Core 2 - Exponentials and Logarithms

Challenge 1

Given that $p = \log_2 3$ and $q = \log_2 5$, find expressions in terms of p and q for

(a) $\log_2 45$,   (3)

(b) $\log_2 0.3$ (3)

Challenge 2

(a)   Given that $t = \log_3 x,$ find expressions in terms of t for

   (i) $\log_3 x^2,$

   (ii) $\log_9 x.$ **(4)**

(b)   Hence, or otherwise, find to 3 significant figures the value of x such that

$$\log_3 x^2 - \log_9 x = 4.$$ **(3)**

Challenge 3

(a) Evaluate

$$\log_3 27 - \log_8 4.$$

(4)

(b) Solve the equation

$$4^x - 3(2^{x+1}) = 0.$$

(5)

Final Challenge

(a)   Given that

$$\log_2 (y - 1) = 1 + \log_2 x,$$

show that

$$y = 2x + 1.$$ **(3)**

(b)   Solve the simultaneous equations

$$\log_2 (y - 1) = 1 + \log_2 x$$

$$2 \log_3 y = 2 + \log_3 x$$ **(7)**