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# Expand and Simplify Binomials

A Level Further A  
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## Part A $(x + 1)^4$

Expand and simplify  $(x + 1)^4$ .

The following symbols may be useful:  $x$

## Part B $(z + 2a)^3$

Expand and simplify  $(z + 2a)^3$ .

The following symbols may be useful:  $a$ ,  $z$

## Part C $(a - b)^5$

Expand and simplify  $(a - b)^5$ .

The following symbols may be useful:  $a$ ,  $b$

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# Binomial Expansion 3

A Level Further A  
     

Expand  $(3 - a)^4$  in ascending powers of  $a$  up to and including the term in  $a^3$ . Hence, without using a calculator, evaluate  $(2.9)^4$  correct to 2 decimal places

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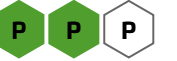


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# Binomial Expansion 5

A Level



Use binomial expansion to expand and simplify the expression  $\left(ax^2 + \frac{2}{x}\right)^5$ .

The following symbols may be useful:  $x$

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
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# Find Coefficients 1

A Level Further A  
     

Find the coefficient of  $x^3$  in the expansion of:

**Part A**  $(x - 10)^5$

$$(x - 10)^5$$

**Part B**  $(2x - \frac{1}{2})^6$

$$\left(2x - \frac{1}{2}\right)^6$$

**Part C**  $(x - y)^{10}$

$$(x - y)^{10}$$

The following symbols may be useful:  $x$ ,  $y$

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**Part D**     $\left(x - \frac{1}{x}\right)^7$

$$\left(x - \frac{1}{x}\right)^7$$

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# Find Coefficients 2

A Level Further A  


Without expanding the binomials, find:

## Part A Coefficient of $x^4y^6$

The coefficient of  $x^4y^6$  in the expansion of  $(x^2 + 3y^2)^5$ .

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## Part B Coefficient of $x^{20}$

The coefficient of  $x^{20}$  in the expansion of  $(x^2 + 3x)^{12}$ .

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## Part C The coefficient of $ab^7$

The coefficient of  $ab^7$  in the expansion of  $(a + \frac{1}{4}b)^8$ .

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**Part D**    **Constant term**

The constant term in the expansion of  $\left(\frac{x^2}{2} - \frac{8}{x}\right)^9$ .

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# Group and Expand

A Level Further A  
     

Expand  $(1 - 2x + 3x^2)^7$  in ascending powers of  $x$  as far as  $x^3$ .

The following symbols may be useful:  $x$

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# Binomial Theorem Applied to Variable Acceleration



The force  $F(t)$  N on a particle of mass 4 kg at time  $t$  s is given by

$$F(t) = (\sqrt{t} + 2)^5 - (\sqrt{t} - 2)^5$$

for  $t \geq 0$ .

At  $t = 0$  the particle is at rest at the origin. Find an expression for its displacement from the origin,  $x$  m, in terms of  $t$ .

The following symbols may be useful:  $t$ ,  $x$

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