Marked example 2

Paper 1 style · No calculator

2 7 marks SL 2.2 · 2.5 ●●○ Typical

Let $f(x) = e^{2x} - 1$, 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 $f^{-1}(x) = \ln 2$. **[2]**

MARKSCHEME (a)

$f(x) > -1$ **A1**

Total 1 mark

MARKSCHEME (b)

$x = e^{2y} - 1$ **(M1)**

$2y = \ln(x+1)$ **(A1)**

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

Total 3 marks

Note Accept $\ln\sqrt{x+1}$.

MARKSCHEME (c)

$x > -1$ **A1**

Total 1 mark

Note The domain of f^{-1} is the range of f.

MARKSCHEME (d)

$\ln(x+1) = 2\ln 2 = \ln 4$ **(M1)**

$x = 3$ **A1**

Total 2 marks

Note Or: $x = f(\ln 2) = e^{2\ln 2} - 1 = 3$.

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