Question Number	Scheme	Marks
1	$(8+32x)^{\frac{1}{3}} = 8^{\frac{1}{3}}(1+4x)^{\frac{1}{3}}$	B1
	$(1+4x)^{\frac{1}{3}} = 1+\left(\frac{1}{3}\right)(4x)+\frac{\frac{1}{3}\left(\frac{1}{3}-1\right)}{2!}(4x)^2+\frac{\frac{1}{3}\left(\frac{1}{3}-1\right)\left(\frac{1}{3}-2\right)}{3!}(4x)^3+\ldots$	M1A1
	$(8+32x)^{\frac{1}{3}} = 2+\frac{8}{3}x-\frac{32}{9}x^2+\frac{640}{81}x^3+\ldots$	A1
		(4)
		Total 4

Notes

B1: For taking out a factor of $8^{\frac{1}{3}}$ or e.g. 2 to obtain e.g. $8^{\frac{1}{3}}(1+\ldots)$. Seen anywhere in their work

M1: Correct attempt at the 3rd or 4th term of a binomial expansion of $(1\pm ax)^{\frac{1}{3}}$

Look for $\frac{\frac{1}{3}\left(\frac{1}{3}-1\right)}{2}(\pm ax)^2$ or $\frac{\frac{1}{3}\left(\frac{1}{3}-1\right)\left(\frac{1}{3}-2\right)}{3!}(\pm ax)^3$ where *a* could be 1

For this mark we are looking for the correct binomial coefficient paired with the correct power of *x*

A1: Correct unsimplified (or simplified) expansion of the **bracket** e.g.:

$$(1+4x)^{\frac{1}{3}} = 1+\left(\frac{1}{3}\right)(4x)+\frac{\frac{1}{3}\left(\frac{1}{3}-1\right)}{2!}(4x)^2+\frac{\frac{1}{3}\left(\frac{1}{3}-1\right)\left(\frac{1}{3}-2\right)}{3!}(4x)^3+\ldots$$

NB simplified is: $1+\frac{4}{3}x-\frac{16}{9}x^2+\frac{320}{81}x^3+\ldots$

or for 2 correct simplified terms for the final expansion from $\frac{8}{3}x-\frac{32}{9}x^2+\frac{640}{81}x^3$

A1cao: $2+\frac{8}{3}x-\frac{32}{9}x^2+\frac{640}{81}x^3+\ldots$

All coefficients must be simplified, accept as a list and ignore any extra terms

Alternative by direct expansion:

$$(8+32x)^{\frac{1}{3}} = 8^{\frac{1}{3}}+\frac{1}{3}\left(8^{-\frac{2}{3}}\right)(32x)+\frac{\frac{1}{3}\left(-\frac{2}{3}\right)}{2}\left(8^{-\frac{5}{3}}\right)(32x)^2+\frac{\frac{1}{3}\left(-\frac{2}{3}\right)\left(-\frac{5}{3}\right)}{6}\left(8^{-\frac{8}{3}}\right)(32x)^3+\ldots$$