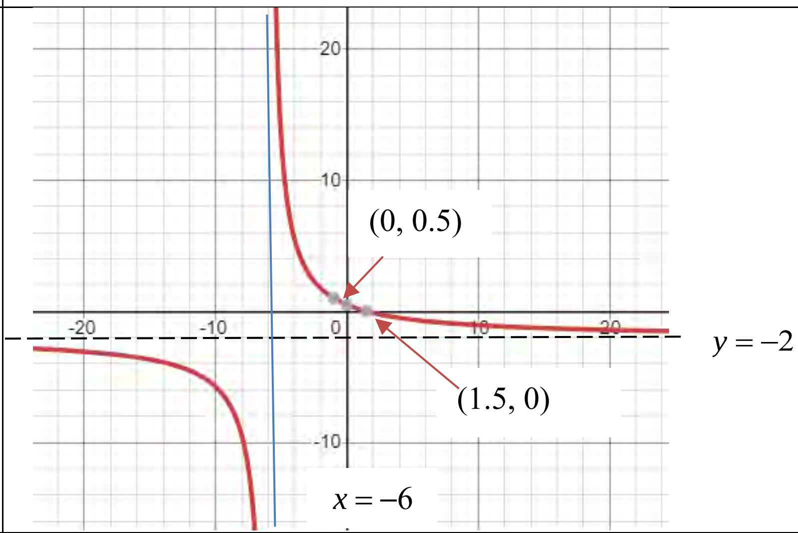
Question	Scheme	Marks
9(a)	(i) $y=-2$ (ii) $x=-6$	B1 B1 [2]
(b)	(i) $\left(\frac{3}{2},0\right)$ (ii) $\left(0,\frac{1}{2}\right)$	B1 B1 [2]
(c)		B1 – shape B1ft– Asymptotes B1ft – Intersections [3]
(d)	$\frac{\mathrm{d}y}{\mathrm{d}x}=\frac{(x+6)(-2)-(3-2x)(1)}{(x+6)^2}$ $\frac{\mathrm{d}y}{\mathrm{d}x}=\frac{-15}{(x+6)^2}$ with conclusion; numerator negative, denominator always positive, $\frac{-}{+}\Rightarrow$ negative	M1A1 A1 [3]
(e)	$\frac{-15}{(x+6)^2}=-\frac{3}{5}\Rightarrow 25=(x+6)^2\Rightarrow x=-6\pm5=-11,\quad -1$ $y=\frac{3-2(-1)}{-1+6}=1$ $y-1=-\frac{3}{5}(x-[-1])\Rightarrow y=-\frac{3}{5}x+\frac{2}{5}\Rightarrow k=\frac{2}{5}$	M1A1 B1 M1A1 [5]
		Total 15 marks

Part	Mark	Notes
(a) (i)	B1	For the correct equation. If their equations are not labelled (i) and (ii) accept them in the order given only. For example, the following presentation is B0B0 $x = -6$ $y = -2$
(ii)	B1	For the correct equation.
(b)		If their coordinates are not labelled (i) and (ii) or are given in the incorrect place [for example, (b)(i) $y = \frac{1}{2}$ is B0] accept them in the order given only. For example, the following presentation is B0B0 $\left(0, \frac{1}{2}\right)$ $\left(\frac{3}{2}, 0\right)$
(i)	B1	For the correct coordinates. Accept $x = \frac{3}{2}$
(ii)	B1	For the correct coordinates. Accept $y = \frac{1}{2}$
(c)	B1	For the correct shape with two branches the correct way around anywhere in the grid. It must be asymptotic in nature. The ends of the curve must not come back on themselves. Whilst you need to be fairly generous, any obvious turning back is B0
	B1ft	For the correct asymptotes drawn and labelled with at least one branch of the curve [which must be asymptotic in nature in at least one branch] in the correct place seen. Ft their asymptotes Accept the vertical line drawn shown passing through their -6 and the horizontal line drawn shown passing through their -2
	B1ft	For the correct coordinates of intersections with the relevant branch of the curve drawn correctly seen. The curve must go through the points. Do not accept touching the axis. Allow $\frac{1}{2}$ marked on y-axis and $\frac{3}{2}$ marked on the x-axis. Ft their coordinates of intersections.
(d)	M1	For an attempt at quotient rule. • The denominator must be squared, or accept $(x+6)(x+6)$ or $x^2+12x+36$ • Both $(x+6)$ and $(3-2x)$ differentiated correctly. • The two terms in the numerator subtracted either way around.
	A1	Fully correct derivative (simplification not required for this mark).
	A1	For a correct simplified derivative with a correct conclusion. For example: $(x+6)^2 \geqslant 0$, -15 is negative, $\frac{\text{negative}}{\text{positive}}$ is always negative. [Accept also $(x+6)^2 > 0$]

(e)	M1	For setting the value of $-\frac{3}{5}=$ their $\frac{\mathrm{d}y}{\mathrm{d}x}$ with an attempt to find at least one value of x. Allow this even if their derivative results in a linear equation.
	A1	For **both** correct values of x
	B1	For $y=1$ using $x=-1$ OR For $y=-5$ using $x=-11$
	M1	For forming an equation of the line with either $x=-1,\quad y=1$ or $x=-11,\quad y=-5$ or their x and their y
	A1	For the correct value of k (accept an embedded value). $y=-\frac{3}{5}x+\frac{2}{5}\Rightarrow k=\frac{2}{5}$ You can award this mark even if the previous A mark has not been scored. So, for a correct solution without showing that $x=-11$ score M1A0B1M1A1
	ALT for last 3 marks	
	B1	Sets $-\frac{3}{5}x+k=\frac{3-2x}{x+6}$
	M1	Substitutes $x=-1$ or -11 into the above equation
	A1	For $k=\frac{2}{5}$ You can award this mark even if the previous A mark has not been scored. So, for a correct solution without showing that $x=-11$ score M1A0B1M1A1