

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

Working:

Answer:

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(Total 6 marks)

2. (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 $\log_3 x - \log_3 (x - 5) = 1$.

Working:

Answers:

(a)

(b)

(Total 6 marks)

3. 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 .

Working:

Answer:

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(Total 6 marks)

4. 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 .

Working:

Answer:

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(Total 6 marks)

5. 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) $\log_{25} x$

Working:

Answers:

(a)

(b)

(c)

(Total 6 marks)

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

Working:

Answer:

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(Total 6 marks)

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

Working:

Answer:

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(Total 4 marks)

8. 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 .

Working:

Answer:

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(Total 4 marks)

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

(a) $\log_2 5$;

(b) $\log_a 20$.

Working:

Answers:

(a)

(b)

(Total 4 marks)

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

Working:

Answer:

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(Total 4 marks)

11. Solve the equation $4^{3x-1} = 1.5625 \times 10^{-2}$.

Working:

Answer:

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(Total 4 marks)