BINOMIAL EXPANSION

A2 Unit 3: Pure Mathematics B

WJEC past paper questions: 2008 – 2017

Total marks available 56 (approximately 1 hour 10 minutes)

1. Expand $\frac{1+3x}{\sqrt{1-2x}}$ in ascending powers of x up to and including the term in x^2. State the range of x for which the expansion is valid. [5]

(Summer 08)

2. Expand $(1+4x)^{\frac{1}{2}}$ in ascending powers of x as far as the term in x^2. State the range of values of x for which your expansion is valid.
Expand $(1+4k+16k^2)^{\frac{1}{2}}$ in ascending powers of k as far as the term in k^2. [6]

(Summer 09)

3. Expand $\left(1-\frac{x}{4}\right)^{\frac{1}{2}}$ in ascending powers of x up to and including the term in x^2.
State the range of values of x for which your expansion is valid.
Hence, by writing $x = 1$ in your expansion, show that
$$\sqrt{3} \approx \frac{111}{64}.$$ [5]

(Summer 10)

4. Expand $4(1+2x)^{\frac{1}{2}} - \frac{1}{(1+3x)^2}$ in ascending powers of x up to and including the term in x^2.
State the range of values of x for which your expansion is valid. [7]

(Summer 11)

5. Expand $\left(1+\frac{x}{3}\right)^{-\frac{1}{2}}$ in ascending powers of x up to and including the term in x^2.
State the range of values of x for which your expansion is valid.
Hence, by writing $x = \frac{1}{5}$ in your expansion, find an approximate value for $\sqrt{15}$ in the form $\frac{a}{b}$, where a and b are integers whose values are to be found. [5]

(Summer 12)

6.

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

(ii) State the range of values of x for which your expansion is valid. [3]

(b) Use your expansion in part *(a)* to find an approximate value for one root of the equation

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

(Summer 13)

7. Expand

$$6\sqrt{1-2x} - \frac{1}{1+4x}$$

in ascending powers of x up to and including the term in x^2.
State the range of values of x for which your expansion is valid. [7]

(Summer 14)

8.

Expand $\left(1+\frac{x}{8}\right)^{-\frac{1}{2}}$ in ascending powers of x up to and including the term in x^2.

State the range of values of x for which your expansion is valid.
Hence, by writing $x = 1$ in your expansion, find an approximate value for $\sqrt{2}$ in the form $\frac{a}{b}$, where a and b are integers whose values are to be found. [5]

(Summer 15)

9.

(a) (i) Expand $\frac{1}{\sqrt{1+2x}}$ in ascending powers of x up to and including the term in x^2.

(ii) State the range of values of x for which your expansion is valid. [3]

(b) Use your expansion in part *(a)* to find an approximate value for one root of the equation

$$\frac{6}{\sqrt{1+2x}} = 4+15x-x^2.$$ [2]

(Summer 16)

10.

(a) Expand $(1+4x)^{-\frac{1}{2}}$ in ascending powers of x up to and including the term in x^2. State the range of values of x for which your expansion is valid. [3]

(b) Use your answer to part *(a)* to expand $(1+4y+8y^2)^{-\frac{1}{2}}$ in ascending powers of y up to and including the term in y^2. [3]

(Summer 17)