Question number	Scheme	Marks
10 (a)	$\dfrac{3}{\sqrt{9-3x}}=\dfrac{1}{\sqrt{9}}\times\dfrac{3}{\sqrt{1-\dfrac{3x}{9}}}=\dfrac{1}{\sqrt{1-\dfrac{x}{3}}}=\left(1-\dfrac{x}{3}\right)^{-\frac{1}{2}}$ *	B1B1* cso [2]
(b)	$\left(1-\dfrac{x}{3}\right)^{-\frac{1}{2}}=1+\left(-\dfrac{1}{2}\right)\left(-\dfrac{x}{3}\right)+\dfrac{\left(-\dfrac{1}{2}\right)\left(-\dfrac{3}{2}\right)\left(-\dfrac{x}{3}\right)^2}{2!}+\dfrac{\left(-\dfrac{1}{2}\right)\left(-\dfrac{3}{2}\right)\left(-\dfrac{5}{2}\right)\left(-\dfrac{x}{3}\right)^3}{3!}$	M1
	$\left(1-\dfrac{x}{3}\right)^{-\frac{1}{2}}=1+\dfrac{x}{6}+\dfrac{x^2}{24}+\dfrac{5x^3}{432}$	A1A1 [3]
(c)	$3\mathrm{f}(x)=\dfrac{3(1+2x)}{\sqrt{9-3x}}=\dfrac{3(1+2x)}{3\sqrt{1-\dfrac{x}{3}}}=(1+2x)\left(1-\dfrac{x}{3}\right)^{-\frac{1}{2}}$	B1
	$3\mathrm{f}(x)=(1+2x)\left(1+\dfrac{x}{6}+\dfrac{x^2}{24}+\dfrac{5x^3}{432}\right)$	M1
	$3\mathrm{f}(x)=(1+2x)\left(1+\dfrac{x}{6}+\dfrac{x^2}{24}+\dfrac{5x^3}{432}\right)=1+\dfrac{13}{6}x+\dfrac{3}{8}x^2+\dfrac{41}{432}x^3$	M1A1 [4]
(d)	$\displaystyle\int_{0.1}^{0.2}\dfrac{3+6x}{\sqrt{9-3x}}\,\mathrm{d}x=\int_{0.1}^{0.2}\left(1+\dfrac{13}{6}x+\dfrac{3}{8}x^2+\dfrac{41}{432}x^3\right)\mathrm{d}x$ $=\left[x+\dfrac{13}{12}x^2+\dfrac{3}{24}x^3+\dfrac{41}{1728}x^4\right]_{0.1}^{0.2}$	M1A1ft
	$\displaystyle\int_{0.1}^{0.2}\dfrac{1+2x}{\sqrt{9-3x}}\,\mathrm{d}x=\dfrac{1}{3}\left[\begin{array}{l}\left(0.2+\dfrac{13}{12}\times0.2^2+\dfrac{3}{24}\times0.2^3+\dfrac{41}{1728}\times0.2^4\right)\\-\left(0.1+\dfrac{13}{12}\times0.1^2+\dfrac{3}{24}\times0.1^3+\dfrac{41}{1728}\times0.1^4\right)\end{array}\right]=0.044\ 470\ 2$	dM1A1 [4]
		Total 13 marks

Part	Mark	Notes
(a)	**B1**	For taking out the common factor of 9 from the denominator to achieve $\dfrac{3}{\sqrt{9-3x}}=\dfrac{1}{\sqrt{9}}\times\dfrac{3}{\sqrt{1-\dfrac{3x}{9}}}$ **NB** The common factor of 9 must be seen for this mark.

	B1*	For simplifying to the required form $\dfrac{3}{\sqrt{9-3x}}=\left(1-\dfrac{x}{3}\right)^{-\frac{1}{2}}$
(b)	**M1**	For an attempt to find the binomial expansion for the given expression. • The expansion must begin with 1 • The denominators must be correct (ie. 2! And 3!) on the third and fourth terms. • The power of x must be correct (ie. $\left(-\dfrac{x}{3}\right)$ $\left(-\dfrac{x}{3}\right)^2$ and $\left(-\dfrac{x}{3}\right)^3$ with the correct corresponding denominators.
	A1	For one algebraic term correct and simplified
	A1	For the whole expansion correct up to x^3 Ignore extra terms beyond these. $\left(1-\dfrac{x}{3}\right)^{-\frac{1}{2}}=1+\dfrac{x}{6}+\dfrac{x^2}{24}+\dfrac{5x^3}{432}$
(c)	**B1**	For writing down $3\mathrm{f}(x)=(1+2x)\left(1-\dfrac{x}{3}\right)^{-\frac{1}{2}}$
	M1	For replacing $\left(1-\dfrac{x}{3}\right)^{-\frac{1}{2}}$ with their $\left(1+\dfrac{x}{6}+\dfrac{x^2}{24}+\dfrac{5x^3}{432}\right)$ provided their expansion has at least two terms one of which is an algebraic term.
	M1	For an attempt to expand $(1+2x)\left('1+\dfrac{x}{6}+\dfrac{x^2}{24}+\dfrac{5x^3}{432}'\right)$ up to and including the term in x^3. Accept the expansion of $(3+6x)\left('1+\dfrac{x}{6}+\dfrac{x^2}{24}+\dfrac{5x^3}{432}'\right)$
	A1	For the correct expansion $3\mathrm{f}(x)=1+\dfrac{13}{6}x+\dfrac{3}{8}x^2+\dfrac{41}{432}x^3$ ignore extra terms
(d)	**M1**	For an attempt to integrate their expansion of 3f(x) or f(x) which must have as a minimum two terms, one of which is a term in x, x^2 or x^3 Ignore limits for this mark. They may multiply by $\dfrac{1}{3}$ at this stage so accept e.g $\left[\dfrac{x}{3}+\dfrac{13}{36}x^2+\dfrac{3}{72}x^3+\dfrac{41}{5184}x^4\right]$
	A1ft	For a correct integrated expression ft their expression.
	dM1	For substituting both values of 0.2 and 0.1 the correct way around seen. This mark can be implied by the value of 0.044 470 2 seen. If their expansion from (c) has not been divided by 3 for the integration, it must be divided by 3 here for the award of this mark.
	A1	For the correct value of 0.044 470 2 **NB**: The calculator value is 0.044 470 77