Exercise 1

Paper 1 style · No calculator

1 7 marks AHL 1.11 ●●○ Typical

Let $f(x) = \dfrac{5x-5}{(x+2)(2x-1)}$, for $x > \frac{1}{2}$.

(a) Express $f(x)$ in partial fractions. **[3]**

(b) Hence show that $\displaystyle\int_1^3 f(x)\,\mathrm{d}x = \ln\left(\frac{25\sqrt{5}}{27}\right)$. **[4]**

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.
© 2026 Hence

Exercise 1 — markscheme

Paper 1 style · No calculator

1 7 marks AHL 1.11 ●●○ Typical

Let $f(x) = \dfrac{5x-5}{(x+2)(2x-1)}$, for $x > \frac{1}{2}$.

(a) Express $f(x)$ in partial fractions. **[3]**

(b) Hence show that $\displaystyle\int_1^3 f(x)\,\mathrm{d}x = \ln\left(\frac{25\sqrt{5}}{27}\right)$. **[4]**

MARKSCHEME (a)

$5x-5 = A(2x-1)+B(x+2)$ **M1**

$x=-2:\ A=3;\ x=\frac{1}{2}:\ B=-1,$ so $f(x) = \dfrac{3}{x+2} - \dfrac{1}{2x-1}$ **A1A1**

Total 3 marks

MARKSCHEME (b)

$\left[3\ln(x+2) - \frac{1}{2}\ln(2x-1)\right]_1^3$ **M1A1**

$= 3\ln 5 - \frac{1}{2}\ln 5 - 3\ln 3 + 0$ **A1**

$= \frac{5}{2}\ln 5 - 3\ln 3 = \ln\left(\frac{25\sqrt{5}}{27}\right)$ **A1**

Total 4 marks

Note A1 for the factor $\frac{1}{2}$.

Note AG.