

1 Solve the equation

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

Give the answer correct to 3 decimal places.

[3]

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- [illegible]

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- 1** Solve the equation $\ln(e^{2x} + 3) = 2x + \ln 3$, giving your answer correct to 3 decimal places. [4]

[illegible]

- 2 Solve the equation $\ln(x-5) = 7 - \ln x$. Give your answer correct to 2 decimal places. [4]

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- 3 (a) Show that the equation $\log_3(2x + 1) = 1 + 2\log_3(x - 1)$ can be written as a quadratic equation in x . [3]

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- (b) Hence solve the equation $\log_3(4y + 1) = 1 + 2\log_3(2y - 1)$, giving your answer correct to 2 decimal places. [2]

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- 1** Solve the equation $2(3^{2x-1}) = 4^{x+1}$, giving your answer correct to 2 decimal places. [4]

[illegible]

- [illegible]

[3]

[illegible]

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

[illegible]

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- This image shows a blank sheet of white paper designed for handwriting practice. It features multiple sets of horizontal dotted lines spaced evenly down the page. A large, light gray watermark with the text "pastpaperpenguin.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. There are no other markings, text, or illustrations on the page.

1 Solve the equation

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

Give the answer correct to 3 decimal places.

[3]

[illegible]

- 4 The positive numbers p and q are such that

$$\ln\left(\frac{p}{q}\right) = a \quad \text{and} \quad \ln(q^2 p) = b.$$

Express $\ln(p^7q)$ in terms of a and b .

[4]