Marked example 1

Paper 1 style · No calculator

1 7 marks AHL 2.13 ●●○ Typical

Let $f(x) = \dfrac{x^2 - 3x + 6}{x - 1}$, for $x \neq 1$.

(a) Write $f(x)$ in the form $x + a + \dfrac{b}{x-1}$, where $a, b \in \mathbb{Z}$. **[2]**

(b) Write down the equations of the asymptotes of the graph of f. **[2]**

(c) Find the coordinates of the stationary points of the graph of f. **[3]**

MARKSCHEME (a)

$x^2 - 3x + 6 = (x-1)(x-2) + 4$ **(M1)**

$f(x) = x - 2 + \dfrac{4}{x-1}$ **A1**

Total 2 marks

MARKSCHEME (b)

$x = 1$ **A1**

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

Total 2 marks

MARKSCHEME (c)

$f'(x) = 1 - \dfrac{4}{(x-1)^2} = 0$ **M1**

$x - 1 = \pm 2$: $x = 3$ or $x = -1$ **(A1)**

$(3, 3)$ and $(-1, -5)$ **A1**

Total 3 marks

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