3. Given that $x > y > 0$,

(a) by writing $\log_y x = z$, or otherwise, show that $\log_y x = \dfrac{1}{\log_x y}$.

(2)

(b) Given also that $\log_x y = \log_y x$, show that $y = \dfrac{1}{x}$.

(2)

(c) Solve the simultaneous equations

$$\log_x y = \log_y x,$$

$$\log_x (x - y) = \log_y (x + y).$$

(7)