

Pearson Edexcel

A Level Mathematics 9MA0

Unit Test

5 Binomial Theorem

Time allowed: 50 minutes

School:

Name:

Teacher:

Question	Points	Score
1	10	
2	6	
3	9	
4	12	
5	13	
Total:	50	



1. (a) Find the binomial expansion of $\frac{1+x}{\sqrt{1-2x}}$ in ascending powers of x up to and including the x^2 term, simplifying each term. [4]
- (b) State the set of values of x for which the expansion is valid. [1]
- (c) Show that when $x = \frac{1}{100}$, the exact value of $\frac{1+x}{\sqrt{1-2x}}$ is $\frac{101\sqrt{2}}{140}$. [2]
- (d) Substitute $x = \frac{1}{100}$ into the binomial expansion in part (a) and hence obtain an approximation to $\sqrt{2}$. Give your answer to 5 decimal places. [3]

Total: 10



2. Given that in the expansion of $\frac{1}{(1+ax)^2}$, the coefficient of the x^2 term is 75 find:

(a) the possible values of a , [4]

(b) the corresponding coefficients of the x^3 term. [2]

Total: 6



3. The first three terms in the binomial expansion of $(a + bx)^{\frac{1}{3}}$ are

$$4 - \frac{1}{8}x + cx^2 + \dots$$

- (a) Find the values of a and b . [5]
- (b) State the range of values of x for which the expansion is valid. [2]
- (c) Find the value of c . [2]

Total: 9



4.

$$f(x) = \frac{6}{2+3x} - \frac{4}{3-5x}, \quad |x| < \frac{3}{5}.$$

(a) Show that the first three terms in the series expansion of $f(x)$ can be written as [7]

$$\frac{5}{3} - \frac{121}{18}x + \frac{329}{108}x^2.$$

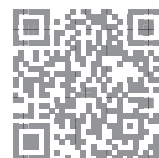
(b) Find the exact value of $f(0.01)$. [2]

Round your answer to 7 decimal places.

(c) Find the percentage error made in using the series expansion in part (a) to estimate the value of $f(0.01)$. [3]

Give your answer to 2 significant figures.

Total: 12



5.

$$\frac{4x^2 - 4x - 9}{(2x + 1)(x - 1)} \equiv A + \frac{B}{2x + 1} + \frac{C}{x - 1}$$

- (a) Find the values of the constants A , B and C . [6]
- (b) Hence, or otherwise, expand in ascending powers of x , as far as the x^2 term. [6]
- (c) Explain why the expansion is not valid for $x = \frac{3}{4}$. [1]

Total: 13

