Edexcel AS Maths The binomial expansion

Topic assessment

1. Expand $(2-x)^5$. [5]

2. Expand $(3+2x)^4$. [4]

3. Find the first three terms in the expansion of $(1-2x)^{15}$. [4]

4. Find the term in x^3 in the expansion of $(2-3x)^8$. [3]

5. Find the constant term in the expansion of $\left(3x-\frac{1}{2x}\right)^6$. [3]

6. (i) Find the first three terms in the expansion of $(1+2x)^{10}$. [3]

   (ii) Use the substitution $x = 0.01$ and your answer to (a) to find an approximate value for 1.02^{10}. Give your answer to an appropriate number of decimal places. [3]

Total 25 marks

Edexcel AS Maths Binomial Assessment solutions

Solutions to topic assessment

1. $(2-x)^5 = 2^5 + 5(2^4)(-x) + 10(2^3)(-x)^2 + 10(2^2)(-x)^3 + 5(2)(-x)^4 + (-x)^5$

$= 32 - 80x + 80x^2 - 40x^3 + 10x^4 - x^5$

[5]

2. $(3+2x)^4 = 3^4 + 4(3)^3(2x) + 6(3^2)(2x)^2 + 4(3)(2x)^3 + (2x)^4$

$= 81 + 4(27)(2x) + 6(9)(4x^2) + 4(3)(8x^3) + 16x^4$

$= 81 + 216x + 216x^2 + 96x^3 + 16x^4$

[4]

3. $(1-2x)^{15} = 1 + 15(-2x) + {}_{15}C_2(-2x)^2 + \ldots$

$= 1 - 30x + (105 \times 4x^2) + \ldots$

$= 1 - 30x + 420x^2 + \ldots$

[3]

4. Term in x^3 $= {}_8C_3(2)^5(-3x)^3$

$= 56 \times 32 \times -27x^3$

$= -48384$

[3]

5. Constant term $= {}_6C_3(3x)^3\left(-\frac{1}{2x}\right)^3$

$= 20 \times 27x^3 \times -\frac{1}{8x^3}$

$= -67.5$

[3]

6. (i) $(1+2x)^{10} = 1 + 10(2x) + \frac{10 \times 9}{2!}(2x)^2 + \ldots$

$= 1 + 20x + 45 \times 4x^2 + \ldots$

$= 1 + 20x + 180x^2 + \ldots$

[3]

(ii) Let $x = 0.01$

$(1.02)^{10} = 1 + 20 \times 0.01 + 180 \times 0.0001 + \ldots$

$= 1 + 0.2 + 0.018 + \ldots$

$= 1.22$ (2 d.p.)

[3]