

Question			Answer	Marks	AO	Guidance	
8	(a)		$(1 + \frac{1}{2}x)^{-3} = 1 + (-3)(\frac{1}{2}x)$	B1	1.1	Correct first two terms	Possibly unsimplified
			$+ \frac{(-3)(-4)}{2}(\frac{1}{2}x)^2$	M1	1.1	Attempt third term	Must be expanding $(1 + \frac{1}{2}x)^{-3}$ Allow $\frac{1}{2}x^2$ for $(\frac{1}{2}x)^2$
			$(2+x)^{-3} = \frac{1}{8}(1 - \frac{3}{2}x + \frac{3}{2}x^2) = \frac{1}{8} - \frac{3}{16}x + \frac{3}{16}x^2$	A1	1.1	Obtain correct third term	Possibly unsimplified
				B1FT	1.1	Multiply their three term expansion by $\frac{1}{8}$	Bracket expanded and coefficients simplified Terms could be listed or summed If B1M1A1 awarded, but attempt to simplify then goes wrong, B1FT is not also awarded ISW once correct expansion seen
				[4]			
8	(b)		$(1+4x)^{\frac{1}{2}} = 1 + (\frac{1}{2})(4x) + \frac{(\frac{1}{2})(-\frac{1}{2})}{2}(4x)^2$	M1	3.1a	Attempt expansion of $(1+4x)^{\frac{1}{2}}$	To obtain $1 + 2x + kx^2$ (allow unsimplified)
			$= 1 + 2x - 2x^2$	A1	1.1	Obtain correct, simplified, expansion	Ignore any terms beyond x^2
			$(1 + 2x - 2x^2)(\frac{1}{8} - \frac{3}{16}x + \frac{3}{16}x^2)$ $= \frac{1}{8} - \frac{3}{16}x + \frac{3}{16}x^2 + \frac{1}{4}x - \frac{3}{8}x^2 - \frac{1}{4}x^2$	M1	1.1	Attempt product of their two expansions ie their answer to (a) and their attempt at $(1+4x)^{\frac{1}{2}}$ 'Hence' so M0 for division attempts	To obtain attempts at the six relevant terms (ie 1 constant term, 2 terms in x and 3 terms in x^2 , but not necessarily all correct) Ignore higher powers
			$\frac{1}{8} + \frac{1}{16}x - \frac{7}{16}x^2$	A1	1.1	Obtain correct three terms	Terms could be listed or summed
				[4]			

Question			Answer	Marks	AO	Guidance	
8	(c)		$(1 + \frac{1}{2}x)^{-3}$ requires $ \frac{1}{2}x < 1$ hence $ x < 2$ $(1 + 4x)^{\frac{1}{2}}$ requires $ 4x < 1$ hence $ x < \frac{1}{4}$	B1*	2.5	Both conditions correct oe eg $-2 < x < 2$ and $-\frac{1}{4} < x < \frac{1}{4}$	Allow $ \frac{1}{2}x < 1$ and/or $ 4x < 1$ oe ie conditions on $ kx $ not $ x $ $ x < \frac{1}{4}$ could also be $ x \leq \frac{1}{4}$ oe, as $n > 0$
		Select tighter condition, hence $ x < \frac{1}{4}$	B1dep*	2.3	Correct conclusion; reason needed that identifies that $ x < \frac{1}{4}$ is contained within $ x < 2$ eg $ x < \frac{1}{4}$ is a subset of $ x < 2$ eg nested interval eg $\frac{1}{4} < 2$	Must now be $ x < \frac{1}{4}$ not $ 4x < 1$ B0 for vague statements such as ‘so that both are valid’ without any further clarification Or $ x \leq \frac{1}{4}$	
				[2]			