Question Number	Scheme	Marks
7(a)	$\left(1+\frac{2x}{5}\right)^{\frac{1}{2}} = 1+\frac{1}{2}\left(\frac{2x}{5}\right)+\frac{\frac{1}{2}\times\left(-\frac{1}{2}\right)}{2!}\left(\frac{2x}{5}\right)^2+\frac{\frac{1}{2}\times\left(-\frac{1}{2}\right)\left(-\frac{3}{2}\right)}{3!}\left(\frac{2x}{5}\right)^3$	M1
	$=1+\frac{x}{5}-\frac{x^2}{50}+\frac{x^3}{250}...$	A1A1 (3)
(b)	$\left(1-\frac{2x}{5}\right)^{-\frac{1}{2}} = 1-\frac{1}{2}\left(-\frac{2x}{5}\right)+\frac{-\frac{1}{2}\left(-\frac{3}{2}\right)}{2!}\left(-\frac{2x}{5}\right)^2+\frac{-\frac{1}{2}\left(-\frac{3}{2}\right)\left(-\frac{5}{2}\right)}{3!}\left(-\frac{2x}{5}\right)^3$	M1
	$=1+\frac{x}{5}+\frac{3x^2}{50}+\frac{x^3}{50}+...$	A1A1 (3)
(c)	$-\frac{5}{2}\le x\le\frac{5}{2}$ or $-\frac{5}{2}\le x<\frac{5}{2}$ or $-\frac{5}{2}<x\le\frac{5}{2}$ or $-\frac{5}{2}<x<\frac{5}{2}$ (Accept $\lvert x\rvert<\frac{5}{2}$ or $\lvert x\rvert\leqslant\frac{5}{2}$)	B1 (1)
(d)	$\left(\frac{5+2x}{5-2x}\right)^{\frac{1}{2}} = \left(\frac{1+\frac{2}{5}x}{1-\frac{2}{5}x}\right)^{\frac{1}{2}} = \left(1+\frac{2x}{5}\right)^{\frac{1}{2}}\times\left(1-\frac{2x}{5}\right)^{-\frac{1}{2}}$	M1
	$=\left(1+\frac{x}{5}-\frac{x^2}{50}...\right)\left(1+\frac{x}{5}+\frac{3x^2}{50}...\right)$	
	$=1+\frac{x}{5}+\frac{3x^2}{50}+\frac{x}{5}+\frac{x^2}{25}-\frac{x^2}{50}+...$	M1
	$=1+\frac{2x}{5}+\frac{2x^2}{25}+...$	A1 (3)
(e)	$\int_{0.1}^{0.3}\left(\frac{5+2x}{5-2x}\right)^{\frac{1}{2}}\mathrm{d}x \approx \int_{0.1}^{0.3}\left(1+\frac{2x}{5}+\frac{2x^2}{25}\right)\mathrm{d}x$	
	$=\left[x+\frac{x^2}{5}+\frac{2x^3}{75}\right]_{0.1}^{0.3}$	M1A1ft
	$=0.3+\frac{0.3^2}{5}+\frac{2\times0.3^3}{75}-\left(0.1+\frac{0.1^2}{5}+\frac{2\times0.1^3}{75}\right), = 0.21669... = 0.2167$	dM1,A1 cao (4)
		[14]

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Question Number	Scheme	Marks
(a)		
M1	Attempt the binomial expansion. Must start with 1 and go up to at least x^3. $\left(\frac{2x}{5}\right)$ must be used in at least one term. Denominators 2 or 2!, 6 or 3!	
A1	2 correct algebraic terms; must be simplified, but fractions equivalent to those shown accepted for this mark.	
A1	Fully correct expansion as shown.	
(b)		
M1	Attempt the binomial expansion. Must start with 1 and go up to at least x^3. $\left(-\frac{2x}{5}\right)$ must be used in at least one term. Denominators 2 or 2!, 6 or 3!	
A1	2 correct algebraic terms, but fractions equivalent to those shown accepted for this mark.	
A1	Fully correct expansion as shown.	
(c)		
B1	Award for any of the ranges shown (5/2 or 2.5 accepted) (ie x between -5/2 and 5/2 with any inequality signs) Must be clear that the range applies to both expansions. Accept if just one range shown with no indication of expansion(s) it applies to or ranges for both expansions given and identical.	
(d)		
M1	Deal with the 5s to write the given expression in terms of the expressions in (a) and (b) - can be their expansions or $\left(1+\frac{2x}{5}\right)^{\frac{1}{2}}\times\left(1-\frac{2x}{5}\right)^{-\frac{1}{2}}$	
M1	Attempt the multiplication of their expansions from (a) and (b). Must have all terms needed up to x^2. Ignore higher powers. NB: This is not a dependent mark.	
A1	Simplify to the 3 terms shown.	
(e)		
M1	Attempt to integrate their expansion obtained in (d), min 2 terms. Must be a valid integration with powers of x increasing by 1 in at least 2 terms.	
A1ft	Correct integration of **their** expansion	
dM1	Use the given limits correctly in their integrated expression; ie attempt to substitute 0.3 and 0.1 in their terms and subtract the substitutions. Depends on the first M mark of (e).	
A1cao	Correct final answer. **Must** be 4 sf. **NB:** Correct answer w/o working scores 0/4 here as question states "use algebraic integration".	