Question Number	Scheme	Marks
2.	$\left(2-\frac{x}{2}\right)^6 = 2^6 + \binom{6}{1}2^5.\left(-\frac{x}{2}\right) + \binom{6}{2}2^4.\left(-\frac{x}{2}\right)^2 + \ldots$ $= 64 - 96x + 60x^2 + \ldots$	M1 B1A1A1 **(4)**
		(4 marks)

Note that a correct expression scores 4/4

M1: An attempt at the binomial expansion to get the second and/or third term – needs the **correct** binomial coefficient combined with the correct power of x.

Accept any notation for ${}^6C_1$ and ${}^6C_2$, e.g. $\binom{6}{1}$ and $\binom{6}{2}$ (unsimplified) or 6 and 15 from Pascal's triangle. May be implied by either term correct (which may be unsimplified).

Alternatively $\left(2-\frac{x}{2}\right)^6 = 2^6\left(1-\frac{x}{4}\right)^6 \Rightarrow 2^6 \times 6\left(-\frac{x}{4}\right)$ or $2^6 \times \frac{6\times 5}{2!}\left(-\frac{x}{4}\right)^2$

(You only need to look for the correct binomial coefficient combined with the correct power of x.)

In either approach condone bracket errors/invisible brackets for this mark.

B1: 64 (writing just 2^6 is B0).

A1: One of $-96x$ or $60x^2$ Condone $-96x^1$ Must be simplified.

A1: $-96x$ and $60x^2$ (can follow omission of negative sign in working). Condone $+-96x$ if it was part of an expression (not just an isolated term in a list). Must be simplified.

Note: Terms do not need to be written as a polynomial expression. They may appear as a list or appear on different lines. isw once the correct simplified terms have been found unless they divide all terms by e.g. 4

Question Number	Scheme	Marks
3 (a)	States $h = 3$, or use of $\frac{1}{2}\times 3$	B1
	$\left\{8.485 + 1.100 + 2\left(2.502 + 1.524\right)\right\}$	M1
	$= \frac{1}{2}\times 3 \times \left\{17.637\right\} =$ awrt 26.46	A1
		(3)
(b)	Either adds 9 or halves their answer from part (a)	M1
	Full attempt using a correct method Estimate = 9 + 13.23 = awrt 22.2	dM1A1ft
		(3)
		(6 marks)

(a)Note using the integration button on the calculator gives 22.307… and is unlikely to score any marks.

B1: for using $\frac{1}{2}\times 3$ or 1.5 or equivalent (allow for sight of a correct calculation or expression for h) or just states $h = 3$

M1: requires the correct $\{.....\}$ bracket structure. It typically requires

- the "outside" brackets to contain first y value plus last y value and the "inside" bracket
- the "inside" bracket needs to be multiplied by 2 and to be the summation of the remaining y values in the table with no additional values.

If the only mistake is a copying error this may be regarded as a slip and the M mark can be allowed

Condone a missing trailing bracket and condone invisible brackets if the correct structure is implied by their answer.

M0 if values used in brackets are x values instead of y values

May attempt separate trapezia which is acceptable condoning a copying error only.

A1: awrt 26.46 after attempt at trapezium rule. isw

(b) Note using the integration button on the calculator gives 20.153623… with no working scores M0dM0A0
Attempts at using the trapezium rule instead of the answer to part (a) scores M0dM0A0

M1: Correct attempt at one aspect of the integral.

Either 9 +…. or calculates ½ of their answer to part (a) . Allow $11-2$ for 9.