Question Number	Scheme	Marks
1	Attempts to get t in terms of x or y. E.g. $x=\frac{t}{t-3}\Rightarrow t=\frac{3x}{x-1}$ Forms a Cartesian equation and makes progress to making y the subject E.g. $y=\frac{1}{t}+2\Rightarrow y=\frac{x-1}{3x}+2$ $\Rightarrow y=\frac{7x-1}{3x}$	M1 dM1 A1 **(3)** **(3 marks)**

M1: For an attempt to get t or $\frac{1}{t}$ in terms of x or y.

Condone poor attempts here. It is the intention that is important

dM1: For a complete attempt to form an equation of the form $y=\mathrm{f}(x)$

Look for

- getting t or $\frac{1}{t}$ in terms of x or y
- using this to form a Cartesian equation and makes some progress towards making y the subject.

E.g.I. $x=\frac{t}{t-3}\Rightarrow t=\frac{3x}{x-1}$ **followed by** $y=\frac{1}{t}+2\Rightarrow y=\frac{1}{\frac{3x}{x-1}}+2$

E.g.II. $y=\frac{1}{t}+2\Rightarrow t=\frac{1}{y-2}$ **followed by**

$$x=\frac{\frac{1}{y-2}}{\frac{1}{y-2}-3}\Rightarrow x=\frac{1}{1-3\left(y-2\right)}\Rightarrow\left(7-3y\right)x=1$$

Condone slips, for example in the signs and miscopies/misreads, but the overall mechanics of the attempt should be sound.

In E.g.II. an attempt must be made to make progress towards $y = \mathrm{f}(x)$, so allow for example when an intermediate line such as $\mathrm{g}(y)\times\mathrm{h}(x)=b$ or $\mathrm{g}(y)=\mathrm{h}(x)$ where $\mathrm{g}(y)$ is a linear expression in y

A1: Correct equation $y=\frac{7x-1}{3x}$ but allow $y=\frac{-1+7x}{3x}$

Alt Method:

M1: Substitutes both $y=\frac{1}{t}+2$ and $x=\frac{t}{t-3}$ into $y=\frac{ax-1}{bx}$ and makes progress to a point in which sides can be compared

$$\frac{1}{t}+2=\frac{a\times\frac{t}{t-3}-1}{b\times\frac{t}{t-3}}=\left(\frac{a-1}{b}\right)+\frac{3}{bt}\qquad\text{or}\qquad b+2bt=\left(a-1\right)t+3$$

dM1: Compares terms to set up and solve simultaneous equations in both a and b.

FYI $\frac{3}{b}=1,\frac{a-1}{b}=2$ or $b=3,\quad 2b=a-1$

A1: $y=\frac{7x-1}{3x}$ NOT just for correct values of a and b

Question Number	Scheme	Marks
2 (a)	$\dfrac{3x}{(2x-1)(x-2)} \equiv \dfrac{A}{2x-1}+\dfrac{B}{x-2} \Rightarrow$ Values for A and B	M1
	One correct value, either $A=-1$ or $B=2$	A1
	Correct PF form $\dfrac{-1}{2x-1}+\dfrac{2}{x-2}$	A1
		(3)
(b)	$\displaystyle\int \frac{-1}{2x-1}+\frac{2}{x-2}\,\mathrm{d}x = -\frac{1}{2}\ln(2x-1)+2\ln(x-2)+(c)$	M1, A1ft
	$\displaystyle\int_5^{25} \frac{3x}{(2x-1)(x-2)}\,\mathrm{d}x = \left[-\frac{1}{2}\ln(2x-1)+2\ln(x-2)\right]_5^{25}$	
	$= \left(-\frac{1}{2}\ln 49+2\ln 23\right)-\left(-\frac{1}{2}\ln 9+2\ln 3\right)$	dM1
	$\ln\dfrac{529}{21}$	A1
		(4)
		(7 marks)

(a)

M1: Attempts a correct PF form leading to values for A and B.

Condone $\dfrac{3x}{(2x-1)(x-2)} \equiv C+\dfrac{A}{2x-1}+\dfrac{B}{x-2} \Rightarrow$ Values for at least A and B

A1: One correct value for A or B or one correct term

A1: Correct PF form $\dfrac{-1}{2x-1}+\dfrac{2}{x-2}$.

This is not just for correct values for A and B but it may be awarded from work seen in (b)

(b)

M1: $\displaystyle\int \frac{A}{2x-1}+\frac{B}{x-2}\,\mathrm{d}x = C\ln(2x-1)+D\ln(x-2)$ o.e. Condone missing brackets here

A1ft: Correct ft on their values for A and B $\displaystyle\int \frac{A}{2x-1}+\frac{B}{x-2}\,\mathrm{d}x = \frac{A}{2}\ln(2x-1)+B\ln(x-2)+(c)$

Do not condone missing brackets but the brackets can be implied by subsequent working, E.g. ln 49

dM1: Attempts to substitute the limits 5 and 25 (no misreads on the limits but condone slips, so don't accept a consistent lower limit of 0 for instance) into an expression of the correct form (with brackets which may be implied) and subtracts, either way around. Condone attempts where the substitutions were made into incorrectly combined ln terms.

A1: cso $\ln\dfrac{529}{21}$ Also allow in mixed number form $\ln 25\frac{4}{21}$