EduSahara™ Assignment

Name : Logarithmic Expressions involving Variables

Chapter : Logarithms

Grade : ICSE Grade IX

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

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

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

2. If $log_9y+2log_9x=2$ express y in terms of x

(i) $y=\frac{81}{x}$ (ii) $y=\frac{x}{81}$ (iii) $y=\frac{x^2}{81}$ (iv) $y=\frac{81}{x^2}$

3. Express $log_8\frac{ac^3}{\sqrt{b}}$ in terms of log_8a , log_8b and log_8c

(i) $log_8a-3log_8c+\frac{1}{2}log_8b$ (ii) $log_8a+3log_8c+\frac{1}{2}log_8b$ (iii) $3log_8c-\frac{1}{2}log_8b+log_8a$

(iv) $log_8a+3log_8c-\frac{1}{2}log_8b$ (v) $log_8a-3log_8c-\frac{1}{2}log_8b$

4. Express $log_7\frac{\sqrt{p^2q^5}}{r^4s}$ in terms of log_7p , log_7q , log_7r and log_7s

(i) $log_7p+\frac{5}{2}log_7q+4log_7r-log_7s$ (ii) $log_7p-\frac{5}{2}log_7q-4log_7r+log_7s$

(iii) $log_7p+\frac{5}{2}log_7q-4log_7r-log_7s$ (iv) $log_7p-\frac{5}{2}log_7q-4log_7r-log_7s$

(v) $log_7p-\frac{5}{2}log_7q+4log_7r-log_7s$

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

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

6. 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}

7. Express $log_{10}\frac{x^2y^3}{z^5}$ in terms of $log_{10}x$, $log_{10}y$ and $log_{10}z$

(i) $2log_{10}x - 5log_{10}z + 3log_{10}y$ (ii) $2log_{10}x + 3log_{10}y + 5log_{10}z$ (iii) $2log_{10}x - 3log_{10}y + 5log_{10}z$

(iv) $2log_{10}x + 3log_{10}y - 5log_{10}z$ (v) $2log_{10}x - 3log_{10}y - 5log_{10}z$

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

(i) $y=\frac{x}{36}$ (ii) $y=\frac{x^2}{36}$ (iii) $y=\frac{36}{x^2}$ (iv) $y=\frac{36}{x}$

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9. Express $log_5\frac{a^4c}{\sqrt{b}}$ in terms of $log_5 a$, $log_5 b$ and $log_5 c$

(i) $4log_5 a - log_5 c + \frac{1}{2}log_5 b$ (ii) $4log_5 a + log_5 c + \frac{1}{2}log_5 b$ (iii) $log_5 c - \frac{1}{2}log_5 b + 4log_5 a$

(iv) $4log_5 a + log_5 c - \frac{1}{2}log_5 b$ (v) $4log_5 a - log_5 c - \frac{1}{2}log_5 b$

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10. Express $log_7\frac{\sqrt{p^2q^2}}{r^3s^2}$ in terms of $log_7 p$, $log_7 q$, $log_7 r$ and $log_7 s$

(i) $log_7 p - log_7 q - 3log_7 r - 2log_7 s$ (ii) $log_7 p + log_7 q - 3log_7 r - 2log_7 s$

(iii) $log_7 p - log_7 q - 3log_7 r + 2log_7 s$ (iv) $log_7 p - log_7 q + 3log_7 r - 2log_7 s$

(v) $log_7 p + log_7 q + 3log_7 r - 2log_7 s$

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

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

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

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

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

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

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14. If $log_8 x = a$ and $log_8 y = b$, then $8^{(a+b)} =$

(i) ax (ii) 8 (iii) xy (iv) ab (v) yb

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

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

16. If $log_6 x = a$ and $log_6 y = b$, then $6^{3b} =$

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

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

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

18. Express $log\ \sqrt{pq^5}$ in terms of $log\ p$ and $log\ q$

(i) $\frac{1}{2}log\ p + \frac{5}{2}log\ q$ (ii) $5\,log\ q - log\ p$ (iii) $log\ p + 5\,log\ q$ (iv) $\frac{\frac{1}{5}log\ p}{log\ q}$ (v) $log\ p - 5\,log\ q$

19. Express $log\ \sqrt[3]{p^2q^5}$ in terms of $log\ p$ and $log\ q$

(i) $\frac{2}{3}log\ p + \frac{5}{3}log\ q$ (ii) $2\,log\ p + 5\,log\ q$ (iii) $5\,log\ q - 2\,log\ p$ (iv) $2\,log\ p - 5\,log\ q$ (v) $\frac{\frac{2}{5}log\ p}{log\ q}$

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

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

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

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

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 $(x^2+y^2)=11xy$, 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) $\frac{1}{2}log\,x-\frac{1}{2}log\,y+log\,3$

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24. 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) $log\,x+log\,y+log\,6$

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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) $log\,x+log\,y$

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

(v) $log_x(z+y)+log_x(z-y)=5$

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

(i) $log_x(z-y)+log_x(z^2+zy+y^2)=6$ (ii) $\frac{log(z-y)}{log(z^2+zy+y^2)}=4$ (iii) $log_x(z-y)-log_x(z^2+zy+y^2)=3$

(iv) $log_x(z-y)+log_x(z^2+zy+y^2)=3$ (v) $log_x(z-y)+log_x(z^2+zy+y^2)=5$

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

(i) $log_x(z^2-y^2)+log_x(z^2+y^2)=6$ (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) $\frac{log(z^2-y^2)}{log(z^2+y^2)}=5$ (v) $log_x(z^2-y^2)+log_x(z^2+y^2)=4$

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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) $(x+y+z)=xyz$ (iii) $(xy+xz+yz)=xyz$ (iv) $(xy-xz-yz)=xyz$

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

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30. If $log_8 x=a$ and $log_8 y=b$, then $8^{(a+1)}=$

(i) $8y$ (ii) 8 (iii) $8b$ (iv) $8a$ (v) $8x$

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

(i) ab (ii) ax (iii) yb (iv) 5 (v) xy

32. If $\log_9 x = a$ and $\log_9 y = b$, then $9^{(a-b)} =$

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

33. If $\log_7 x = a$ and $\log_7 y = b$, then $7^{3b} =$

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

34. Express $\log\ p^3q^2$ 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) $\frac{\frac{3}{2}\log p}{\log q}$

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

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

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

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

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

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

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

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

39. If $(x^2 + y^2) = 14xy$, then $2\log(x+y) =$

(i) $\log x + \log y - 2\log 4$ (ii) $\log x - \log y - 2\log 4$ (iii) $\log x - \log y + 2\log 4$ (iv) $\log x + \log y + 2\log 4$

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