

Question number	Scheme	Marks
5 a	$(2+3x)^{-1} = \frac{1}{2} \left(1 + \frac{3}{2}x \right)^{-1}$ so $p = \frac{1}{2}$ and $q = \frac{3}{2}$ oe	B1 B1 (2)
b	$\left(\frac{1}{2} \right) \left[1 + (-1) \left(\frac{3}{2}x \right) + \frac{(-1)(-2)}{2!} \left(\frac{3}{2}x \right)^2 + \frac{(-1)(-2)(-3)}{3!} \left(\frac{3}{2}x \right)^3 + \dots \right]$ $\frac{1}{2} - \frac{3}{4}x + \frac{9}{8}x^2 - \frac{27}{16}x^3 + \dots$	M1 A1ft A1 (3)
c	$\frac{1}{2} - \frac{3}{4}x + \frac{9}{8}x^2 - \frac{27}{16}x^3 + \frac{1}{2}x - \frac{3}{4}x^2 + \frac{9}{8}x^3 + \dots$ $\frac{1}{2} - \frac{1}{4}x + \frac{3}{8}x^2 - \frac{9}{16}x^3$	M1 A1 (2)
d	$\int_0^{0.5} \left(\frac{1}{2} - \frac{1}{4}x + \frac{3}{8}x^2 - \frac{9}{16}x^3 \right) dx = \frac{1}{2}x - \frac{1}{8}x^2 + \frac{1}{8}x^3 - \frac{9}{64}x^4$ $\frac{1}{2} \left(\frac{1}{2} \right) - \frac{1}{8} \left(\frac{1}{2} \right)^2 + \frac{1}{8} \left(\frac{1}{2} \right)^3 - \frac{9}{64} \left(\frac{1}{2} \right)^4 = 0.2256 \text{ for awrt } 0.2256$	M1 A1 M1 A1 (4)
Total 11 marks		

Part	Marks	Notes
(a)	B1	For $p = \frac{1}{2}$ or 2^{-1} or $q = \frac{3}{2}$
	B1	For $p = \frac{1}{2}$ or 2^{-1} and $q = \frac{3}{2}$
		NB $\frac{1}{2}\left(1 + \frac{3}{2}x\right)^{-1}$ scores B1 B1
(b)	M1	For an attempt to expand $(1 + qx)^{-1}$ with their value of q up to the term in x^3 It is not necessary to see p at this stage. The definition of an attempt is as follows: <ul style="list-style-type: none"> • The first term must be 1 • The next term must be correct for their value of q • The powers of qx must be correct eg $(qx)^2$ • The denominators must be correct Simplification not required. Do not allow missing brackets unless recovered later – this is a general point of marking.
	A1ft	For at least 3 terms fully correct and unsimplified for their value of q . It is not necessary to see p at this point.
	A1	For all 4 terms correct, all simplified.
		If there are any other methods used – send this to review please.
(c)	M1	For multiplying their expansion by $(1 + x)$ There must be a clear attempt to multiply to get 7 terms, allow up to 2 errors. Ignore terms with powers higher than 3.
	A1	For all 4 terms correct, ignore terms with powers higher than 3.
(d)	M1	For a minimally acceptable attempt to integrate an expression with at least 3 terms, which must include a term in x^3 See general guidance for definition of minimally acceptable attempt.
	A1ft	For a fully correct integration of their expression (defined as above for the M mark).
	M1	For substitution of limits into a changed expression, the correct way round – this can be implied if the final answer is correct. We don't need to see 0 substituted in.
	A1	For awrt 0.2256 (Note the calculator value is 0.2288461.....)