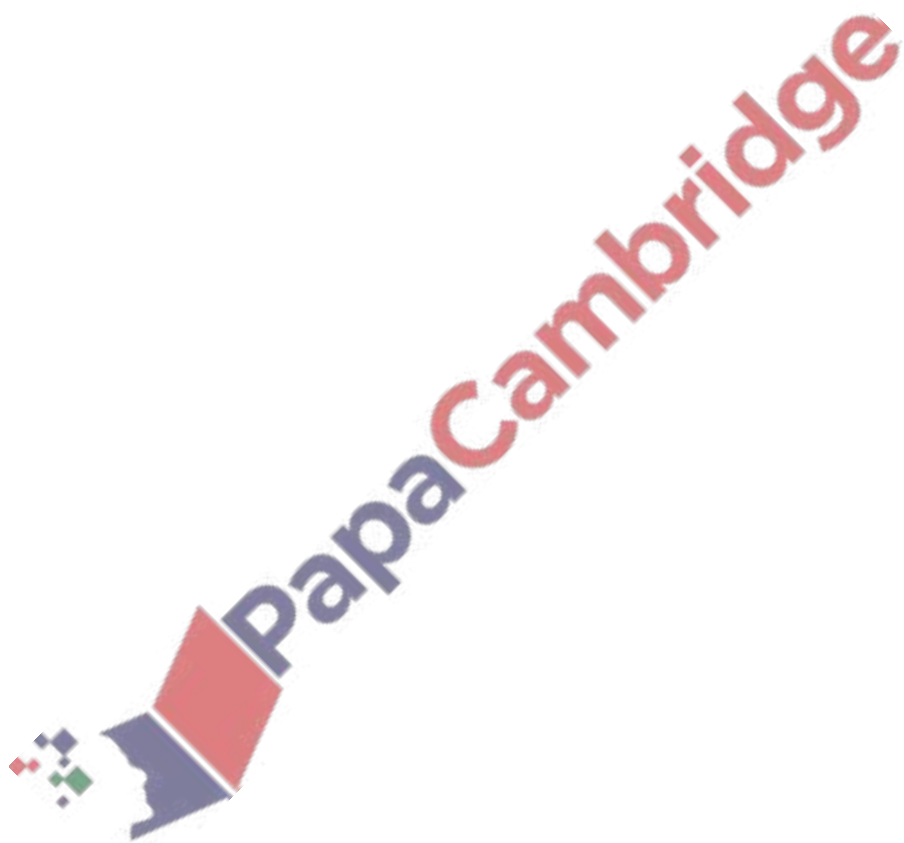1. Nov/2020/Paper_9709/21/No.1
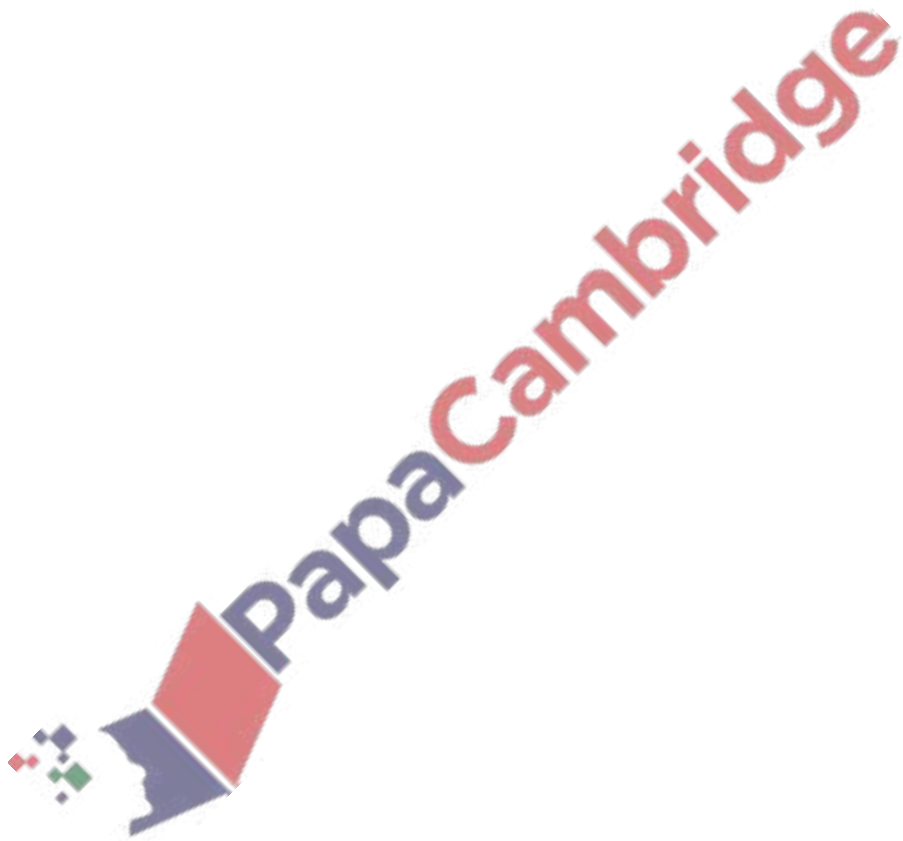
   Given that

   $$\ln(2x + 1) - \ln(x - 3) = 2,$$

   find $x$ in terms of e. [4]

Given that $\dfrac{2^{3x+2} + 8}{2^{3x} - 7} = 5$, find the value of $2^{3x}$ and hence, using logarithms, find the value of $x$ correct to 4 significant figures. [5]
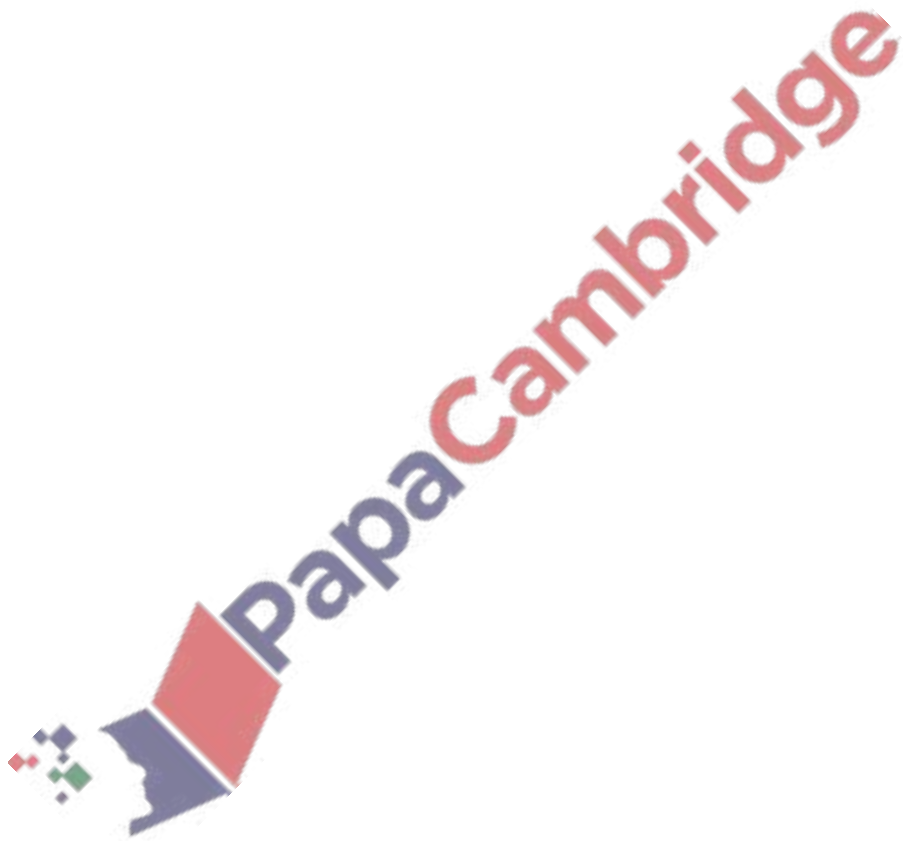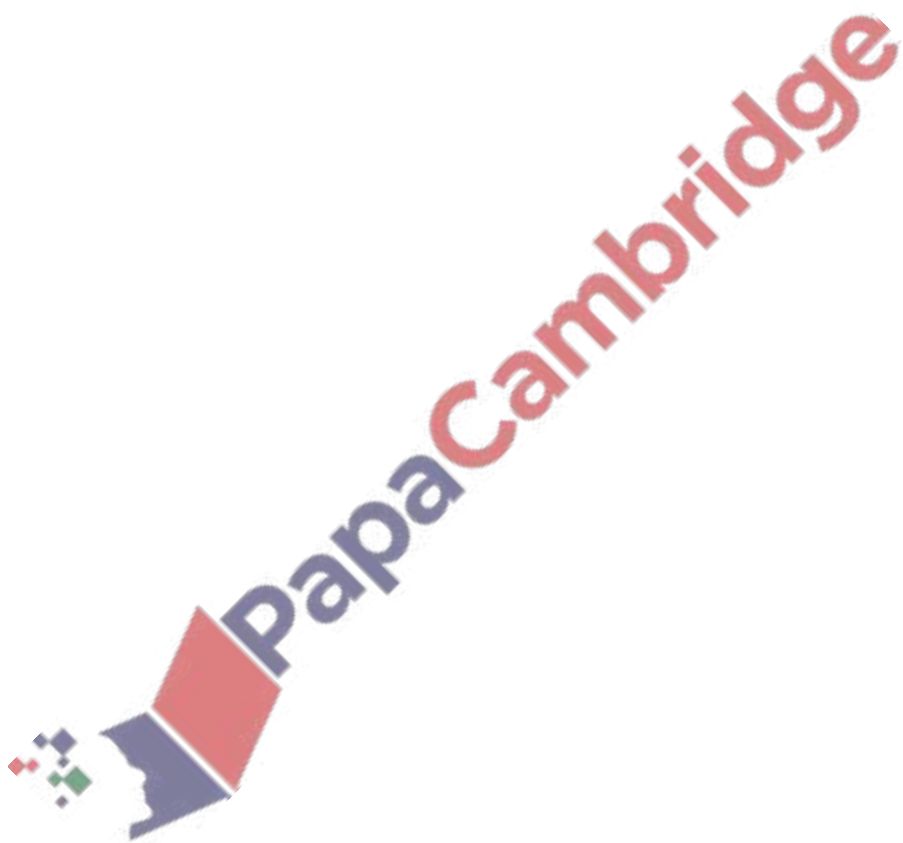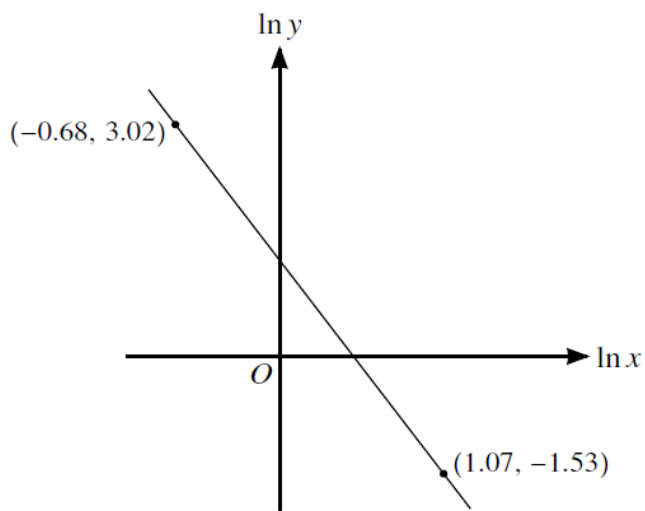
**3.**

Solve the equation

$$\ln(x + 1) - \ln x = 2 \ln 2.$$

[3]

**4.**

Given that $2^y = 9^{3x}$, use logarithms to show that $y = kx$ and find the value of $k$ correct to 3 significant figures. [3]

The variables $x$ and $y$ satisfy the equation $y = Ax^{-2p}$, where $A$ and $p$ are constants. The graph of $\ln y$ against $\ln x$ is a straight line passing through the points $(-0.68, 3.02)$ and $(1.07, -1.53)$, as shown in the diagram.

Find the values of $A$ and $p$. [5]