Question	Scheme	Marks
6	$\frac{\mathrm{d}}{\mathrm{d}x}(\cos x+\sin x)=-\sin x+\cos x$	**B1**
	$\frac{\mathrm{d}y}{\mathrm{d}x}=\frac{(\cos x+\sin x)(3\cos x)-(-\sin x+\cos x)(2+3\sin x)}{(\cos x+\sin x)^2}$	**M1 A1**
	$=\frac{3\cos^2 x+\cancel{3\sin x\cos x}+2\sin x+3\sin^2 x-2\cos x-\cancel{3\sin x\cos x}}{\cos^2 x+2\sin x\cos x+\sin^2 x}$ $=\frac{3+2\sin x-2\cos x}{1+2\sin x\cos x}$	**M1**
	$=\frac{3+2\sin x-2\cos x}{1+2\sin x\cos x}\times\frac{\sec x}{\sec x}=\frac{3\sec x+2\sec x\sin x-2}{\sec x+2\sin x}$	**M1**
	$=\frac{2\tan x+3\sec x-2}{\sec x+2\sin x}$	**A1**
		(6)
		(6 marks)

Notes:

B1: Correct differentiation of $\cos x+\sin x\rightarrow-\sin x+\cos x$ seen somewhere in the proof. This can be scored if seen in workings for quotient rule, or even in the denominator of an incorrect attempt at *u*'/*v*'.

M1: Differentiates using the quotient rule or product rule. For quotient rule look for $\frac{(\cos x+\sin x)(\pm a\cos x)-(\pm\sin x\pm\cos x)(2+3\sin x)}{(\cos x+\sin x)^2}$

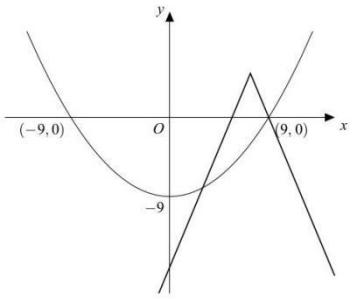
For product rule look for $(\cos x+\sin x)^{-1}(\pm a\cos x)\pm(\cos x+\sin x)^{-2}(\pm\cos x\pm\sin x)(2+3\sin x)$

A1: Fully correct derivative.

M1: Expands numerator or denominator and applies $\sin^2 x+\cos^2 x=1$ or other appropriate correct Pythagorean identity at least once in the proof.

M1: Attempts to multiply through by sec *x* in numerator and denominator (to achieve the 2sin *x* term). Not dependent and may be scored before the previous M.

A1: Correct answer. Terms may be in different order. Allow minor slips in notation (e.g. a single missing *x*) and recovery from missing brackets if the intent is clear, but A0 for persistent incorrect notation throughout (e.g no *x*'s in the trig terms).

Question	Scheme		Marks
7(a)	(i) $\left(\frac{22}{3}, 5\right)$		**B1**
	(ii) $(0, -17)$		**B1**
			(2)
(b)	$5-(3x-22)=0 \Rightarrow x=...$ **and** $5+(3x-22)=0 \Rightarrow x=...$		**M1**
	$x=9$ and $x=\frac{17}{3}$		**A1**
			(2)
(c)		Correct U shape symmetric about *y*-axis with vertex on negative *y*-axis.	**B1**
		Graphs meet $(9,0)$ with $(-9,0)$ also shown.	**B1**
		Intercept at $(0,-9)$ stated or labelled.	**B1**
			(3)
(d)	Intersect at $(9,0)$		**B1**
	Or when $5+3x-22=\frac{1}{9}x^2-9$		**M1**
	$\Rightarrow (x-3)(x-24)=0 \Rightarrow x=...$		**dM1**
	Need smaller root $x=3 \Rightarrow y=...$		**dM1**
	$(3,-8)$		**A1**
			(5)
			(12 marks)

Notes:

(a)

Mark (a) and (b) as a whole

(i) B1: Correct coordinates. May be listed as separate coordinates, $x = \ldots$, $y = \ldots$

(ii) B1: Correct y intercept (and no other). Accept as coordinates, or stated as $y = \ldots$ (allow without the $x = 0$) or seen on graph as the y intercept. However just -17 on its own is B0.

(b)

M1: Attempts to solve **both** equations, though allow sign slips when expanding the brackets.

A1: Both values correct.