Logarithmic and Exponential Functions

Question Paper 3

Level	International A Level
Subject	Maths
Exam Board	CIE
Topic	Logarithmic and Exponential Functions
Sub Topic	
Booklet	Question Paper 3

Time Allowed: **58 minutes**

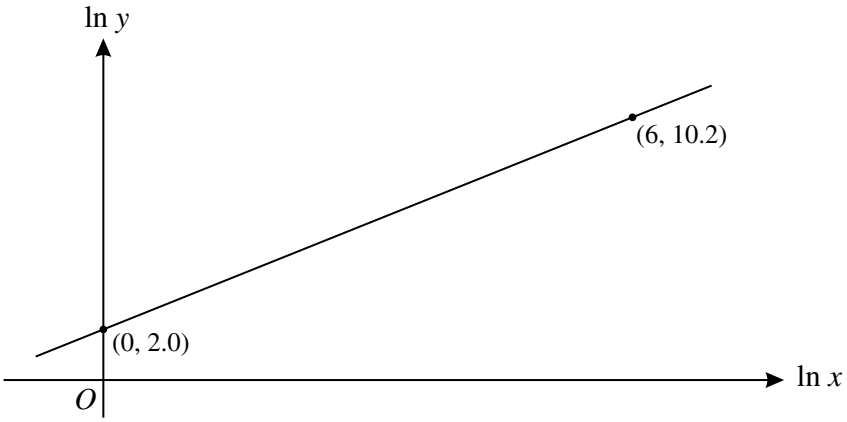
Score: **/48**

Percentage: **/100**

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

1

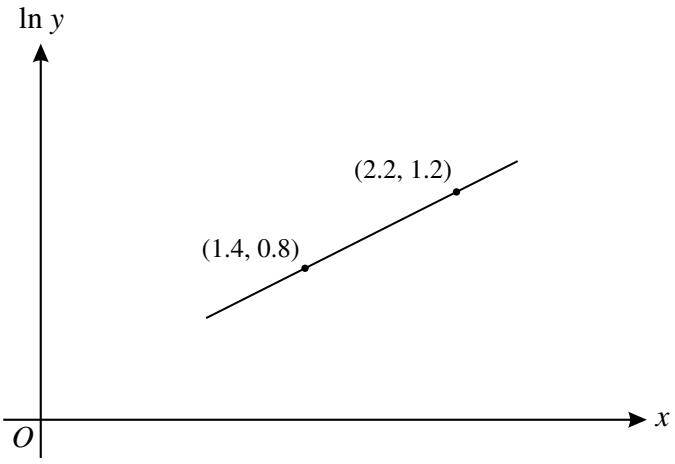


The variables x and y satisfy the equation $y = Kx^m$, where K and m are constants. The graph of $\ln y$ against $\ln x$ is a straight line passing through the points (0, 2.0) and (6, 10.2), as shown in the diagram. Find the values of K and m, correct to 2 decimal places. [5]

2 Use logarithms to solve the equation $3^x = 2^{x+2}$, giving your answer correct to 3 significant figures. [4]

3 Use logarithms to solve the equation $5^x = 2^{2x+1}$, giving your answer correct to 3 significant figures. [4]

4



The variables x and y satisfy the equation $y = A(b^x)$, where A and b are constants. The graph of $\ln y$ against x is a straight line passing through the points (1.4, 0.8) and (2.2, 1.2), as shown in the diagram. Find the values of A and b, correct to 2 decimal places. [6]

5 **(i)** Given that $y = 2^x$, show that the equation

$$2^x + 3(2^{-x}) = 4$$

can be written in the form

$$y^2 - 4y + 3 = 0.$$ [3]

(ii) Hence solve the equation

$$2^x + 3(2^{-x}) = 4,$$

giving the values of x correct to 3 significant figures where appropriate. [3]

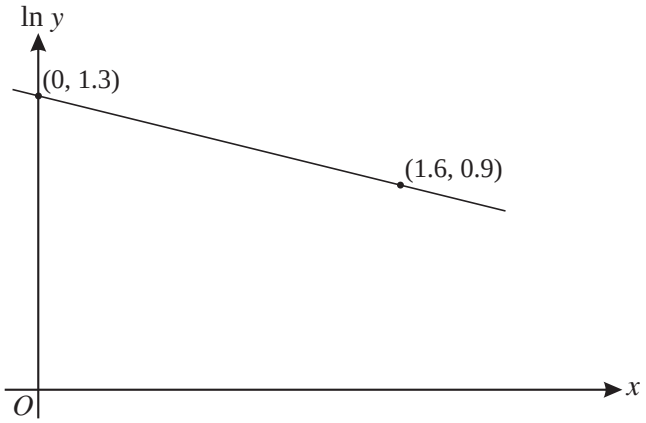
6 Given that $13^x = (2.8)^y$, use logarithms to show that $y = kx$ and find the value of k correct to 3 significant figures. [3]

7 Solve the equation $\ln(3 - x^2) = 2\ln x$, giving your answer correct to 3 significant figures. [4]

8 It is given that $\ln(y + 5) - \ln y = 2\ln x$. Express y in terms of x, in a form not involving logarithms. [4]

9 Given that $(1.25)^x = (2.5)^y$, use logarithms to find the value of $\frac{x}{y}$ correct to 3 significant figures. [3]

10



The variables x and y satisfy the equation $y = A(b^{-x})$, where A and b are constants. The graph of $\ln y$ against x is a straight line passing through the points $(0, 1.3)$ and $(1.6, 0.9)$, as shown in the diagram. Find the values of A and b, correct to 2 decimal places. [5]

11 Use logarithms to solve the equation $4^x = 2(3^x)$, giving your answer correct to 3 significant figures. [4]