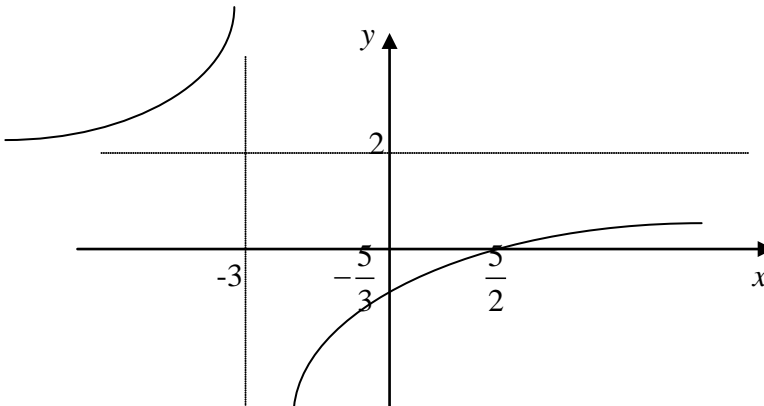


Question Number	Answer	Marks
<b>5</b>		
<b>(a)</b>	(i) $y = 2$	B1
	(ii) $x = -3$	B1 (2)
<b>(b)</b>	(i) $\left(\frac{5}{2}, 0\right)$ accept $x = \frac{5}{2}$	B1
	(ii) $\left(0, -\frac{5}{3}\right)$ accept $y = -\frac{5}{3}$ oe (accept -1.67 or better)	B1 (2)
<b>(c)</b>		B1(2 branches in corr quads.) B1 (asymptotes) B1(Crossing points) (3)
<b>(d)</b>	$\frac{dy}{dx} = \frac{2(x+3) - (2x-5)}{(x+3)^2} \quad (\text{or divide and differentiate})$	M1A1
	$x = -1 \quad \frac{dy}{dx} = \frac{2 \times 2 - (-7)}{2^2} = \frac{11}{4} \quad \text{oe}$	A1ft (3)
		[10]

**Notes**

(a)

(i) B1 for  $y = 2$  must be an equation(ii) B1 for  $x = -3$  must be an equation**NB:** If correct equations seen but incorrectly identified, award B1B0(ie (i)  $x = -3$  etc)

(b)

(i) B1 for  $\left(\frac{5}{2}, 0\right)$  or  $x = \frac{5}{2}$ (ii) B1 for  $\left(0, -\frac{5}{3}\right)$  accept  $y = -\frac{5}{3}$  oe (accept -1.67 or better)**NB:** As in (a), correct answers the wrong way round gain B1B0(c) **NB:** No follow through here.

B1 for two branches in the correct "quadrants"

B1 for the asymptotes. The lines should have their equations or the coords of the points where they cross the axes shown. The curve should approach the asymptotes but not touch/cross either (or both) lines nor should it clearly bend away from an asymptote.

B1 for indicating the coordinates of the points where the curve crosses the axes.

**NB:** A candidate who draws one branch can score B0B1B1; A candidate who introduces extra crossing points scores B1B1B0 max.

(d)

M1 for attempting the differentiation of the curve equation. If quotient rule used, the denominator must be squared and the 2 numerator terms must be subtracted (but their order may be incorrect). If division used first, diff of  $-11(x+3)^{-1}$  may be seen instead of use of quotient ruleA1 for a correct differential  $\frac{dy}{dx} = \frac{2(x+3) - (2x-5)}{(x+3)^2}$  or  $11(x+3)^{-2}$  oeA1ft for a correct numerical value when  $x = -1$  follow through their differential.