1. Solve $\log_2 x + \log_2 (x - 2) = 3$, for x > 2.

(Total 7 marks)

2. (a) Find $\log_2 32$.

(1)

(b) Given that $\log_2\left(\frac{32^x}{8^y}\right)$ can be written as px + qy, find the value of p and of q.

(4)

(Total 5 marks)

- 3. Given that $p = \log_a 5$, $q = \log_a 2$, express the following in terms of p and/or q.
 - (a) $\log_a 10$
 - (b) $\log_a 8$
 - (c) $\log_a 2.5$

(Total 6 marks)

4. Find the **exact** solution of the equation $9^{2x} = 27^{(1-x)}$.

(Total 6 marks)

5. (a) Given that $\log_3 x - \log_3 (x - 5) = \log_3 A$, express A in terms of x.

(b) Hence or otherwise, solve the equation $\log_3 x - \log_3 (x - 5) = 1$.

(Total 6 marks)

6. Let $p = \log_{10} x$, $q = \log_{10} y$ and $r = \log_{10} z$.

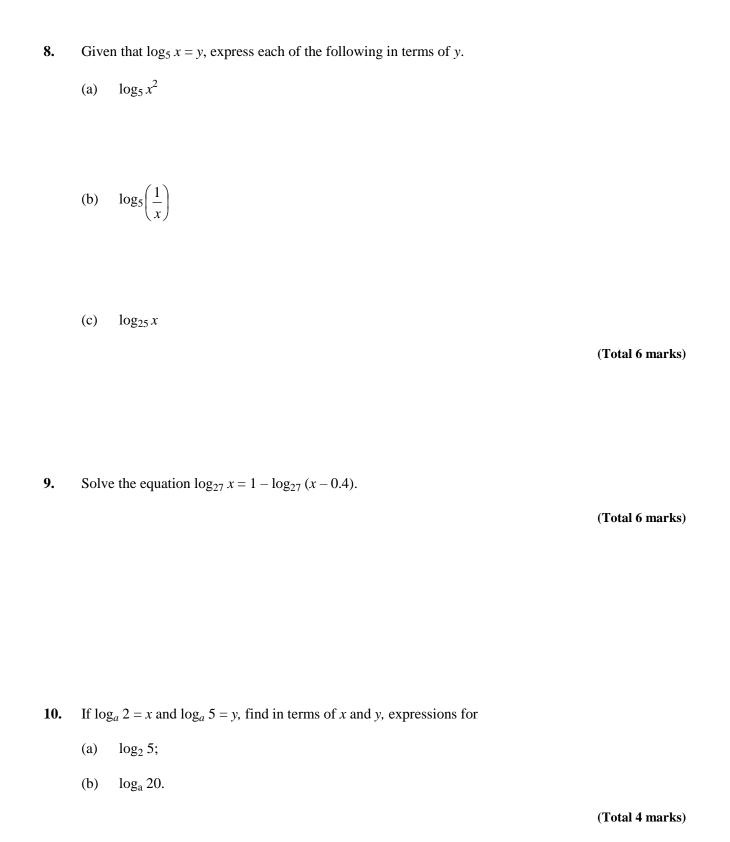
Write the expression $\log_{10} \left(\frac{x}{y^2 \sqrt{z}} \right)$ in terms of p, q and r.

(Total 6 marks)

7. Let $a = \log x$, $b = \log y$, and $c = \log z$.

Write $\log \left(\frac{x^2 \sqrt{y}}{z^3} \right)$ in terms of a, b and c.

(Total 6 marks)



11. Solve the equation $\log_9 81 + \log_9 \frac{1}{9} + \log_9 3 = \log_9 x$.

(Total 4 marks)

12. Let $\log_{10}P = x$, $\log_{10}Q = y$ and $\log_{10}R = z$. Express $\log_{10}\left(\frac{P}{QR^3}\right)^2$ in terms of x, y and z.

(Total 4 marks)

13. Solve the equation $9^{x-1} = \left(\frac{1}{3}\right)^{2x}$.

(Total 4 marks)

12. Solve the equation $\log_3(x + 17) - 2 = \log_3 2x$.

(Total 5 marks)