

These are P2 questions(all variants) as the syllabus is same as P3 :)

Q1.

- 1 Given that $2^x = 5^y$, use logarithms to find the value of $\frac{x}{y}$ correct to 3 significant figures. [3]

Q2.

- 2 (a) Use logarithms to solve the equation $3^x = 8$, giving your answer correct to 2 decimal places. [2]

(b) It is given that

$$\ln z = \ln(y + 2) - 2 \ln y,$$

where $y > 0$. Express z in terms of y in a form not involving logarithms. [3]

Q3.

- 2 The variables x and y satisfy the relation $3^y = 4^{x+2}$.

(i) By taking logarithms, show that the graph of y against x is a straight line. Find the exact value of the gradient of this line. [3]

(ii) Calculate the x -coordinate of the point of intersection of this line with the line $y = 2x$, giving your answer correct to 2 decimal places. [3]

Q4.

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

Q5.

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

Q6.

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

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

can be written in the form

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

- (ii) Hence solve the equation

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

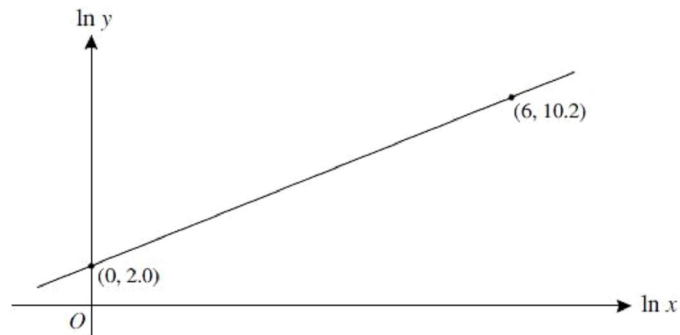
giving the values of x correct to 3 significant figures where appropriate. [3]

Q7.

- 1 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]

Q8.

3



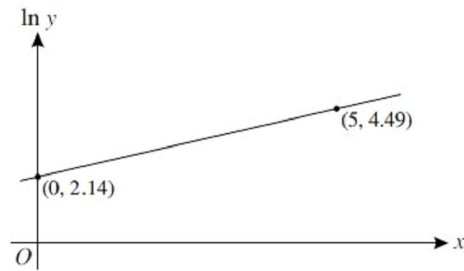
The variables x and y satisfy the equation $y = Kx^m$, where K and m are constants. The graph of $\ln y$ against $\ln x$ is a straight line passing through the points $(0, 2.0)$ and $(6, 10.2)$, as shown in the diagram. Find the values of K and m , correct to 2 decimal places. [5]

Q9.

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

Q10.

2



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 $(0, 2.14)$ and $(5, 4.49)$, as shown in the diagram. Find the values of A and b , correct to 1 decimal place. [5]

Q11.

- 2 (i) Given that $5^{2x} + 5^x = 12$, find the value of 5^x . [3]
- (ii) Hence, using logarithms, solve the equation $5^{2x} + 5^x = 12$, giving the value of x correct to 3 significant figures. [2]

Q12.

- 2 Solve the equation $\ln(3 - 2x) - 2 \ln x = \ln 5$. [5]

Q13.

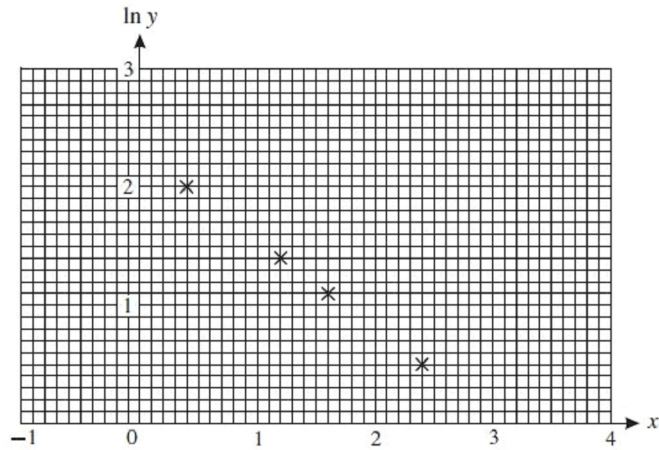
- 4 The variables x and y satisfy the equation $5^{y+1} = 2^{3x}$.
- (i) By taking logarithms, show that the graph of y against x is a straight line. [2]
- (ii) Find the exact value of the gradient of this line and state the coordinates of the point at which the line cuts the y -axis. [2]

Q14.

- 3 (i) Express 9^x in terms of y , where $y = 3^x$. [1]
- (ii) Hence solve the equation
- $$2(9^x) - 7(3^x) + 3 = 0,$$
- expressing your answers for x in terms of logarithms where appropriate. [5]

Q15.

2



Two variable quantities x and y are related by the equation

$$y = k(a^{-x}),$$

where a and k are constants. Four pairs of values of x and y are measured experimentally. The result of plotting $\ln y$ against x is shown in the diagram. Use the diagram to estimate the values of a and k .

[5]

Q16.

- 2 Solve the equation $x^{3.9} = 11x^{3.2}$, where $x \neq 0$. [3]

Q17.

- 2 (i) Express 4^x in terms of y , where $y = 2^x$. [1]

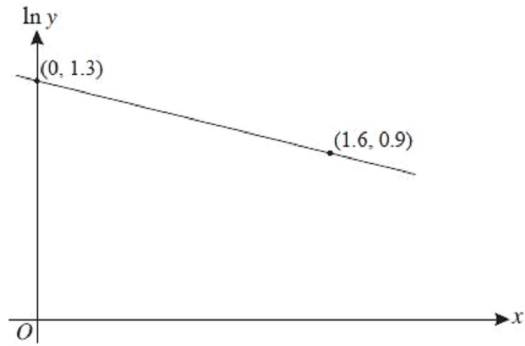
(ii) Hence find the values of x that satisfy the equation

$$3(4^x) - 10(2^x) + 3 = 0,$$

giving your answers correct to 2 decimal places. [5]

Q18.

3



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]

Q19.

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

Q20.

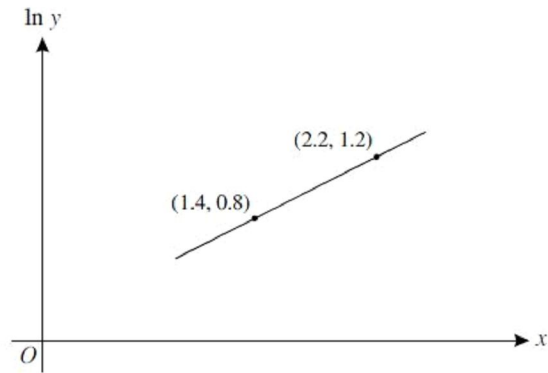
- 2 It is given that $\ln(y + 5) - \ln y = 2 \ln x$. Express y in terms of x , in a form not involving logarithms. [4]

Q21.

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

Q22.

5



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]

Q23.

- 4 Solve the equation $3^{2x} - 7(3^x) + 10 = 0$, giving your answers correct to 3 significant figures. [5]

Q24.

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

Q25.

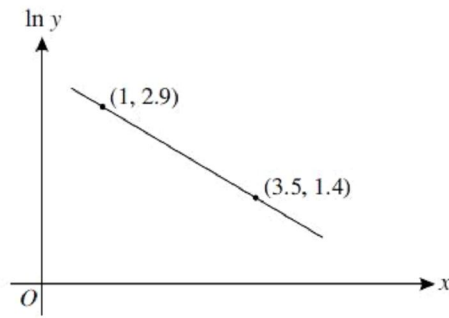
- 3 Solve the equation $2 \ln(x + 3) - \ln x = \ln(2x - 2)$. [5]

Q26.

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

Q27.

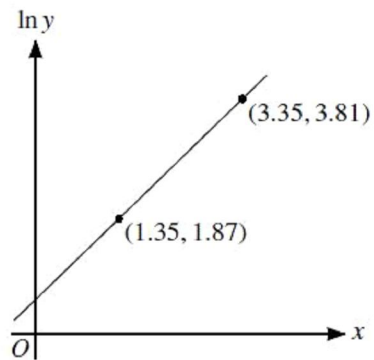
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The variables x and y satisfy the equation $y = A(b^{-x})$, where A and b are constants. The graph of $\ln y$ against x is a straight line passing through the points $(1, 2.9)$ and $(3.5, 1.4)$, as shown in the diagram. Find the values of A and b , correct to 2 decimal places. [6]

Q28.

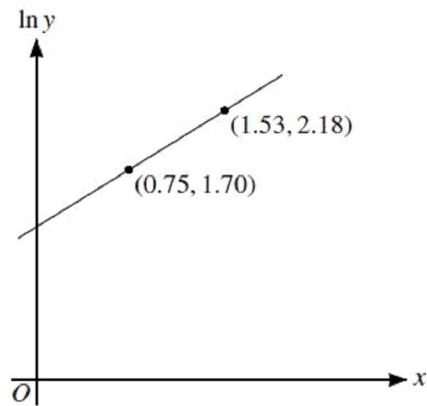
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The variables x and y satisfy the equation $y = K(2^{px})$, where K and p are constants. The graph of $\ln y$ against x is a straight line passing through the points $(1.35, 1.87)$ and $(3.35, 3.81)$, as shown in the diagram. Find the values of K and p correct to 2 decimal places. [6]

Q29.

2



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 $(0.75, 1.70)$ and $(1.53, 2.18)$, as shown in the diagram. Find the values of a and b correct to 2 decimal places. [5]

Q30.

4 (a) Find the value of x satisfying the equation $2 \ln(x - 4) - \ln x = \ln 2$. [5]

(b) Use logarithms to find the smallest integer satisfying the inequality

$$1.4^y > 10^{10}. \quad [3]$$

P3 (variant1 and 3)

Q1.

3 The variables x and y satisfy the equation $x^n y = C$, where n and C are constants. When $x = 1.10$, $y = 5.20$, and when $x = 3.20$, $y = 1.05$.

(i) Find the values of n and C . [5]

(ii) Explain why the graph of $\ln y$ against $\ln x$ is a straight line. [1]

Q2.

2 The variables x and y satisfy the equation $y^3 = Ae^{2x}$, where A is a constant. The graph of $\ln y$ against x is a straight line.

(i) Find the gradient of this line. [2]

(ii) Given that the line intersects the axis of $\ln y$ at the point where $\ln y = 0.5$, find the value of A correct to 2 decimal places. [2]

Q3.

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

Q4.

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

Q5.

- 2 It is given that $\ln(y + 1) - \ln y = 1 + 3 \ln x$. Express y in terms of x , in a form not involving logarithms. [4]

Q6.

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

Q7.

- 2 Solve the equation

$$\ln(1 + x^2) = 1 + 2 \ln x,$$

giving your answer correct to 3 significant figures.

[4]

Q8.

- 1 Using the substitution $u = e^x$, or otherwise, solve the equation

$$e^x = 1 + 6e^{-x},$$

giving your answer correct to 3 significant figures.

[4]

Q9.

- 2 Solve the equation

$$5^{x-1} = 5^x - 5,$$

giving your answer correct to 3 significant figures.

[4]

Q10.

1 Solve the equation

$$\ln(x+5) = 1 + \ln x,$$

giving your answer in terms of e .

[3]

Q11.

2 Solve the equation $2|3^x - 1| = 3^x$, giving your answers correct to 3 significant figures.

[4]

Q12.

1 Given that $2 \ln(x+4) - \ln x = \ln(x+a)$, express x in terms of a .

[4]

Q13.

6 It is given that $2 \ln(4x-5) + \ln(x+1) = 3 \ln 3$.

(i) Show that $16x^3 - 24x^2 - 15x - 2 = 0$.

[3]

(ii) By first using the factor theorem, factorise $16x^3 - 24x^2 - 15x - 2$ completely.

[4]

(iii) Hence solve the equation $2 \ln(4x-5) + \ln(x+1) = 3 \ln 3$.

[1]

Q14.

1 Solve the equation $\log_{10}(x+9) = 2 + \log_{10} x$.

[3]

Q15.

1 Use logarithms to solve the equation $e^x = 3^{x-2}$, giving your answer correct to 3 decimal places. [3]

