Question	Scheme	Marks	AOs
14	Attempts the term in x^3 or the term in x^5 of $\left(3-\frac{1}{2}x\right)^6$ Look for ${}^6C_3 3^3\left(-\frac{1}{2}x\right)^3$ or ${}^6C_5 3^1\left(-\frac{1}{2}x\right)^5$	M1	3.1a
	Correct term in x^3 or correct term in x^5 of $\left(3-\frac{1}{2}x\right)^6$ $-\frac{135}{2}x^3$ **or** $-\frac{9}{16}x^5$	A1	1.1b
	Attempts one of the required terms in x^5 of $\left(5+8x^2\right)\left(3-\frac{1}{2}x\right)^6$ Either $5\times {}^6C_5 3^1\left(-\frac{1}{2}x\right)^5$ **or** $8x^2\times {}^6C_3 3^3\left(-\frac{1}{2}x\right)^3$	M1	1.1b
	Attempts the sum of $5\times {}^6C_5 3^1\left(-\frac{1}{2}x\right)^5$ and $8x^2\times {}^6C_3 3^3\left(-\frac{1}{2}x\right)^3$	dM1	2.1
	Coefficient of x^5 $=-\frac{45}{16}-540=-\frac{8685}{16}$	A1	1.1b
		(5)	
			(5 marks)

Notes:

M1: For the key step in attempting to find one of the required terms in the expansion of $\left(3-\frac{1}{2}x\right)^6$ to enable the problem to be solved.

Look for ${}^6C_3 3^3\left(-\frac{1}{2}x\right)^3$ **or** ${}^6C_5 3^1\left(-\frac{1}{2}x\right)$ but condone missing brackets and slips in signs.

May be part of a complete expansion but only one of the required terms needs to be of the correct form.

A1: For $-\frac{135}{2}\left\{x^3\right\}$ **or** $-\frac{9}{16}\left\{x^5\right\}$ which may be unsimplified but the ${}^6C_3$ or ${}^6C_5$ must be processed. May be implied by $-540\left\{x^5\right\}$ **or** $-\frac{45}{16}\left\{x^5\right\}$

M1: Attempts one of the required terms in x^5 of the expansion of $\left(5+8x^2\right)\left(3-\frac{1}{2}x\right)^6$

Look for $5\times {}^6C_5 3^1\left(-\frac{1}{2}x\right)^5$ **or** $8x^2\times {}^6C_3 3^3\left(-\frac{1}{2}x\right)^3$ which would also imply the previous M.

The x^5 may be missing as just the coefficient is required.

May be implied by $-540\left\{x^5\right\}$ **or** $-\frac{45}{16}\left\{x^5\right\}$

Condone missing brackets and signs.

You might see candidates make a slip in, e.g., their binomial coefficients, but have an (essentially) correct method to solve the problem.

Note that this M mark is not dependent on the first, so you may be able to award it even if they have made a slip in finding their x^3 or x^5 term in the expansion.

dM1: Attempts the sum of $5\times {}^6C_5 3^1\left(-\frac{1}{2}x\right)^5$ and $8x^2\times {}^6C_3 3^3\left(-\frac{1}{2}x\right)^3$

Dependent on the previous M but may be scored at the same time.

The x^5 may be missing as just the coefficients are required.

Condone missing brackets and signs.

A1: $-\frac{8685}{16}$ or exact equivalent, -542.8125 and apply isw

Condone $-\frac{8685}{16}x^5$ for A1

Note that rounded decimals, e.g., -542.81 will not score the last mark.

Note that full marks can be scored for concise solutions such as:

$$5\times {}^6C_5\times 3\times\left(-\frac{1}{2}\right)^5 \quad + \quad 8\times {}^6C_3\times 3^3\times\left(-\frac{1}{2}\right)^3 \quad = -\frac{8685}{16}$$

Alternative

Attempts via the taking out of the common factor can be scored in the same way.

$$\left(3-\frac{1}{2}x\right)^6 = 3^6\left\{1+6\times\left(-\frac{1}{6}x\right)^1+\frac{6\times5}{2}\left(-\frac{1}{6}x\right)^2+\frac{6\times5\times4}{3!}\left(-\frac{1}{6}x\right)^3+\frac{6\times5\times4\times3}{4!}\left(-\frac{1}{6}x\right)^4+\frac{6\times5\times4\times3\times2}{5!}\left(-\frac{1}{6}x\right)^5+\left(-\frac{1}{6}x\right)^6\right\}$$

For M1 A1 look for $3^6\times\frac{6\times5\times4}{3!}\left(-\frac{1}{6}x\right)^3$ **or** $3^6\times\frac{6\times5\times4\times3\times2}{5!}\left(-\frac{1}{6}x\right)^5$

Score the remaining marks as per the main scheme.