

- 1 (a) Expand $(1 + 3x)^6$ in ascending powers of x up to, and including, the term in x^2 . [2]

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- (b) Hence find the coefficient of x^2 in the expansion of $(1 - 7x + x^2)(1 + 3x)^6$. [2]

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[4]

[illegible]

- 2** The coefficient of x^4 in the expansion of $(x + a)^6$ is p and the coefficient of x^2 in the expansion of $(ax + 3)^4$ is q . It is given that $p + q = 276$.

Find the possible values of the constant a .

[4]

This image shows a full page of primary-ruled paper. It features multiple sets of horizontal dotted lines spaced evenly down the page. A large, light gray watermark with the text "pastpaperpenguin.com" is oriented diagonally from the bottom left towards the top right, spanning across the entire page. The background is white, and there are no other markings or text present.

3 The coefficient of x^3 in the expansion of $(3+ax)^6$ is 160.

(a) Find the value of the constant a .

[2]

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(b) Hence find the coefficient of x^3 in the expansion of $(3+ax)^6(1-2x)$.

[3]

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- 2 (a) Find the first three terms, in ascending powers of x , in the expansion of $(1 + ax)^6$. [1]

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- (b) Given that the coefficient of x^2 in the expansion of $(1 - 3x)(1 + ax)^6$ is -3 , find the possible values of the constant a . [4]

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- 1 (a) Find the coefficient of x^2 in the expansion of $\left(x - \frac{2}{x}\right)^6$. [2]

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- (b) Find the coefficient of x^2 in the expansion of $(2 + 3x^2)\left(x - \frac{2}{x}\right)^6$. [3]

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- 4 (a) Expand the following in ascending powers of x up to and including the term in x^2 .

(i) $(1 + 2x)^5$.

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(ii) $(1 - ax)^6$, where a is a constant.

[2]

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In the expansion of $(1 + 2x)^5(1 - ax)^6$, the coefficient of x^2 is -5 .

- (b) Find the possible values of a .

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- 3 (a) Find the first three terms in the expansion of $(3 - 2x)^5$ in ascending powers of x . [3]

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- (b) Hence find the coefficient of x^2 in the expansion of $(4 + x)^2(3 - 2x)^5$. [3]

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- [4]

[illegible]

- [2]

[illegible]

3 Find the term independent of x in each of the following expansions.

(a) $\left(3x + \frac{2}{x^2}\right)^6$ [3]

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(b) $\left(3x + \frac{2}{x^2}\right)^6 (1 - x^3)$ [3]

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- 5** In the expansion of $\left(2x^2 + \frac{a}{x}\right)^6$, the coefficients of x^6 and x^3 are equal.

(a) Find the value of the non-zero constant a .

[4]

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- (b)** Find the coefficient of x^6 in the expansion of $(1 - x^3) \left(2x^2 + \frac{a}{x}\right)^6$.

[1]

[illegible]

- 1 (a) Find the first three terms in the expansion, in ascending powers of x , of $(1 + x)^5$. [1]

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- (b) Find the first three terms in the expansion, in ascending powers of x , of $(1 - 2x)^6$. [2]

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- (c) Hence find the coefficient of x^2 in the expansion of $(1 + x)^5(1 - 2x)^6$. [2]

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- 2 (a) Find the first three terms in the expansion, in ascending powers of x , of $(2 + 3x)^4$. [2]

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- (b) Find the first three terms in the expansion, in ascending powers of x , of $(1 - 2x)^5$. [2]

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- (c) Hence find the coefficient of x^2 in the expansion of $(2 + 3x)^4(1 - 2x)^5$. [2]

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- 2** The coefficient of $\frac{1}{x}$ in the expansion of $\left(kx + \frac{1}{x}\right)^5 + \left(1 - \frac{2}{x}\right)^8$ is 74.

Find the value of the positive constant k .

[5]

[illegible]

- 6** In the expansion of $\left(\frac{x}{a} + \frac{a}{x^2}\right)^7$, it is given that

$$\frac{\text{the coefficient of } x^4}{\text{the coefficient of } x} = 3.$$

Find the possible values of the constant a .

[6]

[illegible]

- Find the possible values of a .

[4]

[4]

[illegible]