

EduSahara™ Learning Center Assignment

Grade : Class X, SSC

Chapter : Real Numbers

Name : Logarithms involving variables

1. Express $\log_{10} \frac{x^4 y^5}{z^2}$ in terms of $\log_{10} x$, $\log_{10} y$ and $\log_{10} z$

(i) $4 \log_{10} x - 5 \log_{10} y + 2 \log_{10} z$

(ii) $4 \log_{10} x - 5 \log_{10} y - 2 \log_{10} z$

(iii) $4 \log_{10} x - 2 \log_{10} z + 5 \log_{10} y$

(iv) $4 \log_{10} x + 5 \log_{10} y - 2 \log_{10} z$

(v) $4 \log_{10} x + 5 \log_{10} y + 2 \log_{10} z$

2. If $\log_4 y + 3 \log_4 x = 2$ express y in terms of x

(i) $y = \frac{16}{x^3}$ (ii) $y = \frac{x^3}{16}$ (iii) $y = \frac{x}{16}$ (iv) $y = \frac{16}{x}$

3. Express $\log_6 \frac{a^2 c^3}{\sqrt{b}}$ in terms of $\log_6 a$, $\log_6 b$ and $\log_6 c$

(i) $3 \log_6 c - \frac{1}{2} \log_6 b + 2 \log_6 a$

(ii) $2 \log_6 a + 3 \log_6 c - \frac{1}{2} \log_6 b$

(iii) $2 \log_6 a - 3 \log_6 c + \frac{1}{2} \log_6 b$

(iv) $2 \log_6 a - 3 \log_6 c - \frac{1}{2} \log_6 b$

(v) $2 \log_6 a + 3 \log_6 c + \frac{1}{2} \log_6 b$

4. Express $\log_8 \frac{\sqrt{pq^3}}{r^2 s}$ in terms of $\log_8 p$, $\log_8 q$, $\log_8 r$ and $\log_8 s$

(i) $\frac{7}{2} \log_8 p - \frac{7}{2} \log_8 q + 2 \log_8 r - \log_8 s$

(ii) $\frac{1}{2} \log_8 p - \frac{3}{2} \log_8 q - 2 \log_8 r - \log_8 s$

(iii) $\frac{1}{2} \log_8 p + \frac{3}{2} \log_8 q - 2 \log_8 r - \log_8 s$

(iv) $\frac{1}{2} \log_8 p - \frac{3}{2} \log_8 q - 2 \log_8 r + \log_8 s$

(v) $\frac{1}{2} \log_8 p + \frac{3}{2} \log_8 q + 2 \log_8 r - \log_8 s$

5. If $\log_2 x = p$ and $\log_2 y = q$, then $xy =$

(i) 2^{2pq} (ii) $2^{(p-q)}$ (iii) $2^{(p+q)}$ (iv) 2^{pq}

6. If $\log_5 x = p$ and $\log_5 y = q$, then $\frac{x}{y} =$

(i) $5^{(p-q)}$ (ii) $5^{(p+q)}$ (iii) 5^{pq} (iv) 5^{2pq}

7. If $\log_2 x = a$ and $\log_2 y = b$, then $2^{(a+1)} =$

(i) $2y$ (ii) 2 (iii) $2x$ (iv) $2b$ (v) $2a$

8. If $\log_6 x = a$ and $\log_6 y = b$, then $6^{(a+b)} =$

(i) xy (ii) yb (iii) ab (iv) ax (v) 6

9. If $\log_8 x = a$ and $\log_8 y = b$, then $8^{(a-b)} =$

(i) $\frac{x}{y}$ (ii) $\frac{a}{b}$ (iii) $\frac{a}{y}$ (iv) $\frac{y}{x}$ (v) $\frac{x}{b}$

10. If $\log_2 x = a$ and $\log_2 y = b$, then $2^{2b} =$

(i) $2b$ (ii) a^2 (iii) y^2 (iv) x^2 (v) $2y$

11. Express $\log pq^4$ in terms of $\log p$ and $\log q$

(i) $\log p - 4 \log q$

(ii) $\frac{1}{4} \log p$

+

$$\log q$$

(iii) $4 \log q - \log p$

(iv) $\log p + 4 \log q$

12. Express $\log \sqrt{pq^3}$ in terms of $\log p$ and $\log q$

(i) $\log p - 3 \log q$

(ii) $\frac{1}{2} \log p + \frac{3}{2} \log q$

(iii) $\log p + 3 \log q$

(iv) $3 \log q - \log p$

(v) $\frac{\frac{1}{3} \log p}{\log q}$

13. Express $\log \sqrt[3]{pq^5}$ in terms of $\log p$ and $\log q$

(i) $5 \log q - \log p$

(ii) $\log p + 5 \log q$

(iii) $\log p - 5 \log q$

(iv) $\frac{1}{3} \log p + \frac{5}{3} \log q$

(v) $\frac{\frac{1}{5} \log p}{\log q}$

14. Express $\log \frac{p^3}{q^4}$ in terms of $\log p$ and $\log q$

(i) $4 \log q - 3 \log p$

(ii) $\frac{3}{4} \log p$

$$\log q$$

$$(iii) 3 \log p - 4 \log q$$

$$(iv) 3 \log p + 4 \log q$$

15. Express $\log \sqrt{\frac{p^3}{q^5}}$ in terms of $\log p$ and $\log q$

$$(i) \frac{3}{2} \log p - \frac{5}{2} \log q$$

$$(ii) \frac{\frac{3}{5} \log p}{\log q}$$

$$(iii) \frac{5}{2} \log q - \frac{3}{2} \log p$$

$$(iv) \frac{3}{2} \log p + \frac{5}{2} \log q$$

16. If $(x^2 + y^2) = 123xy$, then $2 \log(x+y) =$

$$(i) \log x + \log y + 3 \log 5$$

$$(ii) \log x - \log y - 3 \log 5$$

$$(iii) \log x + \log y - 3 \log 5$$

$$(iv) \log x - \log y + 3 \log 5$$

17. If $(x^2 + y^2) = 18xy$, then $\log(x-y) =$

$$(i) \frac{1}{2} \log x - \frac{1}{2} \log y - \log 4$$

$$(ii) \frac{1}{2} \log x + \frac{1}{2} \log y - \log 4$$

$$(iii) \frac{1}{2} \log x + \frac{1}{2} \log y + \log 4$$

$$(iv) \frac{1}{2} \log x - \frac{1}{2} \log y + \log 4$$

18. If $(x^4 + y^4) = 34x^2y^2$, then $\log(x^2+y^2) =$

(i) $\log x - \log y + \log 6$

(ii) $\log x + \log y + \log 6$

(iii) $\log x + \log y - \log 6$

(iv) $\log x - \log y - \log 6$

19. If $x = \frac{y^2}{(y-1)}$, then $\log(x-y) =$

(i) $\frac{\log x}{\log y}$

(ii) $\log x - \log y$

(iii) $\log x \log y$

(iv) $\log x + \log y$

20. If $(x^2 + y^2) = z^2$, then which of the following is true?

(i) $\log_x(z+y) + \log_x(z-y) = 5$

(ii) $\frac{\log(z+y)}{\log(z-y)} = 3$

(iii) $\log_x(z+y) + \log_x(z-y) = 4$

(iv) $\log_x(z+y) + \log_x(z-y) = 2$

(v) $\log_x(z+y) - \log_x(z-y) = 2$

21. If $(x^3 + y^3) = z^3$, then which of the following is true?

(i) $\log(z-y) + \log(z^2 + zy + y^2) = 5$

$$x \quad x$$

$$(ii) \log_x (z-y) + \log_x (z^2+zy+y^2) = 3$$

$$(iii) \log_x (z-y) + \log_x (z^2+zy+y^2) = 6$$

$$(iv) \log_x (z-y) - \log_x (z^2+zy+y^2) = 3$$

$$(v) \frac{\log (z-y)}{\log (z^2+zy+y^2)} = 4$$

22. If $(x^4 + y^4) = z^4$, then which of the following is true?

$$(i) \log_x (z^2-y^2) - \log_x (z^2+y^2) = 4$$

$$(ii) \log_x (z^2-y^2) + \log_x (z^2+y^2) = 7$$

$$(iii) \log_x (z^2-y^2) + \log_x (z^2+y^2) = 4$$

$$(iv) \frac{\log (z^2-y^2)}{\log (z^2+y^2)} = 5$$

$$(v) \log_x (z^2-y^2) + \log_x (z^2+y^2) = 6$$

23. If $x = 1 + \log_c ab$; $y = 1 + \log_a bc$; $z = 1 + \log_b ac$,
then which of the following is true?

$$(i) (x y - x z - y z) = x y z$$

$$(ii) (x + y + z) = x y z$$

$$(iii) (x y + x z + y z) = x y z$$

$$(iv) (x y - x z + y z) = x y z$$

$$(v) (x y + x z - y z) = x y z$$

Assignment Key

- 1) (iv)
- 2) (i)
- 3) (ii)
- 4) (iii)
- 5) (iii)
- 6) (i)
- 7) (iii)
- 8) (i)
- 9) (i)
- 10) (iii)
- 11) (iv)
- 12) (ii)
- 13) (iv)
- 14) (iii)
- 15) (i)
- 16) (i)
- 17) (iii)
- 18) (ii)
- 19) (ii)
- 20) (iv)
- 21) (ii)
- 22) (iii)
- 23) (iii)