

- 1** Find the exact value of $\int_1^4 \ln 3x \, dx$. Give your answer in the form $a + \ln b$, where a and b are integers. [4]

[illegible]

- 2 (a) Show that the equation $\log_4(2x+1) = 2\log_4(3x-1) - 2$ can be written as a quadratic equation in x . [3]

[illegible]

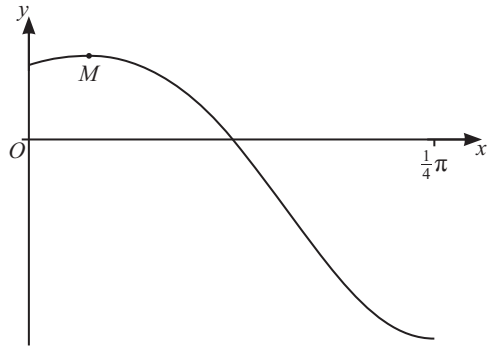
- (b) Hence solve the equation $\log_4(2x+1) = 2\log_4(3x-1) - 2$. [2]

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3 (a) Express $3\sqrt{2}\sin(x+45^\circ) + \cos x$ in the form $R\cos(x-\alpha)$, where $R > 0$ and $0^\circ < \alpha < 90^\circ$. [4]

(b) Hence solve the equation $3\sqrt{2}\sin(3\theta+45^\circ)+\cos 3\theta=-4$ for $0^\circ < \theta < 180^\circ$.

[4]



The diagram shows the graph of $y = e^{\sin 2x} \cos 4x$ for $0 \leq x \leq \frac{1}{4}\pi$, and its maximum point M .

Find the x -coordinate of M .

[5]

10 Let $f(x) = \frac{x + 2x - 11}{(3+x)(2+x^2)}$.

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

[6]

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

[5]