EduSahara™ Assignment

Name : Logarithmic Expressions involving Variables

Chapter : Logarithms

Grade : ICSE Grade IX

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

(i) $log_{10}x + 2log_{10}y + 5log_{10}z$ (ii) $log_{10}x - 2log_{10}y + 5log_{10}z$ (iii) $log_{10}x + 2log_{10}y - 5log_{10}z$

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

2. If $log_2 y + 4log_2 x = 2$ express y in terms of x

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

3. Express $log_6\frac{a^4c^2}{\sqrt{b}}$ in terms of $log_6 a$, $log_6 b$ and $log_6 c$

(i) $2log_6 c - \frac{1}{2}log_6 b + 4log_6 a$ (ii) $4log_6 a + 2log_6 c + \frac{1}{2}log_6 b$ (iii) $4log_6 a - 2log_6 c + \frac{1}{2}log_6 b$

(iv) $4log_6 a - 2log_6 c - \frac{1}{2}log_6 b$ (v) $4log_6 a + 2log_6 c - \frac{1}{2}log_6 b$

4. Express $log_3\frac{\sqrt{pq^4}}{r^3s^3}$ in terms of $log_3 p$, $log_3 q$, $log_3 r$ and $log_3 s$

(i) $\frac{1}{2}log_3 p + \frac{4}{2}log_3 q - 3log_3 r - 3log_3 s$ (ii) $\frac{1}{2}log_3 p + \frac{4}{2}log_3 q + 3log_3 r - 3log_3 s$

(iii) $\frac{1}{2}log_3 p - 2log_3 q + 3log_3 r - 3log_3 s$ (iv) $\frac{1}{2}log_3 p - 2log_3 q - 3log_3 r + 3log_3 s$

(v) $\frac{1}{2}log_3 p - 2log_3 q - 3log_3 r - 3log_3 s$

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

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

6. If $log_6 x = p$ and $log_6 y = q$, then $\frac{x}{y} =$

(i) $6^{(p-q)}$ (ii) 6^{pq} (iii) 6^{2pq} (iv) $6^{(p+q)}$

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

(i) $2log_{10}x-2log_{10}y-4log_{10}z$ (ii) $2log_{10}x+2log_{10}y-4log_{10}z$ (iii) $2log_{10}x-4log_{10}z+2log_{10}y$

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

8. If $log_6y+3log_6x=2$ express y in terms of x

(i) $y=\frac{x}{36}$ (ii) $y=\frac{x^3}{36}$ (iii) $y=\frac{36}{x^3}$ (iv) $y=\frac{36}{x}$

9. Express $log_{10}\frac{ac^5}{\sqrt{b}}$ in terms of $log_{10}a$, $log_{10}b$ and $log_{10}c$

(i) $5log_{10}c-\frac{1}{2}log_{10}b+log_{10}a$ (ii) $log_{10}a-5log_{10}c-\frac{1}{2}log_{10}b$ (iii) $log_{10}a+5log_{10}c-\frac{1}{2}log_{10}b$

(iv) $log_{10}a-5log_{10}c+\frac{1}{2}log_{10}b$ (v) $log_{10}a+5log_{10}c+\frac{1}{2}log_{10}b$

10. Express $log_8\frac{\sqrt{p^3q^3}}{rs}$ in terms of log_8p , log_8q , log_8r and log_8s

(i) $\frac{3}{2}log_8p+\frac{3}{2}log_8q-log_8r-log_8s$ (ii) $\frac{3}{2}log_8p-\frac{3}{2}log_8q+log_8r-log_8s$

(iii) $\frac{3}{2}log_8p-\frac{3}{2}log_8q-log_8r+log_8s$ (iv) $\frac{3}{2}log_8p-\frac{3}{2}log_8q-log_8r-log_8s$

(v) $\frac{3}{2}log_8p+\frac{3}{2}log_8q+log_8r-log_8s$

11. If $log_{10}x=p$ and $log_{10}y=q$, then $xy=$

(i) 10^{2pq} (ii) $10^{(p+q)}$ (iii) 10^{pq} (iv) $10^{(p-q)}$

12. If $log_{10}x=p$ and $log_{10}y=q$, then $\frac{x}{y}=$

(i) $10^{(p-q)}$ (ii) $10^{(p+q)}$ (iii) 10^{pq} (iv) 10^{2pq}

13. If $log_3x=a$ and $log_3y=b$, then $3^{(a+1)}=$

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

14. If $log_2x=a$ and $log_2y=b$, then $2^{(a+b)}=$

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

15. If $\log_5 x = a$ and $\log_5 y = b$, then $5^{(a-b)} =$

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

16. If $\log_3 x = a$ and $\log_3 y = b$, then $3^{3b} =$

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

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

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

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

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

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

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

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

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

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

(i) $\frac{3}{2}\log q - \frac{1}{2}\log p$ (ii) $\frac{\frac{1}{3}\log p}{\log q}$ (iii) $\frac{1}{2}\log p - \frac{3}{2}\log q$ (iv) $\frac{1}{2}\log p + \frac{3}{2}\log q$

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

(i) $\log x - \log y - 2\log 6$ (ii) $\log x + \log y + 2\log 6$ (iii) $\log x + \log y - 2\log 6$ (iv) $\log x - \log y + 2\log 6$

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 $(x^4+y^4)=23x^2y^2$, 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) $log\,x-log\,y+log\,5$

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

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

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

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

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

(i) $\frac{log(z^2-y^2)}{log(z^2+y^2)}=5$ (ii) $log_x(z^2-y^2)-log_x(z^2+y^2)=4$ (iii) $log_x(z^2-y^2)+log_x(z^2+y^2)=7$

(iv) $log_x(z^2-y^2)+log_x(z^2+y^2)=6$ (v) $log_x(z^2-y^2)+log_x(z^2+y^2)=4$

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

(v) $(xy+xz-yz)=xyz$

30. If $log_3 x=a$ and $log_3 y=b$, then $3^{(a+1)}=$

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

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

(i) xy (ii) 10 (iii) yb (iv) ab (v) ax

32. If $log_4 x = a$ and $log_4 y = b$, then $4^{(a-b)} =$

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

33. If $log_9 x = a$ and $log_9 y = b$, then $9^{3b} =$

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

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

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

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

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

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

(i) $log\ p + \frac{1}{3} log\ q$ (ii) $\frac{3\,log\ p}{log\ q}$ (iii) $3\,log\ p - log\ q$ (iv) $log\ q - 3\,log\ p$ (v) $3\,log\ p + log\ q$

37. Express $log\ \frac{p^2}{q^4}$ 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) $4\,log\ q - 2\,log\ p$

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

(i) $\frac{3}{2} log\ p + \frac{1}{2} log\ q$ (ii) $\frac{3}{2} log\ p - \frac{1}{2} log\ q$ (iii) $\frac{1}{2} log\ q - \frac{3}{2} log\ p$ (iv) $\frac{3\,log\ p}{log\ q}$

39. 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) $log\ x - log\ y - 3\,log\,5$

40. If $(x^2+y^2)=11xy$, then $log(x-y)=$

(i) $\frac{1}{2}log\,x+\frac{1}{2}log\,y+log\,3$ (ii) $\frac{1}{2}log\,x-\frac{1}{2}log\,y-log\,3$ (iii) $\frac{1}{2}log\,x-\frac{1}{2}log\,y+log\,3$

(iv) $\frac{1}{2}log\,x+\frac{1}{2}log\,y-log\,3$

41. 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) $log\,x+log\,y-log\,6$

Assignment Key

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