Exercise 2

Paper 1 style · No calculator

2 7 marks SL 2.2 · 2.5 ●●○ Typical

Let $f(x) = e^{3x} + 2$, for $x \in \mathbb{R}$.

(a) Write down the range of f. **[1]**

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

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

(d) Solve $f^{-1}(x) = \ln 3$. **[2]**

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)

$f(x) > 2$ **A1**

Total 1 mark

MARKSCHEME (b)

$x = e^{3y} + 2$ **(M1)**

$3y = \ln(x - 2)$ **(A1)**

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

Total 3 marks

MARKSCHEME (c)

$x > 2$ **A1**

Total 1 mark

MARKSCHEME (d)

$\ln(x - 2) = 3\ln 3 = \ln 27$ **(M1)**

$x = 29$ **A1**

Total 2 marks

Note Or: $x = f(\ln 3) = e^{3\ln 3} + 2 = 29$.