


$$\ln(1 - e^{-2x}) + 3 = 0.$$

[3]

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 is oriented diagonally from the bottom-left towards the top-right, containing the text "dastpaperpenquin.com". The background is 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]

[illegible]

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- 1** It is given that $x = \ln(2y - 3) - \ln(y + 4)$.

Express y in terms of x .

[3]

This image shows a blank sheet of white paper designed for handwriting practice. It features approximately 20 horizontal dotted lines spaced evenly down the page. A large, light gray watermark is oriented diagonally from the bottom-left towards the top-right, displaying the text "pastpaperpenquin.com". The watermark is semi-transparent, allowing the ruled lines to remain visible beneath it. There are no margins, text, or other markings on the page.

4 Solve the equation

$$\log_{10}(2x+1) = 2\log_{10}(x+1) - 1.$$

Give your answers correct to 3 decimal places.

[6]

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- 3 (a) Show that the equation

$$\ln(1 + e^{-x}) + 2x = 0$$

can be expressed as a quadratic equation in e^x .

[2]

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- (b) Hence solve the equation $\ln(1 + e^{-x}) + 2x = 0$, giving your answer correct to 3 decimal places.

[4]

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- 3 Solve the equation $2^{3x-1} = 5(3^{-x})$. Give your answer in the form $\frac{\ln a}{\ln b}$, where a and b are integers. [4]

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- 1** Find the value of x for which $3(2^{1-x}) = 7^x$. Give your answer in the form $\frac{\ln a}{\ln b}$, where a and b are integers. [4]

[illegible]

- 1** Solve the equation $8^{3-6x} = 4 \times 5^{-2x}$. Give your answer correct to 3 decimal places. [4]

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- 3** Solve the equation $4^{x-2} = 4^x - 4^2$, giving your answer correct to 3 decimal places. [4]

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