Pearson Edexcel A Level Mathematics 9MA0

Unit Test 5 Binomial Theorem

Time allowed: 50 **minutes**

School: www.CasperYC.club

Name:

Teacher:

How I can achieve better:

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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

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

(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.

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

(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