

Dr Oliver Mathematics
Applied Mathematics: Binomial Theorem

The total number of marks available is 23.

You must write down all the stages in your working.

1. Expand and simplify (3)

$$\left(2a - \frac{3}{a}\right)^4.$$

2. Use the binomial theorem to expand (4)

$$\left(x^3 - \frac{2}{x}\right)^4$$

and simplify your answer.

3. Obtain the binomial expansion of (4)

$$\left(b - \frac{2}{b}\right)^5$$

and simplify the expression.

4. Find the term in a^6 in the binomial expansion of (4)

$$\left(\frac{1}{a} + 3a\right)^{10}.$$

5. (a) Write down and simplify the general term in the expansion of (3)

$$(x^2 + 3x)^8.$$

- (b) Hence, or otherwise, obtain the coefficient of x^{13} . (2)

6. Write down and simplify the binomial expansion of (3)

$$(e^x + 2)^4.$$