

Exponentials and logarithms

AS Pure Mathematics | Edexcel 8MA0 | 12 questions, 61 marks

A-level Maths topic practice



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Name: _____ **Date:** _____ **Score:** _____ / 61

- 1** Without using a calculator, find the exact value of
 $2 \log_3 6 - \log_3 4$

(3 marks)

Answer _____

- 2** Solve the equation $5^x = 18$, giving your answer to 3 significant figures.

(3 marks)

Answer _____

- 3** Find the exact solution of each equation.

a. $e^{2x-1} = 7$

b. $\ln(3x + 2) = 4$

(4 marks)

Answer _____

4 Given that $\log_a 2 = p$ and $\log_a 3 = q$, write each of the following in terms of p and q

a. $\log_a 18$

b. $\log_a \frac{4}{27}$

c. $\log_a (12a)$

(5 marks)

Answer _____

5 Solve $\log_2(x + 5) - \log_2(x - 1) = 3$, $x > 1$

(4 marks)

Answer _____

6 a. Show that the equation $\log_3 x + \log_3(x - 6) = 3$ can be written as $x^2 - 6x - 27 = 0$

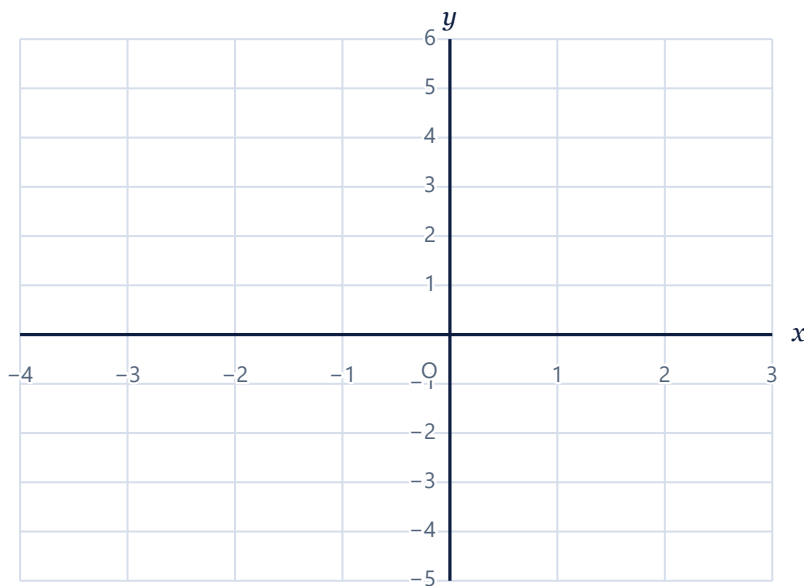
b. Hence solve $\log_3 x + \log_3(x - 6) = 3$, explaining why one root of the quadratic is not a solution.

(5 marks)

Answer _____

7 Sketch the graph of $y = e^x - 4$

On your sketch show the coordinates of any points where the graph meets the coordinate axes, giving exact values, and state the equation of the asymptote.



(4 marks)

Answer _____

8 Solve the equation $3^{x+1} = 5^{2x-1}$

giving your answer in the form $\frac{\ln a}{\ln b}$, where a and b are rational numbers, and then to 3 significant figures.

(5 marks)

Answer _____

9

- a. Show that the substitution $u = 2^x$ turns the equation $2^{2x} - 7(2^x) + 12 = 0$ into $u^2 - 7u + 12 = 0$
- b. Hence solve $2^{2x} - 7(2^x) + 12 = 0$, giving any non-exact answer to 3 significant figures. (6 marks)

Answer _____

10

Solve the simultaneous equations

$$\log_2 x + \log_2 y = 6$$

$$\log_2 x - 2 \log_2 y = 3$$

(6 marks)

Answer _____

11

- a. On the same axes, sketch the curves with equations $y = e^{2x}$ and $y = 6 - e^x$, showing the coordinates of the points where each curve meets the y -axis and the equations of any asymptotes.
- b. Find the exact coordinates of the point where the curves meet, explaining why there is only one such point.



(7 marks)

Answer _____

12

- a. Prove that $\log_4 x = \frac{1}{2} \log_2 x$ for $x > 0$
- b. Hence solve $\log_2 x + \log_4 x = 6$
- c. Solve $\log_2 x = \log_4(x + 6)$, explaining why only one solution is valid.

(9 marks)

Answer

End of questions | Total 61 marks