Question	Scheme	Marks	AOs
12(a)	$\frac{dy}{dx} = \frac{3t^2 - 12}{2t + 1}$	M1 A1	1.1b 1.1b
		(2)	
(b)	At P $3t^2 - 12 = 0 \Rightarrow t = \pm 2$ As P is in quadrant 1, $t = -2 \Rightarrow x = ..., y = ...$	M1	2.1
	$(6, 21)$	A1	2.3
		(2)	
(c)	At Q, $y = 21$ $t^3 - 12t + 5 = 21 \Rightarrow t^3 - 12t - 16 = 0$	M1	3.1a
	$t^3 - 12t - 16 = (t + 2)^2 (t \pm ...) = 0 \Rightarrow t = ...(4)$	dM1	2.1
	Q is $(24, 21)$	A1	2.2a
		(3)	
			(7 marks)

Notes

(a)

M1: Attempts $\frac{dx}{dt}$ and $\frac{dy}{dt}$ and then uses $\frac{dy}{dx} = \frac{dy}{dt} \div \frac{dx}{dt}$ (may be implied by their $\frac{dy}{dx}$)

A1: Correct expression

(b)

M1: Sets the numerator of their $\frac{dy}{dx} = 0$, solves a quadratic equation in t and uses it to find the coordinates of P

A1: Correct coordinates

(c)

M1: Recognises that at Q, the y coordinate is equal to the y coordinate of P and uses this to form a cubic equation in t

M1: Uses a correct strategy to find the value of t at Q. E.g. uses the repeated root at P to factorise the cubic equation.

A1: Deduces the correct coordinates