

Question Number	Scheme	Marks
5. (a)	$\frac{1}{\sqrt{4-x}} = \frac{1}{2} \left(1 - \frac{x}{4}\right)^{-\frac{1}{2}} \quad p = \frac{1}{2}, q = \frac{1}{4}$	B1B1 (2)
(b)	<p>(i)</p> $\left(1 - \frac{x}{4}\right)^{-\frac{1}{2}} = \left\{1 + \left(\frac{-1}{2}\right)\left(\frac{-x}{4}\right) + \frac{\left(\frac{-1}{2}\right)\left(\frac{-3}{2}\right)\left(\frac{-x}{4}\right)^2}{2!} + \frac{\left(\frac{-1}{2}\right)\left(\frac{-3}{2}\right)\left(\frac{-5}{2}\right)\left(\frac{-x}{4}\right)^3}{3!} + \dots\right\}$ $\frac{1}{2} \left(1 - \frac{x}{4}\right)^{-\frac{1}{2}} = \frac{1}{2} + \frac{x}{16} + \frac{3x^2}{256} + \frac{5x^3}{2048}$ <p>(ii)</p> <p>Range $-4 < x < 4$ or $x < 4$</p>	M1A1 A1
(c)	$2(1+x)\left(\frac{1}{2} + \frac{x}{16} + \frac{3x^2}{256}\right) = 1 + \frac{9x}{8} + \frac{19x^2}{128} + \dots$ <p>(i) $a = 1$, (ii) $b = \frac{9}{8}$, (iii) $c = \frac{19}{128}$</p>	M1,M1A1 (3)
		(9)

Notes

(a)

B1 for either $p = \frac{1}{2}$ or $q = \frac{1}{4}$ B1 for both $p = \frac{1}{2}$ and $q = \frac{1}{4}$

(b) (i)

The M1 and first A1 in this part are for the binomial expansion. Ignore p for the first 2 marks

M1 for using a **binomial** expansion at least up to the term in x^3 . If there are errors in substitution, withhold this mark if the formula is not seen. Each term, must have at least, the correct power of their $\left(\frac{-x}{4}\right)$. The expansion must start with 1.

A1 for a fully correct **binomial** expansion. Need not be simplified for this mark.A1 for a fully correct simplified expansion with correct p and q .

(ii)

B1 for the correct validity range of x

(c)

M1 for replacing the fraction with their binomial expansion

$$2(1+x)\left(\frac{1}{2} + \frac{x}{16} + \frac{3x^2}{256} + \dots\right) = 2\left[\frac{1}{2} + \frac{x}{16} + \frac{3x^2}{256} + \frac{x}{2} + \frac{x^2}{16} + \frac{3x^3}{256} + \dots\right]$$

Up to the term in x^2 there will be 5 terms un-simplified.M1 **This is A1 in Epen**for attempting to multiply their binomial expansion by $2(1+x)$ We need to see 5 terms here minimum; ignore powers of x^3 and above.A1 for a correct expansion with correct values of a , b and c . The values of a , b and c need not be shown explicitly, they can be embedded in the expansion.