5.1 Laws of Logarithms

Question Paper

Course	Edexcel IAL Maths: Pure 2
Section	5. Logs & Exponentials
Topic	5.1 Laws of Logarithms
Difficulty	Easy

Time allowed: 40

Score: /36

Percentage: /100

Question 1

Evaluate

(i) $\log_3 27$

(ii) $\log_5 625$

(iii) $\log_2 \frac{1}{4}$

(iv) $\log_a a$

[4 marks]

Question 2

Write the following in the form $a + b \ln 2$, where a and b are integers to be found.

(i) $3^2 + \ln 4$

(ii) $\ln e^7 + \ln 8$

(iii) $\log 1000 + 3 \ln 16$

(iv) $5(3^2 + \ln 64)$

[4 marks]

Question 3

Solve the following equations, giving your answer in exact form.

(i) $e^{2x} = 5$

(ii) $3e^{\frac{1}{3}x} = 27$

[4 marks]

Question 4

Show that

$$3\log_a 4 + 2\log_a 256 = 22\log_a 2.$$

[3 marks]

Question 5

Solve the equation

$$\log_x 16 = 2$$

[2 marks]

Question 6

A square has side length $3 \ln 4$.
Show that the perimeter of the square is $24 \ln 2$.

[2 marks]

Question 7

Write the following in the form $a \ln b$, where a and b are integers to be found.

$$4 \ln 9 + 2 \ln 81 - 3 \ln 27$$

[3 marks]

Question 8

Solve the equation

$$7^{2x-1} = 343.$$

[2 marks]

Question 9

Write down the value of
(i) $\log_3 3$
(ii) $\ln e^6$
(iii) $\log_a 1$
(iv) $\log 1000$

[4 marks]

Question 10

Show that

$$4 \log \left(\frac{27}{16} \right) = 12 \log 3 - 16 \log 2.$$

[3 marks]

Question 11

(a) Express 42 as a product of its prime factors.

[1 mark]

Question 11

(b) Hence, or otherwise, show that

$$\ln 42 = \ln 7 + \ln 3 + \ln 2.$$

[2 marks]

Question 12

Sketch the graph of $y = e^x$, marking clearly the coordinates of any points where the graph intersects the coordinate axes and stating the equation of any asymptotes.

[2 marks]