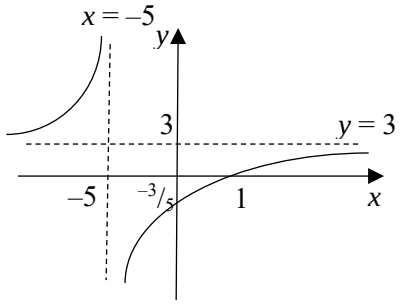
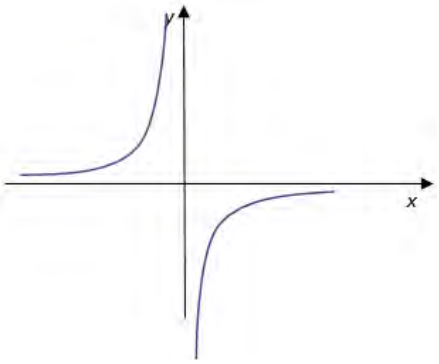
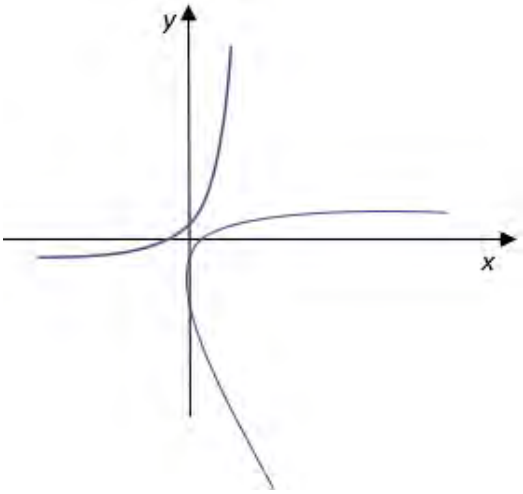
Question number	Scheme	Marks
3 (a)	$\frac{dy}{dx} = \frac{a(x+5)-(ax-3)}{(x+5)^2}$	M1
	When $x = 2$ $\frac{dy}{dx} = \frac{7a-2a+3}{49} = \frac{18}{49} \Rightarrow a = ...$	M1
	$a = 3$ *	A1cso (3)
3 (b)(i)	$y = 3$	B1
(b)(ii)	$x = -5$	B1 (2)
(c)(i)	$(1, 0)$	B1
(c)(ii)	$\left(0, \frac{-3}{5}\right)$	B1 (2)
(d)	 Curve drawn Asymptotes drawn and labelled $^{-3}/_{5}$, 1 labelled on axes	B1 B1ft B1ft (3)
		[10]
		Total 10 marks

Part	Mark	Notes
(a)	**M1**	For an attempt at Quotient rule. The definition of an attempt is that there must be a correct attempt to differentiate both terms and the denominator must be squared. Allow the terms in the numerator to be the wrong way around, but the terms must be subtracted. $ax-3 \Rightarrow a$ and $x+5 \Rightarrow 1$ must be correct. $\frac{dy}{dx} = \frac{a(x+5)-(ax-3)}{(x+5)^2}$ $\left[\text{allow } \frac{dy}{dx} = \frac{(ax-3)-a(x+5)}{(x+5)^2}\right]$
	M1	For substituting $x = 2$ into their differentiated expression, setting it equal to $\frac{18}{49}$ and attempting to solve the linear equation leading to a value for a $\frac{dy}{dx} = \frac{7a-2a+3}{49} = \frac{18}{49} \Rightarrow 5a+3 = 18 \Rightarrow a = ...$ Allow one slip in their method.
	A1 cso	For $a = 3$ * No errors in working.

<table>
<tr><td></td><td></td><td colspan="2"></td></tr>
<tr><td>(b)(i)</td><td>B1</td><td colspan="2">For $y = 3$ This must be an equation of a line. Do not award for just 3.</td></tr>
<tr><td>(ii)</td><td>B1</td><td colspan="2">For $x = -5$ This must be the equation of a line. Do not award for just –5</td></tr>
<tr><td>(c)(i)</td><td>B1</td><td colspan="2">For (1, 0) or clearly listing $x = 1$, $y = 0$ as a pair.</td></tr>
<tr><td>(ii)</td><td>B1</td><td colspan="2">For $\left(0, -\frac{3}{5}\right)$ oe. or clearly listing $x = 0$, $y = -\frac{3}{5}$ as a pair.</td></tr>
<tr><td rowspan="4">(d)</td><td rowspan="2">B1</td><td colspan="2">For the curve drawn with two branches anywhere on the grid provided it is a negative reciprocal curve. The ends of the curves must be asymptotic and must not turn back on themselves. Do not allow any obvious overlap across the ends of the curve with evidence of the presence of asymptotes.</td></tr>
<tr><td>For example, accept:
Negative reciprocal curve in incorrect position
 
</td><td>Do not accept:
• Overlap of asymptotes
• Ends turning back on themselves
 
</td></tr>
<tr><td>B1ft</td><td colspan="2">For their asymptotes correctly drawn and clearly labelled with their equation.
At least one branch of the curve is required. It must be a negative reciprocal and it must be in the correct position for their asymptotes. The follow through is available for their answers in part b.
If correct asymptotes appear on the sketch, do not award marks retrospective marks in part b.</td></tr>
<tr><td>B1ft</td><td colspan="2">The curve must be drawn going through their two points of intersection. It must be a negative reciprocal, in the correct position for their intersections and clearly marked on the axes. The follow through is available for their answers in part c. Allow the other branch to even be missing.
If correct coordinates appear on the sketch, do not award marks retrospective marks in part c.</td></tr>
</table>