

- 4 (a) Expand  $(1 + a)^5$  in ascending powers of  $a$  up to and including the term in  $a^3$ . [1]

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- (b) Hence expand  $[1 + (x + x^2)]^5$  in ascending powers of  $x$  up to and including the term in  $x^3$ , simplifying your answer. [3]

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- 1** The coefficient of  $x^4$  in the expansion of  $(3+x)^5$  is equal to the coefficient of  $x^2$  in the expansion of  $\left(2x + \frac{a}{x}\right)^6$ .

Find the value of the positive constant  $a$ .

[4]

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

- 1** The coefficient of  $x^3$  in the expansion of  $(1 + kx)(1 - 2x)^5$  is 20.

Find the value of the constant  $k$ .

[4]

This image shows a full page of white paper with horizontal dashed lines, typical of primary-ruled notebook paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

- 7 (a) Write down the first four terms of the expansion, in ascending powers of  $x$ , of  $(a - x)^6$ . [2]

[illegible]

- (b) Given that the coefficient of  $x^2$  in the expansion of  $\left(1 + \frac{2}{ax}\right)(a - x)^6$  is  $-20$ , find in exact form the possible values of the constant  $a$ . [5]

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



- 1 (a)** Expand  $\left(1 - \frac{1}{2x}\right)^2$ . [1]

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

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- (c)** Hence find the coefficient of  $x$  in the expansion of  $\left(1 - \frac{1}{2x}\right)^2 (1 + 2x)^6$ . [2]

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- 3 (a)** Give the complete expansion of  $\left(x + \frac{2}{x}\right)^5$ . [2]

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- (b)** In the expansion of  $(a + bx^2)\left(x + \frac{2}{x}\right)^5$ , the coefficient of  $x$  is zero and the coefficient of  $\frac{1}{x}$  is 80.

Find the values of the constants  $a$  and  $b$ . [4]

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- 6 The coefficient of  $\frac{1}{x}$  in the expansion of  $\left(2x + \frac{a}{x^2}\right)^5$  is 720.

(a) Find the possible values of the constant  $a$ . [3]

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(b) Hence find the coefficient of  $\frac{1}{x^7}$  in the expansion. [2]

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

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- (b) Find the first three terms in ascending powers of  $x$  of the expansion of  $(1 - 3x)^4$ . [2]

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

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- 4** The coefficient of  $x^2$  in the expansion of  $\left(1 + \frac{2}{p}x\right)^5 + (1 + px)^6$  is 70.

Find the possible values of the constant  $p$ .

[6]

[illegible]

- 4** The coefficient of  $x$  in the expansion of  $\left(4x + \frac{10}{x}\right)^3$  is  $p$ . The coefficient of  $\frac{1}{x}$  in the expansion of  $\left(2x + \frac{k}{x^2}\right)^5$  is  $q$ .

Given that  $p = 6q$ , find the possible values of  $k$ . [5]

[5]

This image shows a single page of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

- 3** The coefficient of  $x^4$  in the expansion of  $\left(2x^2 + \frac{k^2}{x}\right)^5$  is  $a$ . The coefficient of  $x^2$  in the expansion of  $(2kx - 1)^4$  is  $b$ .

(a) Find  $a$  and  $b$  in terms of the constant  $k$ .

[3]

This image shows a full page of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page, providing a template for handwriting practice or general writing. There are no margins, text, or other markings on the page.

This image shows a full page of white paper designed for handwriting practice. It features approximately 20 evenly spaced horizontal dotted lines running across the width of the page. There are no margins, text, or other markings present.



- 5** In the expansion of  $(a + bx)^7$ , where  $a$  and  $b$  are non-zero constants, the coefficients of  $x$ ,  $x^2$  and  $x^4$  are the first, second and third terms respectively of a geometric progression.

Find the value of  $\frac{a}{b}$ .

[5]

[illegible]