Binomial Expansion (Integer Powers) Worksheet

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Topic tags have been given for each question to enable you to know if you can do the question or whether you need to wait to cover the additional topic(s).

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7. (a) Find the first 3 terms, in ascending powers of x, of the binomial expansion of $\left(2-\frac{x}{2}\right)^7$, giving each term in its simplest form.

(4)

(b) Explain how you would use your expansion to give an estimate for the value of 1.995^7

(1)

Qualification: AS-Level Edexcel
Areas: Binomial Expansion
Subtopics: Binomial Expansion - Single Brackets, Binomial Expansion - Estimations, Approximation
Paper: Paper-1-Pure / Series: 2019-June / Difficulty: Easy / Question Number: 8

8. (a) Find the first 3 terms, in ascending powers of x, of the binomial expansion of

$$\left(2+\frac{3x}{4}\right)^6$$

giving each term in its simplest form.

(4)

(b) Explain how you could use your expansion to estimate the value of 1.925^6
You do not need to perform the calculation.

(1)

6. The binomial expansion of

$$(1 + ax)^{12}$$

up to and including the term in x^2 is

$$1 - \frac{15}{2}x + kx^2$$

where a and k are constants.

(a) Show that $a = -\frac{5}{8}$

(2)

(b) Hence find the value of k

(2)

Using the expansion and making your method clear,

(c) find an estimate for the value of $\left(\frac{17}{16}\right)^{12}$, giving your answer to 4 decimal places.

(2)

4. In the binomial expansion of

$$(a + 2x)^7 \qquad \text{where } a \text{ is a constant}$$

the coefficient of x^4 is 15 120

Find the value of a.

(3)

Qualification: AS-Level Edexcel

Areas: Binomial Expansion

Subtopics: Binomial Expansion - Double Brackets

Paper: Paper-1-Pure / Series: 2023-June / Difficulty: Somewhat Challenging / Question Number: 14

14. Find, in simplest form, the coefficient of x^5 in the expansion of

$$\left(5+8x^2\right)\left(3-\frac{1}{2}x\right)^6$$

(5)

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Areas: Binomial Expansion

Subtopics: Binomial Expansion - Single Brackets, Binomial Expansion - Double Brackets

Paper: Paper-1-Pure / Series: 2022-June / Difficulty: Somewhat Challenging / Question Number: 6

6. (a) Find the first 4 terms, in ascending powers of x, of the binomial expansion of

$$\left(3-\frac{2x}{9}\right)^8$$

giving each term in simplest form.

(4)

$$\mathrm{f}(x)=\left(\frac{x-1}{2x}\right)\left(3-\frac{2x}{9}\right)^8$$

(b) Find the coefficient of x^2 in the series expansion of $\mathrm{f}(x)$, giving your answer as a simplified fraction.

(2)

7. (a) Expand $\left(1+\frac{3}{x}\right)^2$ simplifying each term.

(2)

(b) Use the binomial expansion to find, in ascending powers of x, the first four terms in the expansion of

$$\left(1+\frac{3}{4}x\right)^6$$

simplifying each term.

(4)

(c) Hence find the coefficient of x in the expansion of

$$\left(1+\frac{3}{x}\right)^2\left(1+\frac{3}{4}x\right)^6$$

(2)

6. (a) Find the first 4 terms, in ascending powers of x, in the binomial expansion of

$$(1 + kx)^{10}$$

where k is a non-zero constant. Write each coefficient as simply as possible.

(3)

Given that in the expansion of $(1 + kx)^{10}$ the coefficient x^3 is 3 times the coefficient of x,

(b) find the possible values of k.

(3)

11. (a) Find the first 3 terms, in ascending powers of x, of the binomial expansion of

$$\left(2 - \frac{x}{16}\right)^9$$

giving each term in its simplest form.

(4)

$$f(x) = (a + bx)\left(2 - \frac{x}{16}\right)^9$$, where a and b are constants

Given that the first two terms, in ascending powers of x, in the series expansion of $f(x)$ are 128 and $36x$,

(b) find the value of a,

(2)

(c) find the value of b.

(2)

8. $g(x) = (2 + ax)^8$ where a is a constant

Given that one of the terms in the binomial expansion of $g(x)$ is $3402x^5$

(a) find the value of a.

(4)

Using this value of a,

(b) find the constant term in the expansion of

$$\left(1 + \frac{1}{x^4}\right)(2 + ax)^8$$

(3)