Question Number	Scheme	Marks
2 (a)	$x = 2y^2 + 5y - 6$	
	$\frac{dx}{dy} = 4y + 5 \Rightarrow \frac{dy}{dx} = \frac{1}{4y+5}$	M1, A1
		(2)
(b)	Sets their $4y + 5 = 0 \Rightarrow y = -\frac{5}{4}$	M1
	Substitutes their $y = -\frac{5}{4}$ into $x = 2y^2 + 5y - 6$ to find x	dM1
	$\left(-\frac{73}{8}, -\frac{5}{4}\right)$	A1
		(3)
		Total 5

Mark as one complete question

Main method via differentiation in (a) and (b)

(a)

M1: Differentiates $2y^2 + 5y - 6$ to a linear term in y AND attempts to take the reciprocal.

Condone for this mark attempts such as $\frac{dx}{dy} = 4y + 5 \Rightarrow \frac{dy}{dx} = \frac{1}{4y} + \frac{1}{5}$

We may see other methods including implicit differentiation from WMA14.

Look for $x = 2y^2 + 5y - 6 \Rightarrow 1 = ay\frac{dy}{dx} + b\frac{dy}{dx}$ followed by an attempt to make $\frac{dy}{dx}$ the subject

A1: $\frac{dy}{dx} = \frac{1}{4y+5}$ ISW after a correct answer.

(b) **Marks in part (b) can only be awarded after sight of $\frac{dx}{dy} = \frac{ay+b}{k}$ or $\frac{dy}{dx} = \frac{k}{ay+b}$**

So full marks can only be awarded after sight of $\frac{dx}{dy} = 4y + 5$ or $\frac{dy}{dx} = \frac{1}{4y+5}$

M1: Sets $'ay + b' = 0 \Rightarrow y = \ldots$. following sight of $\frac{dx}{dy} = \frac{ay+b}{k}$ **or** $\frac{dy}{dx} = \frac{k}{ay+b}$

Ignore/condone incorrect statements such as $\frac{dy}{dx} = 0$ here

This can be implied. E.g $\frac{dy}{dx} = \frac{1}{4y+5}$ followed by $y = -\frac{5}{4}$

dM1: Substitutes their solution of their $4y + 5 = 0$ into $x = 2y^2 + 5y - 6$ to find x.

This is dependent upon the previous M

A1: $\left(-\frac{73}{8}, -\frac{5}{4}\right)$ following $\frac{dx}{dy} = 4y + 5$ **or** $\frac{dy}{dx} = \frac{1}{4y+5}$

The answer may be given separately, for example, as $x = -9.125$, $y = -1.25$

ISW after a correct answer.

Further guidance to highlighted sentence.

If (a) is incorrect or incomplete follow the following guidance.

Incorrect (a): If they incorrectly state $\frac{\mathrm{d}y}{\mathrm{d}x} = 4y + 5$ o.e. and go on to use $4y + 5 = 0 \Rightarrow y = ...$ and write down a correct set of coordinates for *P* they will score NO MARKS in (b)

Incomplete (a): If they state $\frac{\mathrm{d}x}{\mathrm{d}y} = 4y + 5$ in (a) and go on to use $4y + 5 = 0 \Rightarrow y = ...$ in (b) they will score no marks in (a) but could potentially score full marks in (b)

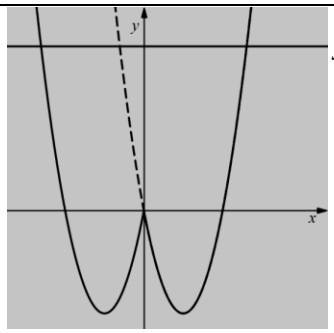
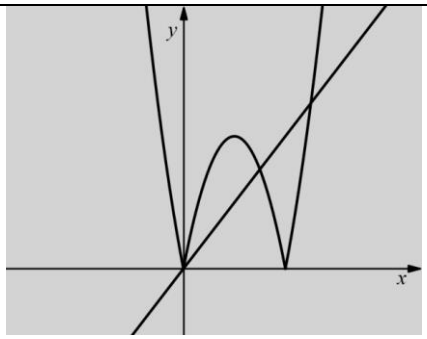
You can award all 3 marks for $\left(-\frac{73}{8}, -\frac{5}{4}\right)$ following either $\frac{\mathrm{d}x}{\mathrm{d}y} = 4y + 5$ or $\frac{\mathrm{d}y}{\mathrm{d}x} = \frac{1}{4y + 5}$

……
Alternative approach: Part (a) may well be blank or incorrect. Part(b) done via completion of square

It is possible to do part (b) by not doing any differentiating.

$x = 2y^2 + 5y - 6 \Rightarrow x = 2\left(y + \frac{5}{4}\right)^2 - \frac{73}{8}$

M1: An allowable attempt to complete the square followed by a valid attempt at either *x* or *y* from their attempt
A1: For a correct *x* or *y*
A1: For a correct *x* and *y*
……..

Question Number	Scheme	Marks
3 (a)	 $y = 48$ Graphical interpretation of $\mathrm{f}(\lvert x \rvert) = 48$	
	One of $8, -8$	B1
	Attempts to solve an appropriate equation E.g. $2x^2 - 10x = 48 \Rightarrow x^2 - 5x - 24 = 0 \Rightarrow (x \pm 8)(x \pm 3) = 0 \Rightarrow x = ...$	M1
	$x = 8, -8$ with no additional values	A1
		(3)
(b)	 $y = \frac{5}{2}x$ Graphical interpretation of $\lvert \mathrm{f}(x) \rvert \ldots \frac{5}{2}x$	
	Attempts to solve $2x^2 - 10x = \frac{5}{2}x \Rightarrow 4x^2 - 25x = 0 \Rightarrow x = \frac{25}{4}$ OR attempts to solve (o.e.) $10x - 2x^2 = \frac{5}{2}x \Rightarrow 4x^2 - 15x = 0 \Rightarrow x = \frac{15}{4}$	M1
	Attempts to solve $2x^2 - 10x = \frac{5}{2}x \Rightarrow 4x^2 - 25x = 0 \Rightarrow x = \frac{25}{4}$ AND attempts to solve (o.e.) $10x - 2x^2 = \frac{5}{2}x \Rightarrow 4x^2 - 15x = 0 \Rightarrow x = \frac{15}{4}$	dM1
	Achieves both critical values $x = \frac{15}{4}$, $x = \frac{25}{4}$	A1
	Correct set of values $x \,,, \frac{15}{4}$ or $x \ldots \frac{25}{4}$	A1
		(4)
		Total 7

This question demands that some working should be shown

(a) This part is now being marked B1 M1 A1 instead of M1 A1 A1

B1: Correctly obtains 8 or -8 as a solution (for x) . Condone solution appearing as $\lvert x \rvert = 8$

M1: Attempts to solve $\mathrm{f}(\lvert x \rvert) = 48$ via an appropriate method including a calculator, factors or formula

So, look for a correct equation followed by an attempt to solve.