



**1** Solve the equation

$$3e^{2x} - 4e^{-2x} = 5.$$

Give the answer correct to 3 decimal places.

[3]

[illegible]

- 2 (a) Sketch the graph of  $y = |2x + 3|$ .

[1]

- (b) Solve the inequality  $3x + 8 > |2x + 3|$ .

[3]

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- 3** Find the coefficient of  $x^3$  in the binomial expansion of  $(3+x)\sqrt{1+4x}$ . [4]

This image shows a full page of a handwriting practice worksheet. It consists of approximately 20 horizontal rows. Each row is defined by two parallel dotted lines, creating a series of uniform gaps for letter height. The lines are evenly spaced across the entire page, providing a guide for consistent letter formation. There is no text or other markings on the page.

- 4 (a) Show that the equation  $\sin 2\theta + \cos 2\theta = 2 \sin^2 \theta$  can be expressed in the form

$$\cos^2 \theta + 2 \sin \theta \cos \theta - 3 \sin^2 \theta = 0. \quad [2]$$

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- (b) Hence solve the equation  $\sin 2\theta + \cos 2\theta = 2 \sin^2 \theta$  for  $0^\circ < \theta < 180^\circ$ . [4]

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- 1** Solve the inequality  $|5x - 3| < 2|3x - 7|$ .

[4]

This image shows a full page of a handwriting practice worksheet. It consists of multiple sets of three horizontal dashed lines spaced evenly down the page, providing a guide for letter height and placement. The background is plain white, and there are no other markings or text present.

- 2** Solve the equation  $\ln(2x^2 - 3) = 2 \ln x - \ln 2$ , giving your answer in an exact form. [3]

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

- 4** Solve the equation  $2 \cos x - \cos \frac{1}{2}x = 1$  for  $0 \leq x \leq 2\pi$ .

[5]

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.



- 1** Solve the equation  $\ln(x+5) = 5 + \ln x$ . Give your answer correct to 3 decimal places. [4]

[illegible]

- 2** Find the quotient and remainder when  $2x^4 - 27$  is divided by  $x^2 + x + 3$ . [3]

[illegible]

- 6 (a)** Express  $3 \cos x + 2 \cos(x - 60^\circ)$  in the form  $R \cos(x - \alpha)$ , where  $R > 0$  and  $0^\circ < \alpha < 90^\circ$ . State the exact value of  $R$  and give  $\alpha$  correct to 2 decimal places. [4]

[illegible]

**(b)** Hence solve the equation

$$3 \cos 2\theta + 2 \cos(2\theta - 60^\circ) = 2.5$$

for  $0^\circ < \theta < 180^\circ$ .

[4]

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.

**10** Let  $f(x) = \frac{21 - 8x - 2x^2}{(1 + 2x)(3 - x)^2}$ .

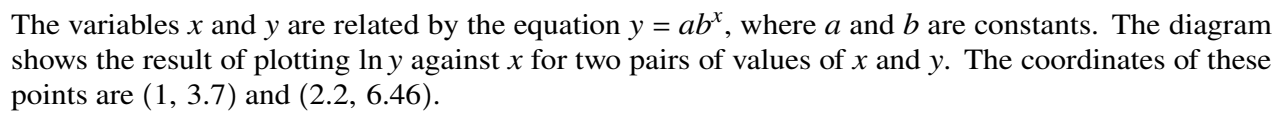
**(a)** Express  $f(x)$  in partial fractions.

[5]

[illegible]

- (b)** Hence obtain the expansion of  $f(x)$  in ascending powers of  $x$ , up to and including the term in  $x^2$ . [5]

[illegible]



[4]

This image shows a full page of white paper with horizontal dashed lines, typical of primary school writing 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.

**5 (a)** Given that

$$\sin\left(x + \frac{1}{6}\pi\right) - \sin\left(x - \frac{1}{6}\pi\right) = \cos\left(x + \frac{1}{3}\pi\right) - \cos\left(x - \frac{1}{3}\pi\right),$$

find the exact value of  $\tan x$ .

[4]

[illegible]



**(b)** Hence find the exact roots of the equation

$$\sin\left(x + \frac{1}{6}\pi\right) - \sin\left(x - \frac{1}{6}\pi\right) = \cos\left(x + \frac{1}{3}\pi\right) - \cos\left(x - \frac{1}{3}\pi\right)$$

for  $0 \leq x \leq 2\pi$ .

[2]

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.

**10** Let  $f(x) = \frac{24x + 13}{(1 - 2x)(2 + x)^2}$ .

(a) Express  $f(x)$  in partial fractions.

[5]

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

- (b) Hence obtain the expansion of  $f(x)$  in ascending powers of  $x$ , up to and including the term in  $x^2$ . [5]

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- (c) State the set of values of  $x$  for which the expansion in (b) is valid. [1]

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- 1 (a) Sketch the graph of  $y = |4x - 2|$ .

[1]

- (b) Solve the inequality  $1 + 3x < |4x - 2|$ .

[4]

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- 3 The polynomial  $2x^3 + ax^2 - 11x + b$  is denoted by  $p(x)$ . It is given that  $p(x)$  is divisible by  $(2x - 1)$  and that when  $p(x)$  is divided by  $(x + 1)$  the remainder is 12.

Find the values of  $a$  and  $b$ .

[5]

[illegible]

- 7** (a) By expressing  $3\theta$  as  $2\theta + \theta$ , prove the identity  $\cos 3\theta \equiv 4\cos^3\theta - 3\cos\theta$ . [3]

[illegible]

**(b)** Hence solve the equation

$$\cos 3\theta + \cos \theta \cos 2\theta = \cos^2 \theta$$

for  $0^\circ \leq \theta \leq 180^\circ$ .

[5]

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

- 1** Find the set of values of  $x$  satisfying the inequality  $|2^{x+1} - 2| < 0.5$ , giving your answer to 3 significant figures. [4]

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