

# Pearson Edexcel A Level Mathematics 9MA0

## Unit Test 5 Binomial Theorem

Time allowed: 50 minutes

School: [www.CasperYC.club](http://www.CasperYC.club)

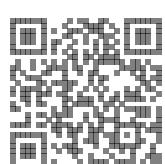
Name:

Teacher:

How I can achieve better:

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

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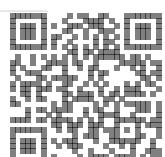
1. (a) Find the binomial expansion of  $\frac{1+x}{\sqrt{1-2x}}$  in ascending powers of  $x$  up to and including the  $x^2$  term, simplifying each term. [4]

(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]

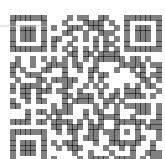
Total: 10



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

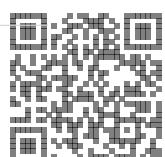
$$4 - \frac{1}{8}x + cx^2 + \dots$$

- (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]

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

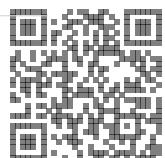
- (b) Find the exact value of  $f(0.01)$ . [2]

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

