

- 1** Find the coefficient of  $x^2$  in the expansion of

$$(2-5x)(1+3x)^{10}.$$

[4]

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- 1** The coefficient of  $x^2$  in the expansion of  $(1-4x)^6$  is 12 times the coefficient of  $x^2$  in the expansion of  $(2+ax)^5$ .

Find the value of the positive constant  $a$ .

[3]

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- 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]

[illegible]

This image shows a blank sheet of white paper designed for handwriting practice. It features ten sets of horizontal dashed lines spaced evenly down the page. A large, light gray watermark with the text "aguijn.com" is oriented diagonally from the bottom left towards the top right, spanning across the entire page. The watermark is semi-transparent, allowing the ruled lines to remain visible beneath it.

[illegible]

- 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]

[illegible]

- 6** It is given that the coefficient of  $x^3$  in the expansion of

$$(2+ax)^4(5-ax)$$

is 432.

Find the value of the constant  $a$ .

[5]

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 "pastpaperpenquin.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.

- 1** The coefficient of  $x^3$  in the expansion of  $(3 + 2ax)^5$  is six times the coefficient of  $x^2$  in the expansion of  $(2 + ax)^6$ .

Find the value of the constant  $a$ .

[4]

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- (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]

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

[2]

(b)  $(4x^3 - 5)\left(x + \frac{3}{x^2}\right)^6$ .

[4]

- 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]

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- 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]

[illegible]

- 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]

[illegible]

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[5]

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