

	Marking Instructions	AO	Marks	Typical Solution
5(a)	Uses binomial expansion, with at least two terms correct, may be un-simplified	AO1.1a	M1	$(1+6x)^{\frac{1}{3}} \approx 1 + \frac{1}{3} \cdot 6x + \frac{1}{3} \cdot \frac{-2}{3} \cdot \frac{(6x)^2}{2}$
	Obtains correct simplified answer	AO1.1b	A1	$(1+6x)^{\frac{1}{3}} \approx 1 + 2x - 4x^2$
(b)	Determines the correct value for x and substitutes this into 'their' answer to part (a)	AO3.1a	M1	$x = 0.03$
	Obtains correct approximation for 'their' answer to part (a) FT allowed only if M1 from part (a) and M1 from part (b) have been awarded	AO1.1b	A1F	$\sqrt[3]{1.18} \approx 1 + 2(0.03) - 4(0.03)^2$ ≈ 1.0564
(c)	Explains the limitation of the expansion found in part (a) with reference to $x = \frac{1}{2}$	AO2.4	E1	Although $\left(1 + 6 \times \frac{1}{2}\right)^{\frac{1}{3}} = \sqrt[3]{4}$ $x = \frac{1}{2}$ cannot be used since the expansion is only valid for $ x < \frac{1}{6}$
	Total		5	