Question Number	Scheme	Marks
3.(a)	$3\left(\frac{4}{t}\right)-2(4t)=10$	M1
	$8t^2+10t-12(=0)$	A1
	$(8t-6)(t+2)=0\Rightarrow t=\cdots$ or $(4t-3)(2t+4)=0\Rightarrow t=\cdots$ or $2(4t-3)(t+2)=0\Rightarrow t=\cdots$ or $t=\frac{-10\pm\sqrt{100+384}}{16}=\cdots\left(t=\frac{3}{4},-2\right)$ or $4\left(t+\frac{5}{8}\right)^2-\frac{25}{16}-6=0\Rightarrow t=\cdots\left(t=\frac{3}{4},-2\right)$	dM1
	Points are $\left(3,\frac{16}{3}\right)$ and $(-8,\ -2)$	ddM1 A1
		(5)
	(a) Alternative	
	$y=\frac{10+2x}{3}$ or $x=\frac{3y-10}{2}$ and $xy=16$ $\Rightarrow x^2+5x-24(=0)$ or $3y^2-10y-32(=0)$	M1A1
	$x^2+5x-24=0\Rightarrow(x+8)(x-3)\Rightarrow x=\cdots$ $x^2+5x-24=0\Rightarrow x=\frac{-5\pm\sqrt{25+96}}{2}\Rightarrow x=\cdots$ $x^2+5x-24=0\Rightarrow\left(x+\frac{5}{2}\right)^2-\frac{121}{4}=0\Rightarrow x=\cdots$ $3y^2-10y-32=0\Rightarrow(3y-16)(y+2)=0\Rightarrow y=\cdots$ $3y^2-10y-32=0\Rightarrow y=\frac{10\pm\sqrt{100+384}}{6}\Rightarrow y=\cdots$ $3y^2-10y-32=0\Rightarrow 3\left(y-\frac{5}{3}\right)^2-\frac{121}{3}=0\Rightarrow y=$	dM1
	Points are $\left(3,\frac{16}{3}\right)$ and $(-8,\ -2)$	ddM1 A1
(b)	$\left(\frac{3-8}{2},\frac{\frac{16}{3}-2}{2}\right)\rightarrow\left(-\frac{5}{2},\frac{5}{3}\right)$	M1 A1
		(2)
		(7 marks)

Notes

M1: Substitutes $x=4t$ and $y=\frac{4}{t}$ into the printed equation to obtain an equation in t only.

A1: Obtains a correct three term quadratic equation.

dM1: Correct method (e.g. factorising, quadratic formula or completing the square) of solving a 3TQ to find t = ...

Dependent on the previous M mark.

ddM1: Correct substitution for at least one of **their** values for t into the given parametric equations **and** obtains ***two sets*** of corresponding values for x and y. Could be implied by correct points provided dM1 scored.

Dependent on both previous M marks.

A1: Both correct points found. No need to label them as A and B if given in the order shown in the MS but

if the order is reversed, they must be labelled. So '$(-8,\ -2)$ and $\left(3,\ \frac{16}{3}\right)$' scores A0 unless labelled correctly.

Must also be written as coordinates.

Alternative:

M1: Solves simultaneously $3y - 2x = 10$ with $xy = k,\ k \neq 0$ to form an equation in x or y only.

A1: Obtains a correct three term quadratic equation.

dM1: Correct method (e.g. factorising, completing the square or applying the quadratic formula) of solving a 3TQ to find $x = ...$ or $y = ...$
Dependent on the previous M mark.

ddM1: Correct substitution for at least one of **their** values **and** obtains ***two sets*** of corresponding values for x and y. Could be implied by correct points provided dM1 scored.
Dependent on both previous M marks.

A1: Both correct points found. No need to label them as A and B if given in the order shown in the MS but if the order is reversed, they must be labelled. So '$(-8,\ -2)$ and $\left(3,\ \frac{16}{3}\right)$' scores A0 unless labelled correctly.

Must be written as coordinates.

SC: If they show working to arrive at a correct quadratic in x, y, or t and then use a calculator to solve their quadratic, arriving at two correct points then award SC M1A1dM0ddM0A1

(b)

M1: Correct method for the midpoint of their points. Must be adding and dividing by 2

A1: Correct answer. Cannot leave unsimplified to score this mark, so they must combine the numerical values but accept e.g. $\left(-2.5,\ \frac{5}{3}\right)$ or $(-2.5,\ 1.66\cdots)$ or $\left(-2.5,\ 1.\dot{6}\right)$