Cambridge International AS & A Level

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Mathematics 9709/32

Paper 3 Pure Mathematics 3 October/November 2025

Question No(2)

2 Solve the equation $3 \times 2^{x+1} = 4 \times 3^{2x-3}$. Give your answer correct to 3 significant figures.

Solution:

$$3 \times 2^{x+1} = 4 \times 3^{2x-3}$$

$$\ln\left(3 \times 2^{x+1}\right) = \ln\left(4 \times 3^{2x-3}\right)$$

$$\ln 3 + \ln 2^{x+1} = \ln 4 + \ln 3^{2x-3} \qquad \because \ln(ab) = \ln a + \ln b$$

$$\ln 3 + (x+1)\ln 2 = \ln 4 + (2x-3)\ln 3 \qquad \ln x^n = n \ln a$$

$$\ln 3 + x \ln 2 + \ln 2 = \ln 4 + 2x \ln 3 - 3\ln 3$$

$$\ln 3 + \ln 2 - \ln 4 + 3\ln 3 = 2x \ln 3 - x \ln 2$$

$$\ln\left(\frac{3 \times 2 \times 3^3}{4}\right) = x(2\ln 3 - \ln 2)$$

$$= x(\ln 3^2 - \ln 2)$$

$$= x(\ln 9 - \ln 2)$$

$$\ln\left(\frac{81}{2}\right) = x(\ln(9/2))$$

$$3.70 = x\,1.5^{\circ}$$

$$x = 2.46$$