Question Number	Scheme	Notes	Marks
1(a)	$\left(2-\frac{x}{4}\right)^{10}=2^{10}+\binom{10}{1}2^9\left(-\frac{x}{4}\right)+\binom{10}{2}2^8\left(-\frac{x}{4}\right)^2+\binom{10}{3}2^7\left(-\frac{x}{4}\right)^3+\ldots$ Attempts the binomial expansion to get the third and/or fourth term with an acceptable structure. The correct binomial coefficient must be combined with the correct power of $\frac{x}{4}$ and the correct power of 2 but condone omission of brackets. You can ignore the signs between the terms and allow the terms to be listed. Allow for e.g. $\pm\binom{10}{2}2^8\left(\pm\frac{x}{4}\right)^2$ or $\pm{}^{10}C_3 2^7\left(\pm\frac{x}{4}\right)^3$ but condone omission of brackets. NB ${}^{10}C_2=45,\ {}^{10}C_3=120$ NB ${}^{10}C_2={}^{10}C_8$ and ${}^{10}C_3={}^{10}C_7$ **Alternative:** $\left(2-\frac{x}{4}\right)^{10}=2^{10}\left(1-\frac{x}{8}\right)^{10}=2^{10}\left(1-\frac{10x}{8}+\frac{10\times9}{2}\left(-\frac{x}{8}\right)^2+\frac{10\times9\times8}{3!}\left(-\frac{x}{8}\right)^3+\ldots\right)$ Score M1 for $2^{10}\left(\ldots\pm\frac{10\times9}{2}\left(-\frac{x}{8}\right)^2+\ldots\right)$ or $2^{10}\left(\ldots\pm\frac{10\times9\times8}{3!}\left(-\frac{x}{8}\right)^3+\ldots\right)$		M1
	$=1024-1280x+720x^2-240x^3$	$1024-1280x$	B1
		$720x^2$ **or** $-240x^3$	A1
		$720x^2$ **and** $-240x^3$	A1
	Note that if any of the "–"'s are "+ –"'s then penalise once on the first occurrence		
	Allow the terms to be listed e.g. $1024,-1280x,720x^2,-240x^3$ Apply isw once a correct answer is seen. Ignore any extra terms		
			(4)
(b)	$\left(3-\frac{1}{x}\right)^2=9-\frac{6}{x}+\frac{1}{x^2}$ or $9-\frac{3}{x}-\frac{3}{x}+\frac{1}{x^2}$	Correct expansion. May be implied by their work to find the constant.	B1
	$\left(3-\frac{1}{x}\right)^2\left(2-\frac{x}{4}\right)^{10}=\left(9-\frac{6}{x}+\frac{1}{x^2}\right)\left(1024-1280x+720x^2\left(-240x^3\right)+\ldots\right)$ constant term $=9\times1024-\frac{6}{x}\left(-1280x\right)+\frac{1}{x^2}720x^2$ This mark depends on having obtained an expression of the form $A+\frac{B}{x}+\frac{C}{x^2}$ for $\left(3-\frac{1}{x}\right)^2$ and at least a 3-term quadratic expression from part (a) so award for: $A\times"1024"+B\times"-1280"+C\times"720"$ A, B, C non-zero. Allow 1 sign error on their values. May be seen as part of a complete expansion but there must be an attempt to calculate the value of the constant term with the above conditions. For reference, true value calculation is: 9216 + 7680 + 720		M1
	= 17616	Correct value. Must be "extracted" if a complete expansion is found above.	A1
			(3)
			Total 7