of values of k.

..... [2]

16. Question part 2/2 | 0607 May-June 2026 P4 V2 Q5

(e) $\mathrm{h}(x) = \dfrac{5}{(x+1)^2} + \dfrac{1}{(x+1)^3}, \quad x \neq -1$

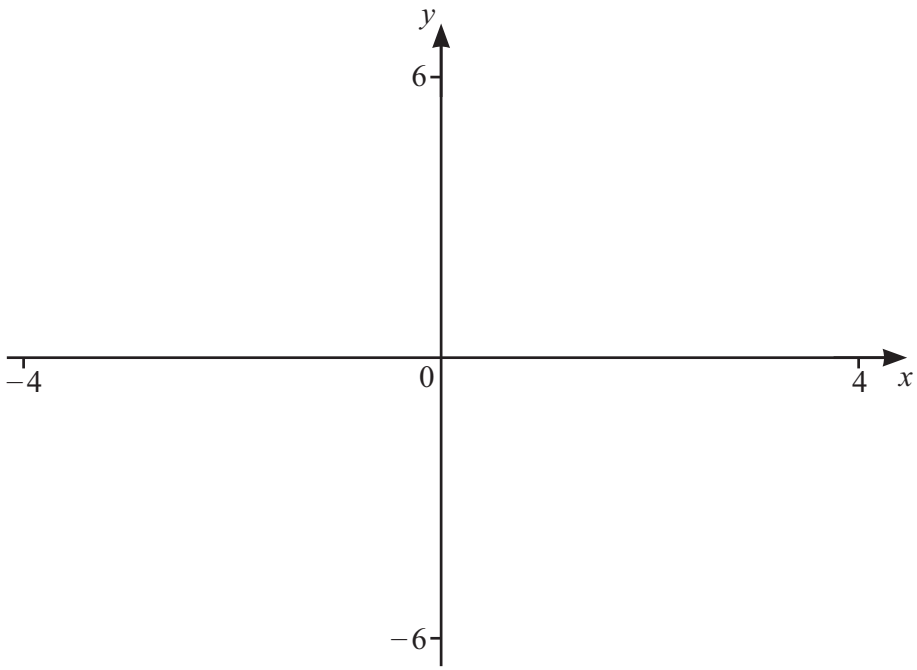
Describe fully the **single** transformation that maps the graph of $y = \mathrm{f}(x)$ onto the graph of $y = \mathrm{h}(x)$.

.....

..... [2]

17. Question | 0607 May-June 2026 P4 V3 Q9

9



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

(i) On the diagram, sketch the graph of $y = f(x)$ for values of x between -4 and 4. [3]

(ii) Write down the equations of the asymptotes parallel to the y-axis.

..... [2]

(iii) The line $y = k$ meets the curve $y = \frac{1}{x-2} + \frac{3}{2x-1}$ once.

Find the value of k.

$k =$ ..... [1]

(b) $g(x) = x - 1$

On the diagram, sketch the graph of $y = g(x)$ for values of x between -4 and 4. [1]

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

..... [3]