



**1** Solve the equation

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

Give the answer correct to 3 decimal places.

[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, typical of notebook or legal stationery. There are no margins, text, or other markings on the page.

- 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 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 (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]

[illegible]

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

[illegible]

- 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 a handwriting practice worksheet. It consists of multiple rows of 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.



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

This image shows a full page of white paper with horizontal dotted 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.

- 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]

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

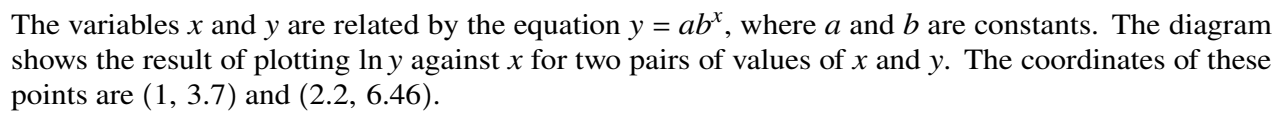
(a) Express  $f(x)$  in partial fractions.

[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]

[illegible]

**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]

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.



**(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]

[illegible]

- (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]

[illegible]

- 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]

[illegible]