Question	Scheme	Marks	AOs
8	$4^{\frac{5}{2}}$ or 32	B1	1.1b
	$\left(1-"\frac{7x}{4}"\right)^{\frac{5}{2}}=...+\frac{\frac{5}{2}\times\left(\frac{3}{2}\right)\left("-\frac{7x}{4}"\right)^2}{2!}$ or $...+\frac{\frac{5}{2}\times\left(\frac{3}{2}\right)\times\left(\frac{1}{2}\right)\left("-\frac{7x}{4}"\right)^3}{3!}$	M1	1.1b
	$1+\frac{5}{2}\times\left(-\frac{7x}{4}\right)+\frac{\frac{5}{2}\times\left(\frac{3}{2}\right)\left(-\frac{7x}{4}\right)^2}{2!}+\frac{\frac{5}{2}\times\left(\frac{3}{2}\right)\times\left(\frac{1}{2}\right)\left(-\frac{7x}{4}\right)^3}{3!}$	A1	1.1b
	$(4-7x)^{\frac{5}{2}}=32-140x+\frac{735x^2}{4}-\frac{1715x^3}{32}$	A1	1.1b
		(4)	
			(4 marks)

Notes:

B1: Takes out a factor of 4 and writes $(4-7x)^{\frac{5}{2}}=32(1\pm...)^{\frac{5}{2}}$ or $2^{\frac{5}{2}}(1\pm...)^{\frac{5}{2}}$ or $\sqrt{4}^5(1\pm...)^{\frac{5}{2}}$

M1: For an attempt at the binomial expansion of $(1+ax)^{\frac{5}{2}}$ $a\neq 1$ to form term 3 or term 4 with the correct structure.

Look for the correct binomial coefficient multiplied by the corresponding power of x e.g.

$\frac{\left(\frac{5}{2}\right)\left(\frac{5}{2}-1\right)}{2!}(...x)^2$ **or** $\frac{\left(\frac{5}{2}\right)\left(\frac{5}{2}-1\right)\left(\frac{5}{2}-2\right)}{3!}(...x)^3$ where $...\neq 1$.

Condone missing or incorrect brackets around the x terms but the binomial coefficients must be correct. Allow 2! and/or 3! or 2 and/or 6. Ignore attempts to find more terms.

A1: Correct expression for the expansion of $\left(1-\frac{7x}{4}\right)^{\frac{5}{2}}$ e.g.

$$1+\frac{5}{2}\times\left(-\frac{7x}{4}\right)+\frac{\frac{5}{2}\times\left(\frac{3}{2}\right)\left(-\frac{7x}{4}\right)^2}{2!}+\frac{\frac{5}{2}\times\left(\frac{3}{2}\right)\times\left(\frac{1}{2}\right)\left(-\frac{7x}{4}\right)^3}{3!}$$

which may be left unsimplified as shown but the bracketing must be correct unless any missing brackets are implied by subsequent work. If the 2 outside this expansion is only partially applied to this expansion then score A0 but if it is applied to all terms this A1 can be implied.

OR at least 2 correct simplified terms **for the final expansion** from,

$-140x$, $\frac{735x^2}{4}$, $-\frac{1715x^3}{32}$

A1: $(4-7x)^{\frac{5}{2}}=32-140x+\frac{735x^2}{4}-\frac{1715x^3}{32}$ oe

Allow equivalent mixed numbers and/or decimals for the coefficients.

Ignore any extra terms if found. Allow terms to be "listed" and apply isw once a correct expansion is seen. Allow recovery if applicable e.g. if an "x" is lost then "reappears".

Direct expansion in (a) can be marked in a similar way:

$$(4-7x)^{\frac{5}{2}} = 4^{\frac{5}{2}} + \left(\frac{5}{2}\right)4^{\frac{3}{2}} \times (-7x)^1 + \left(\frac{5}{2}\right)\left(\frac{5}{2}-1\right)4^{\frac{1}{2}} \times \frac{(-7x)^2}{2!} + \left(\frac{5}{2}\right)\left(\frac{5}{2}-1\right)\left(\frac{5}{2}-2\right)4^{-\frac{1}{2}} \times \frac{(-7x)^3}{3!}$$

B1: For 32 or $\sqrt{4}^5$ or $4^{\frac{5}{2}}$ as the constant term in the expansion.

M1: Correct form for term 3 or term 4.

E.g. $\left(\frac{5}{2}\right)\left(\frac{3}{2}\right) \times \frac{(...x)^2}{2!}$ or $\left(\frac{5}{2}\right)\left(\frac{3}{2}\right)\left(\frac{1}{2}\right) \times \frac{(...x)^3}{3!}$ where $...\neq 1$

Condone missing brackets around the *x* terms but the binomial coefficients must be correct.
Allow 2! and/or 3! or 2 and/or 6. Ignore attempts to find more terms.

Do not allow notation such as $\left(\frac{1}{2}\right)$, $\left(\frac{1}{2}\right)$ unless these are interpreted correctly.

A1: Correct expansion (unsimplified as above)

OR at least 2 correct simplified terms from, $-140x$, $\frac{735x^2}{4}$, $-\frac{1715x^3}{32}$

A1: $(4-7x)^{\frac{5}{2}} = 32 - 140x + \frac{735x^2}{4} - \frac{1715x^3}{32}$ oe