

~~[09-09-15-TII]~~

[09-09-15-NEWMII]

1. Convert the following to logarithmic form.

(a) $2^4 = 16$

(b) $3^{-2} = \frac{1}{9}$

(c) $100 = 10^2$

(d) $a^3 = y$

(e) $2^x = p$

(f) $x^4 = 2 - k$

2. Convert the following to index form.

(a) $3 = \log_5 125$

(b) $-2 = \log_2 \left(\frac{1}{4}\right)$

(c) $\log_4 64 = 3$

(d) $\log_x 3 = 4$

(e) $\log_3 y = n$

(f) $p + 1 = \log_2 (4y)$

3. Check whether the logarithm $\log_x (5 - 2x)$ is defined when:

(a) $x = 2$

(b) $x = 0.5$

(c) $x = 3$

(d) $x = 2.5$

(e) $x = 1$

(f) $x = \sqrt{2}$

4. Solve the following equations.

(a) $\log_2 x = 3$

(b) $\log_x 9 = 2$

(c) $x = \log_4 8$

(d) $\log_3 (x - 2) = 1$

(e) $\log_2 (2x + 1) = -3$

(f) $\log_9 \sqrt{27} = x$

(g) $\log_x (6x - 8) = 2$

(h) $\log_x 8 = \frac{3}{2}$

5. Evaluate.

(a) $\log_4 4 - 3 \log_2 2$

(b) $\log_2 1 + 2 \log_5 5$

(c) $(3 - \log_3 3)^3$

(d) $\left(\frac{3 \log_x x + 2}{4 - 2 \log_5 1}\right)^2$

(e) $\log_2 (6 - 5 \log_7 7)$

6. Given that $\log_4 x = 2$ and $\log_2 y = 3$, evaluate $\frac{x}{y}$.

7. Given that $\log_3 x = a$ and $\log_{\sqrt{3}} y = b$, express xy^2 as a power of 3.

8. Solve the following simultaneous equations.

(a) $\log_x 16 = 4$ and $\log_2 y = x$

(b) $\log_y x = 2$ and $xy = 8$

*9. Given that $\log_4 y = a$ and $\log_8 (2y) = b$, show that $2a = 3b - 1$.

10. If $\log_2 (\log_3 x) = \log_5 5$, find x .

CHAPTER 1

Exercise 1.1 (p. 2)

1. (a) 1 (b) 4 (c) 144 (d) $\frac{1}{2}$ (e) 5 (f) $\frac{1}{3}$
2. (a) 54 (b) 4
3. (a) $8y$ (b) $\frac{1}{2}y^2$ (c) $\frac{12}{y}$ (d) $\frac{32}{y^3}$ (e) $\frac{1}{2}y^2$ (f) $y^3 - \frac{1}{y^2}$
4. (a) $18y^2$ (b) $\frac{1}{6}yz$ (c) $\frac{z^2}{y}$

Exercise 1.2 (p. 5)

1. (a) $\frac{3}{2}$ (b) $\frac{5}{2}$ (c) -2 (d) $-\frac{5}{2}$ (e) $\frac{1}{2}$ (f) 2
 (g) 2, -2 (h) 2 (i) $\frac{2}{3}$ (j) $\frac{5}{4}$ (k) 2 (l) $-6, 2$
 (m) $-2, 4$ (n) $-2, 1$
2. $a = 3, n = 2$
3. (a) $x = -\frac{4}{9}, y = \frac{1}{9}$ (b) $x = 2, y = 1$ (c) $x = 1, y = -1$
4. $m = 4, n = 3$ 5. 3
6. (a) 0, 1 (b) 0, 2
7. (a) 0, 1 (b) 1, 3 (c) $-\frac{1}{2}, \frac{1}{2}$ (d) 0 (e) $-2, 0$ (f) 3
9. (a) 2 (b) ± 2 (c) 6 (d) 3 (e) 2 (f) 2
10. $r = 3, k = \frac{2}{3}$ 11. $x = 1, y = -1$ or $x = 2, y = 1$ 12. 4

Exercise 1.3 (p. 9)

1. (a) $4 = \log_2 16$ (b) $-2 = \log_3 \left(\frac{1}{9}\right)$ (c) $2 = \log_{10} 100$
 (d) $3 = \log_9 y$ (e) $x = \log_2 p$ (f) $4 = \log_x (2 - k)$
2. (a) $5^3 = 125$ (b) $2^{-2} = \frac{1}{4}$ (c) $4^3 = 64$
 (d) $x^4 = 3$ (e) $3^n = y$ (f) $2^{p+1} = 4y$
3. (c), (d) and (e) are not defined
4. (a) 8 (b) 3 (c) $\frac{3}{2}$ (d) 5
 (e) $-\frac{7}{16}$ (f) $\frac{3}{4}$ (g) 2, 4 (h) 4
5. (a) -2 (b) 2 (c) 8 (d) $\frac{25}{16}$ (e) 0
6. 2 7. 3^{a+b}
8. (a) $x = 2, y = 4$ (b) $x = 4, y = 2$ 10. 9