Exercise 2

Paper 1 style · No calculator

2 6 marks SL 2.5 · 2.8 ●●○ Typical

Let $f(x) = \dfrac{ax-1}{x+b}$. The graph of f has a vertical asymptote $x = 3$ and a horizontal asymptote $y = -2$.

(a) Write down the value of a and the value of b. **[2]**

(b) Find $f^{-1}(x)$. **[3]**

(c) Write down the equations of the asymptotes of the graph of f^{-1}. **[1]**

The markscheme is on the next page: try the question first. Written and verified by a practising IB mathematics teacher, produced with AI assistance; solved twice and recomputed by software. Not affiliated with or endorsed by the International Baccalaureate Organization.
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MARKSCHEME (a)

$b = -3$ **A1**

$a = -2$ **A1**

Total 2 marks

MARKSCHEME (b)

$x = \dfrac{-2y-1}{y-3}$ **(M1)**

$xy - 3x = -2y - 1 \Rightarrow y(x+2) = 3x - 1$ **(A1)**

$f^{-1}(x) = \dfrac{3x-1}{x+2}$ **A1**

Total 3 marks

MARKSCHEME (c)

$x = -2$ and $y = 3$ **A1**

Total 1 mark