EduSahara™ Assignment

Name : Logarithmic Expressions involving Variables

Chapter : Logarithms

Grade : ICSE Grade IX

1. Express $log_{10}\frac{x^3y^3}{z}$ in terms of $log_{10}x$, $log_{10}y$ and $log_{10}z$

(i) $3log_{10}x - 3log_{10}y + log_{10}z$ (ii) $3log_{10}x + 3log_{10}y + log_{10}z$ (iii) $3log_{10}x + 3log_{10}y - log_{10}z$

(iv) $3log_{10}x - 3log_{10}y - log_{10}z$ (v) $3log_{10}x - log_{10}z + 3log_{10}y$

2. If $log_6 y + 4log_6 x = 2$ express y in terms of x

(i) $y=\frac{36}{x}$ (ii) $y=\frac{x}{36}$ (iii) $y=\frac{36}{x^4}$ (iv) $y=\frac{x^4}{36}$

3. Express $log_{10}\frac{a^3c^4}{\sqrt{b}}$ in terms of $log_{10}a$, $log_{10}b$ and $log_{10}c$

(i) $4log_{10}c - \frac{1}{2}log_{10}b + 3log_{10}a$ (ii) $3log_{10}a - 4log_{10}c + \frac{1}{2}log_{10}b$ (iii) $3log_{10}a - 4log_{10}c - \frac{1}{2}log_{10}b$

(iv) $3log_{10}a + 4log_{10}c - \frac{1}{2}log_{10}b$ (v) $3log_{10}a + 4log_{10}c + \frac{1}{2}log_{10}b$

4. Express $log_2\frac{\sqrt{p^2q}}{r^5s^2}$ in terms of $log_2 p$, $log_2 q$, $log_2 r$ and $log_2 s$

(i) $log_2 p - \frac{1}{2}log_2 q - 5log_2 r - 2log_2 s$ (ii) $log_2 p + \frac{1}{2}log_2 q + 5log_2 r - 2log_2 s$

(iii) $log_2 p - \frac{1}{2}log_2 q - 5log_2 r + 2log_2 s$ (iv) $log_2 p - \frac{1}{2}log_2 q + 5log_2 r - 2log_2 s$

(v) $log_2 p + \frac{1}{2}log_2 q - 5log_2 r - 2log_2 s$

5. If $log_3 x = p$ and $log_3 y = q$, then $xy =$

(i) $3^{(p+q)}$ (ii) 3^{pq} (iii) 3^{2pq} (iv) $3^{(p-q)}$

6. If $log_4 x = p$ and $log_4 y = q$, then $\frac{x}{y} =$

(i) $4^{(p+q)}$ (ii) $4^{(p-q)}$ (iii) 4^{pq} (iv) 4^{2pq}

7. Express $log_{10}\frac{x^3y^3}{z^2}$ in terms of $log_{10}x$, $log_{10}y$ and $log_{10}z$

(i) $3log_{10}x-2log_{10}z+3log_{10}y$ (ii) $3log_{10}x+3log_{10}y-2log_{10}z$ (iii) $3log_{10}x-3log_{10}y-2log_{10}z$

(iv) $3log_{10}x-3log_{10}y+2log_{10}z$ (v) $3log_{10}x+3log_{10}y+2log_{10}z$

8. If $log_4y+4log_4x=2$ express y in terms of x

(i) $y=\frac{x^4}{16}$ (ii) $y=\frac{16}{x^4}$ (iii) $y=\frac{x}{16}$ (iv) $y=\frac{16}{x}$

9. Express $log_4\frac{a^3c^4}{\sqrt{b}}$ in terms of log_4a , log_4b and log_4c

(i) $4log_4c-\frac{1}{2}log_4b+3log_4a$ (ii) $3log_4a+4log_4c+\frac{1}{2}log_4b$ (iii) $3log_4a-4log_4c-\frac{1}{2}log_4b$

(iv) $3log_4a+4log_4c-\frac{1}{2}log_4b$ (v) $3log_4a-4log_4c+\frac{1}{2}log_4b$

10. Express $log_6\frac{\sqrt{p^2q}}{r^5s^4}$ in terms of log_6p , log_6q , log_6r and log_6s

(i) $log_6p+\frac{1}{2}log_6q+5log_6r-4log_6s$ (ii) $log_6p+\frac{1}{2}log_6q-5log_6r-4log_6s$

(iii) $log_6p-\frac{1}{2}log_6q+5log_6r-4log_6s$ (iv) $log_6p-\frac{1}{2}log_6q-5log_6r-4log_6s$

(v) $log_6p-\frac{1}{2}log_6q-5log_6r+4log_6s$

11. If $log_7x=p$ and $log_7y=q$, then $xy=$

(i) $7^{(p+q)}$ (ii) 7^{2pq} (iii) $7^{(p-q)}$ (iv) 7^{pq}

12. If $log_5x=p$ and $log_5y=q$, then $\frac{x}{y}=$

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

13. If $log_5x=a$ and $log_5y=b$, then $5^{(a+1)}=$

(i) $5y$ (ii) 5 (iii) $5a$ (iv) $5b$ (v) $5x$

14. If $log_4x=a$ and $log_4y=b$, then $4^{(a+b)}=$

(i) xy (ii) yb (iii) ab (iv) ax (v) 4

15. If $log_{10} x = a$ and $log_{10} y = b$, then $10^{(a-b)} =$

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

16. If $log_9 x = a$ and $log_9 y = b$, then $9^{4b} =$

(i) x^4 (ii) $4b$ (iii) $4y$ (iv) a^4 (v) y^4

17. Express $log\ p^2 q$ in terms of $log\ p$ and $log\ q$

(i) $2\,log\ p - log\ q$ (ii) $\frac{2\,log\ p}{log\ q}$ (iii) $log\ q - 2\,log\ p$ (iv) $2\,log\ p + log\ q$

18. Express $log\ \sqrt{p^2 q^3}$ in terms of $log\ p$ and $log\ q$

(i) $\frac{\frac{2}{3}\,log\ p}{log\ q}$ (ii) $2\,log\ p + 3\,log\ q$ (iii) $log\ p + \frac{3}{2}\,log\ q$ (iv) $3\,log\ q - 2\,log\ p$ (v) $2\,log\ p - 3\,log\ q$

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

(i) $3\,log\ p - 5\,log\ q$ (ii) $3\,log\ p + 5\,log\ q$ (iii) $log\ p + \frac{5}{3}\,log\ q$ (iv) $5\,log\ q - 3\,log\ p$ (v) $\frac{\frac{3}{5}\,log\ p}{log\ q}$

20. Express $log\ \frac{p^3}{q^2}$ in terms of $log\ p$ and $log\ q$

(i) $3\,log\ p + 2\,log\ q$ (ii) $2\,log\ q - 3\,log\ p$ (iii) $\frac{\frac{3}{2}\,log\ p}{log\ q}$ (iv) $3\,log\ p - 2\,log\ q$

21. Express $log\ \sqrt{\frac{p}{q^2}}$ in terms of $log\ p$ and $log\ q$

(i) $\frac{\frac{1}{2}\,log\ p}{log\ q}$ (ii) $\frac{1}{2}\,log\ p - log\ q$ (iii) $log\ q - \frac{1}{2}\,log\ p$ (iv) $\frac{1}{2}\,log\ p + log\ q$

22. If $(x^2 + y^2) = 23xy$, then $2\,log\,(x+y) =$

(i) $log\ x - log\ y - 2\,log\ 5$ (ii) $log\ x + log\ y - 2\,log\ 5$ (iii) $log\ x + log\ y + 2\,log\ 5$ (iv) $log\ x - log\ y + 2\,log\ 5$

23. 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) $\frac{1}{2}log\,x+\frac{1}{2}log\,y+log\,4$

24. If $(x^4+y^4)=7x^2y^2$, then $log(x^2+y^2)=$

(i) $log\,x-log\,y-log\,3$ (ii) $log\,x+log\,y-log\,3$ (iii) $log\,x+log\,y+log\,3$ (iv) $log\,x-log\,y+log\,3$

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

(i) $log\,x log\,y$ (ii) $\frac{log\,x}{log\,y}$ (iii) $log\,x+log\,y$ (iv) $log\,x-log\,y$

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

(i) $log_x(z+y)+log_x(z-y)=2$ (ii) $log_x(z+y)+log_x(z-y)=4$ (iii) $log_x(z+y)+log_x(z-y)=5$ (iv) $\frac{log(z+y)}{log(z-y)}=3$

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

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

(i) $log_x(z-y)+log_x(z^2+zy+y^2)=3$ (ii) $log_x(z-y)+log_x(z^2+zy+y^2)=6$ (iii) $log_x(z-y)-log_x(z^2+zy+y^2)=3$

(iv) $\frac{log(z-y)}{log(z^2+zy+y^2)}=4$ (v) $log_x(z-y)+log_x(z^2+zy+y^2)=5$

28. 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) $log_x(z^2-y^2)+log_x(z^2+y^2)=6$ (iii) $\frac{log(z^2-y^2)}{log(z^2+y^2)}=5$

(iv) $log_x(z^2-y^2)+log_x(z^2+y^2)=4$ (v) $log_x(z^2-y^2)+log_x(z^2+y^2)=7$

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

(i) $(xy-xz+yz)=xyz$ (ii) $(xy+xz+yz)=xyz$ (iii) $(xy+xz-yz)=xyz$ (iv) $(xy-xz-yz)=xyz$

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

30. If $log_4 x=a$ and $log_4 y=b$, then $4^{(a+1)}=$

(i) 4 (ii) $4x$ (iii) $4y$ (iv) $4b$ (v) $4a$

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

(i) 2 (ii) xy (iii) ax (iv) yb (v) ab

32. If $\log_{10} x = a$ and $\log_{10} y = b$, then $10^{(a-b)} =$

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

33. If $\log_8 x = a$ and $\log_8 y = b$, then $8^{3b} =$

(i) $3b$ (ii) a^3 (iii) $3y$ (iv) x^3 (v) y^3

34. Express $\log\ p^2q^4$ in terms of $\log p$ and $\log q$

(i) $2\log p + 4\log q$ (ii) $2\log p - 4\log q$ (iii) $\frac{\frac{1}{2}\log p}{\log q}$ (iv) $4\log q - 2\log p$

35. Express $\log \sqrt{p^2q^4}$ in terms of $\log p$ and $\log q$

(i) $2\log p - 4\log q$ (ii) $4\log q - 2\log p$ (iii) $\frac{\frac{1}{2}\log p}{\log q}$ (iv) $\log p + \frac{2}{1}\log q$ (v) $2\log p + 4\log q$

36. Express $\log \sqrt[3]{p^2q^2}$ in terms of $\log p$ and $\log q$

(i) $\frac{2}{3}\log p + \frac{2}{3}\log q$ (ii) $2\log p + 2\log q$ (iii) $\frac{\log p}{\log q}$ (iv) $2\log q - 2\log p$ (v) $2\log p - 2\log q$

37. Express $\log \frac{p^3}{q^2}$ in terms of $\log p$ and $\log q$

(i) $3\log p + 2\log q$ (ii) $3\log p - 2\log q$ (iii) $2\log q - 3\log p$ (iv) $\frac{\frac{3}{2}\log p}{\log q}$

38. Express $\log \sqrt{\frac{p}{q}}$ in terms of $\log p$ and $\log q$

(i) $\frac{1}{2}\log p + \frac{1}{2}\log q$ (ii) $\frac{\log p}{\log q}$ (iii) $\frac{1}{2}\log p - \frac{1}{2}\log q$ (iv) $\frac{1}{2}\log q - \frac{1}{2}\log p$

39. If $(x^2 + y^2) = 23xy$, then $2\log(x+y) =$

(i) $\log x - \log y + 2\log 5$ (ii) $\log x - \log y - 2\log 5$ (iii) $\log x + \log y - 2\log 5$ (iv) $\log x + \log y + 2\log 5$

40. If $(x^2+y^2)=51xy$, then $log(x-y)=$

(i) $\frac{1}{2}log\,x+\frac{1}{2}log\,y+log\,7$ (ii) $\frac{1}{2}log\,x-\frac{1}{2}log\,y-log\,7$ (iii) $\frac{1}{2}log\,x+\frac{1}{2}log\,y-log\,7$

(iv) $\frac{1}{2}log\,x-\frac{1}{2}log\,y+log\,7$

41. If $(x^4+y^4)=23x^2y^2$, then $log(x^2+y^2)=$

(i) $log\,x+log\,y+log\,5$ (ii) $log\,x-log\,y-log\,5$ (iii) $log\,x-log\,y+log\,5$ (iv) $log\,x+log\,y-log\,5$

Assignment Key

1) (iii)	2) (iii)	3) (iv)	4) (v)	5) (i)	6) (ii)
7) (ii)	8) (ii)	9) (iv)	10) (ii)	11) (i)	12) (i)
13) (v)	14) (i)	15) (v)	16) (v)	17) (iv)	18) (iii)
19) (iii)	20) (iv)	21) (ii)	22) (iii)	23) (iv)	24) (iii)
25) (iv)	26) (i)	27) (i)	28) (iv)	29) (ii)	30) (ii)
31) (ii)	32) (v)	33) (v)	34) (i)	35) (iv)	36) (i)
37) (ii)	38) (iii)	39) (iv)	40) (i)	41) (i)	