

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)

8. Given that $\log_5 x = y$, express each of the following in terms of y .

(a) $\log_5 x^2$

(b) $\log_5 \left(\frac{1}{x} \right)$

(c) $\log_{25} x$

(Total 6 marks)

9. Solve the equation $\log_{27} x = 1 - \log_{27} (x - 0.4)$.

(Total 6 marks)

10. If $\log_a 2 = x$ and $\log_a 5 = y$, find in terms of x and y , expressions for

(a) $\log_2 5$;

(b) $\log_a 20$.

(Total 4 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)