

Cambridge International AS & A Level

Mathematics

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Paper 3 Pure Mathematics 3

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Question No (2)

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Question No (2)

(a) Expand $(6-x)(1-2x)^{-\frac{3}{2}}$ in ascending powers of x , up to and including the term in x^2 , simplifying the coefficients.

(b) State the set of values of x for which the expansion is valid.

Solution:

DATE :-

$$(6-x)(1-2x)^{-\frac{3}{2}}$$

Binomial Expansion

$$(1+x)^n = 1 + nx + \frac{n(n-1)}{2!}x^2 + \dots$$

$$(6-x) \left[1 + \left(-\frac{3}{2}\right)(-2x) + \frac{\left(-\frac{3}{2}\right)\left(-\frac{3}{2}-1\right)}{2!}(-2x)^2 \right]$$

$$(6-x) \left[1 + 3x + \frac{3}{4} \times \frac{5}{2} 4x^2 \right]$$

$$(6-x) \left[1 + 3x + \frac{15}{2} x^2 \right]$$

$$6 + 18x + 45x^2 - x - 3x^2 - \frac{15}{2}x^3$$

$$6 + 17x + 42x^2$$

(b)

Expansion is valid for

$$-\frac{1}{2} < x < \frac{1}{2}$$

$\therefore$ -ve value
in square
root is not
valid.

