Marked example 3

Paper 2 style · Graphic display calculator

3 7 marks AHL 2.13 ●●○ Typical

Let $h(x) = \dfrac{2x^2 + 3x - 4}{x + 2}$, for $x \neq -2$.

(a) Find the equations of the asymptotes of the graph of h. **[3]**

(b) Find the x-coordinates of the points where the graph of h meets the line $y = x + 3$. **[2]**

(c) Show that $h'(x) > 0$ for all $x \neq -2$. **[2]**

MARKSCHEME (a)

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

$x = -2$ **A1**

$y = 2x - 1$ **A1**

Total 3 marks

MARKSCHEME (b)

-2.32 and 4.32 **A1A1**

Total 2 marks

Note Exact values $1 \pm \sqrt{11}$.

MARKSCHEME (c)

$h(x) = 2x - 1 - \dfrac{2}{x + 2}$, $h'(x) = 2 + \dfrac{2}{(x + 2)^2}$ **M1**

both terms positive, so $h'(x) > 0$ **R1**

Total 2 marks

Note AG.

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