# STEP/Logarithms: Exercises - Overview (24/6/23)

## Q1

(i) Show that $log_2 3 > \frac{3}{2}$

(ii) Find an upper bound for $log_2 3$ (as small as possible)

## Q2

Show that $1 - \frac{1}{x} \leq lnx \leq x - 1$ , for $x > 0$

## Q3

(i) Use the graphs of $y = lnx$ and $y = mx$ (for a suitable $m$) to show that if $e^a = a^e$, then $a = e$.

(ii) Show that, if $a^b = b^a$, where $a$ & $b$ are distinct, then

$a < e < b$.

## Q4

By approximating the graph of

$y = log_2 x$ by a straight line between $x = 2$ and $x = 4$, find an approximate value for $log_2 \left(\frac{5}{2}\right)$