Marked example 3

Paper 2 style · Graphic display calculator

3 6 marks SL 5.5 ●●○ Typical

Let $f(x) = \ln(x+1)$, for $x > -1$, and $g(x) = x^2 - 1$.

(a) Find the x-coordinates of the points of intersection of the graphs of f and g. **[2]**

(b) Write down an integral for the area of the region enclosed by the two graphs. **[2]**

(c) Find this area. **[2]**

MARKSCHEME (a)

$x = -0.519 \ \ (-0.518599\ldots)$ **A1**

$x = 1.36 \ \ (1.36393\ldots)$ **A1**

Total 2 marks

MARKSCHEME (b)

$$\int_{-0.519}^{1.36} \Big(\ln(x+1) - \left(x^2 - 1\right) \Big)\, \mathrm{d}x$$ **A1A1**

Total 2 marks

Note A1 for the limits, A1 for top minus bottom: f is above g between the intersections.

MARKSCHEME (c)

$1.49 \ \ (1.49341\ldots)$ **A2**

Total 2 marks

Written and verified by a practising IB mathematics teacher, produced with AI assistance; solved twice and recomputed by software.
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