5. The Binomial Expansion

Name:	Class:	Date:

Mark	/ 18	%

1) Write down the expansion of the following using Pascal's triangle [1]

$(c + 3)^4$

2) Find the coefficient of x^3 in the expansion of the following using Pascal's triangle [1]

$(3x + 1)^4$

3) Expand fully the following [1]

$(1 + 3x)(1 - 2x)^4$

4) The coefficient of x^2 in the expansion $(d - x)^3$ is -9. Find the value of d. [1]

5) The coefficient of x^2 in the expansion $(2 + ax)^3$ is 6. Find the values of a. [1]

6) Find the value of the following [3]

a) $\frac{14!}{11!}$

b) $\frac{8!}{(8-5)!5!}$

c) $\binom{6}{5}$

7) Find the value of n given that ${}^nC_2 = 171$. [1]

8) Write down the expansion of the following using the binomial expansion [2]

a) $(q + r)^4$

b) $(5 + 2q)^3$

9) Find the coefficient of x^3 in the following [1]

$(1 + x)^5$

10) Find the first four terms of the following using the binomial expansion [3]

a) $(x + 3y)^6$

b) $\left(5 - \frac{1}{5}x\right)^5$

c) $(1 - 3x)^{10}$

11) The coefficient of x^3 in the expansion $(1 + dx)^7$ is 945. Find the value of d. [1]

12) Write down the first four terms in the expansion $\left(1 + \frac{1}{5}x\right)^7$ and then by substituting a appropriate value of x, find an approximate value of $(1.17)^7$.

[1]

13) If x is so small that terms of x^3 and higher can be ignored and $(2 + 3x)(1 - 3x)^3 \approx a + bx + cx^2$. Find the values of a, b and c.

[1]

Solutions for the assessment 5. The Binomial Expansion

1) The expansion is $c^4 + 12c^3 + 54c^2 + 108c + 81$

2) The coefficient of x^3 is 108

3) The expansion is $1 - 5x + 40x^3 - 80x^4 + 48x^5$

4) $d = -3$

5) $a = 1$ or $a = -1$

6) a) $\frac{14!}{11!} = 2184$

b) $\frac{8!}{(8-5)!5!} = 56$

c) $\binom{6}{5} = 6$

7) $n = 19$

8) a) The expansion is $q^4 + 4q^3r + 6q^2r^2 + 4qr^3 + r^4$

b) The expansion is $125 + 150q + 60q^2 + 8q^3$

9) The coefficient of x^3 is 10

10) a) The expansion is $x^6 + 18x^5y + 135x^4y^2 + 540x^3y^3$

b) The expansion is $3125 - 625x + 50x^2 - 2x^3$

c) The expansion is $1 - 30x + 405x^2 - 3240x^3$

11) $d = 3$

12)

The expansion is $1 + \frac{7}{5}x + \frac{21}{25}x^2 + \frac{7}{25}x^3$

The approximate value of $(1.17)^7$ is 2.968855

13) $a = 2$, $b = -15$ and $c = 27$