



3.10 – Logarithms

Student name: _____ Score: _____

1. Write as a single logarithm.

$$\log 6 + \log 3 - \log 2$$

..... [1]

2. (a) $3\log 2 + 2\log 3 = \log k$

Find the value of k .

$k =$ [2]

(b) Find the value of $\frac{\log 25}{\log 5}$.

..... [1]

3. Simplify.

$$\log 9 + 3 \log 2 - 2 \log 6$$

..... [3]

4. (a) Find the value of $\log_2 8$.

..... [1]

(b) Write the following as a single logarithm.

$$3\log 2 - \log 4 + 2\log 5$$

..... [3]

5. $\log y = 2\log 3 + 5\log 2$

Find the value of y .

..... [3]

6. (a) Write as a single logarithm.

$$\log 3 + \log 4 - \log 2$$

..... [1]

(b) Make x the subject of $y = \log_3 x$.

$x =$ [1]

7. (a) Write down the value of

(i) $\log 1000$,

..... [1]

(ii) $\log 0.01$.

..... [1]

(b) Find p when

$$2\log 5 - \log 2 = \log p.$$

$p =$ [2]

8. (a) Write $2\log(x + 1) - \log(x - 1)$ as a single logarithm.

..... [2]

(b) $\log_3 p = 4$ where p is an integer.

Find the value of p .

$p =$ [2]

9. Solve.

$$\log x + \log 5 - \log 25 = \log 10$$

$x =$ [3]

10. Solve the following equations.

(a) $\log x + \log 3 = \log 12$

$x =$ [1]

(b) $\log x = 3$

$x =$ [1]

(c) $2\log x - \log 5 = \log 20$

$x =$ [3]

11. $\log y = 2\log 3 + 3\log 2 - \log 6$

Find the value of y .

$y =$ [3]

12. (a) $3 = \log_p 8$

Write down the value of p .

$p =$ [2]

(b) $\log 12 + \log 9 = q\log 2 + r\log 3$

Find the values of q and r .

$q =$

$r =$ [3]



13. $3 \log 2 - 2 \log 4 = \log t$

Find the value of t .

$t = \dots\dots\dots [2]$

14. (a) Find $\log_2 8$.

$\dots\dots\dots [1]$

(b) Find p when $\log 3 + 2 \log 5 = \log p$.

$p = \dots\dots\dots [2]$

15. (a) Find the value of $\log_3 \left(\frac{1}{9}\right)$.

$\dots\dots\dots [1]$

(b) $p = \frac{\log q}{\log 3}$

Find q in terms of p .

$q = \dots\dots\dots [2]$

16. Find the value of $\log_9 3$

$\dots\dots\dots [1]$

17. Find the value of

(a) $\frac{\log 4}{\log 8}$,

$\dots\dots\dots [2]$

(b) $\log_4 8$.

$\dots\dots\dots [1]$

18. (a) $2 \log 3 = \log k$

Find the value of k .

$k = \dots\dots\dots [2]$

(b) $\log 5 - \log 2 = \log p$

Find the value of p .

$p = \dots\dots\dots [2]$

19. (a) Find $\log_5 25$.

$\dots\dots\dots [1]$

(b) $2 \log 3 - \log 5 = \log p$

Find p .

$p = \dots\dots\dots [2]$

20. Find the value of x when $5 \log 2 - \log 8 = \log x$.

$x = \dots\dots\dots [2]$



21. Simplify.

$$2 \log 3 - 3 \log 2 + 2 \log \frac{2}{3}$$

..... [3]

22. (a) Write down the value of $\log_9 3$.

..... [1]

(b) $2 \log 2 + \log 11 = \log x$.

Find the value of x .

$x =$ [2]

23. (a) Solve $3 \log 2 - 2 \log 5 = \log x$.

$x =$ [3]

(b) Solve $\log_y 4 = \frac{1}{3}$.

$y =$ [1]

24. (a) Find the value of $\log_{25} 5$.

..... [1]

(b) Simplify $\log 63 - 2 \log 3$.

..... [2]

25. (a) $2 \log x = 3 \log 4$

Find the value of x .

$x =$ [2]

(b) $\log x + \log u - \log v = \log p$

Find p in terms of x , u and v .

$p =$ [1]

26. $3 \log y = 2 \log x - \log w$

Find y in terms of x and w .

$y =$ [3]

27. Solve.

(a) $\log_x 9 = 2$

$x =$ [1]

(b) $2 \log x - \log 4 = \log 9$

$x =$ [2]



28. $2 \log p = 3 \log x - \log y$

Find p in terms of x and y .

$p = \dots\dots\dots$ [3]

29. Solve.

$$2 \log 3 - \log 2 = \log p$$

$p = \dots\dots\dots$ [2]

30. Solve.

$$\log x = 1 + \log 9 - \log 8 + 2 \log \frac{2}{3}$$

$x = \dots\dots\dots$ [3]

31. (a) $\log k = 2 \log 3 - 5 \log 2$

Find the value of k .

$k = \dots\dots\dots$ [2]

(b) $\log_2 p = -1$

Find the value of p .

$p = \dots\dots\dots$ [1]

32. (a) Find the value of n when $\log 5 + \log 3 - \log 2 = \log n$.

$\dots\dots\dots$ [1]

(b) Find $\log_3(3^{1.4})$.

$\dots\dots\dots$ [1]

33. Solve the equation.

$$3 \log x - \log 4 = 4 \log 2$$

$x = \dots\dots\dots$ [3]

34. (a) Find $\log_3\left(\frac{1}{9}\right)$.

$\dots\dots\dots$ [1]

(b) Solve $\log x + 2 \log 5 = \log 15$.

$\dots\dots\dots$ [2]



35. Find the value of

$$\log_5 125.$$

..... [1]

36. $\log x = 2 \log 3 - 5 \log 2$

Find the value of x .

$x =$ [2]

37. Solve.

(a) $\log_3 x = 4$

$x =$ [1]

(b) $2 \log x - 3 \log 2 = \log 50$

$x =$ [3]

38. $\log 48 + \log 18 - 2 \log 24 = \log t$

Find the value of t .

$t =$ [3]

39. Solve.

$$\log 2x = 5$$

$x =$ [2]

40. $4 \log y + 3 \log x = 2$

Find y in terms of x .

..... [3]

41. $\log y = \log h + \log p - \log x$

Find y in terms of h , p and x .

$y =$ [1]

