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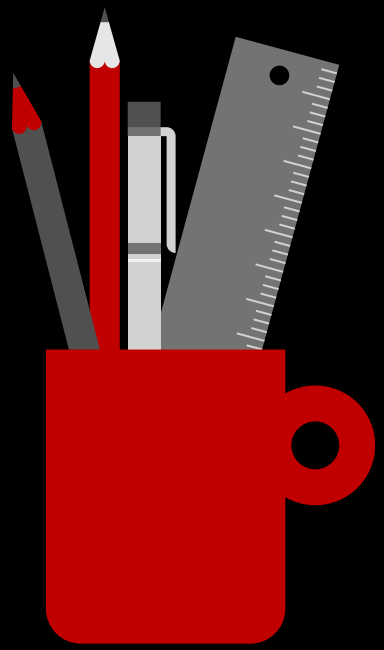

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Ex. 3.3

1. write the following into sum or difference:

(i) $\log(A \times B)$ $\quad \because \log_a mn = \log_a m + \log_a n$

$= \log A + \log B$

1

ii) $\log \frac{15.2}{30.2}$

$\therefore \log_a \frac{m}{n} = \log_a m - \log_a n$

$= \log 15.2 - \log 30.2$

iii) $\log \frac{21 \times 5}{8}$

$= \log 21 + \log 5 - \log 8$

iv) $\log \sqrt[3]{\frac{7}{15}}$

$= \log \left[\frac{7}{15}\right]^{1/3}$ $\quad \because \log_a m^n = n \log_a m$

$= \frac{1}{3} \log \left[\frac{7}{15}\right]$

$= \frac{1}{3} [\log 7 - \log 15]$

v) $\log \frac{(22)^{1/3}}{5^3}$

$= \log (22)^{1/3} - \log 5^3$

$= \frac{1}{3} \log 22 - 3 \log 5$

vi) $\log \frac{25 \times 47}{29}$

$= \log 25 + \log 47 - \log 29$

② Express $\log x - 2\log x + 3\log(x+1) - \log(x^2-1)$ as a single logarithm.

Sol^n

$$\log x - 2\log x + 3\log(x+1) - \log(x^2-1)$$

$$= \log x - \log x^2 + \log(x+1)^3 - \log(x^2-1)$$

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

$$= \log \frac{(x+1)(x+1)^2}{x(x+1)(x-1)}$$

$$= \log \frac{(x+1)^2}{x(x-1)}$$ Ans.


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3) write the following in the form of single logarithm.

(i) $\log 21 + \log 5$

$= \log 21 \times 5$

(ii) $\log 25 - 2\log 3$

$= \log 25 - \log 3^2$

$= \log \frac{25}{3^2}$

(iii) $2\log x - 3\log y$

$= \log x^2 - \log y^3$

$= \log \frac{x^2}{y^3}$

(iv) $\log 5 + \log 6 - \log 2$

$= \log \frac{5 \times 6}{2}$

$= \log 15$

④ Calculate the following:

(i) $\log_3 2 \times \log_2 81$

$= \frac{\log 2}{\log 3} \times \frac{\log 81}{\log 2}$

$= \frac{\log 3\times3\times3\times3}{\log 3}$

$= \frac{\log 3^4}{\log 3}$

$= 4\frac{\log 3}{\log 3}$

$= 4$ Ans

(9) ii) $\log_5 3 \times \log_3 25$

$= \frac{\log 3}{\log 5} \times \frac{\log 25}{\log 3}$

$= \frac{\log 5 \times 5}{\log 5}$

$= \frac{\log 5^2}{\log 5}$

$= \frac{2 \log 5}{\log 5}$

$= 2$

⑤ $\log 2 = 0.3010$, $\log 3 = 0.4771$

$\log 5 = 0.6990$

(i) $\log 32$

$= \log 2 \times 2 \times 2 \times 2 \times 2$

$= \log 2^5$

$= 5 \log 2$

$= 5 (0.3010)$

$= 1.505$

5) (ii)

$$\log 24$$

$$= \log 2 \times 2 \times 2 \times 3$$

$$= \log 2^3 \times 3$$

$$= \log 2^3 + \log 3$$

$$= 3\log 2 + \log 3$$

$$= 3(0.3010) + (0.4771)$$

$$= 0.903 + 0.4771$$

$$= 1.3801$$ Ans

iii) $\log \sqrt{3\frac{1}{3}}$

$= \log \left[\frac{10}{3}\right]^{1/2}$

$= \frac{1}{2} \log \left(\frac{10}{3}\right)$

$= \frac{1}{2} [\log 10 - \log 3]$

$= \frac{1}{2} [\log 2 \times 5 - \log 3]$

$= \frac{1}{2} [\log 2 + \log 5 - \log 3]$

$= \frac{1}{2} [0.3010 + 0.6990 - 0.4771]$

$= \frac{1}{2} [0.5229]$

$= 0.2614$

5)
iv)

$\log \frac{8}{3}$

$= \log 8 - \log 3$

$= \log (2 \times 2 \times 2) - \log 3$

$= \log 2^3 - \log 3$

$= 3 \log 2 - \log 3$

$= 3(0.3010) - 0.4771$

$= 0.903 - 0.4771$

$= 0.4259$

5)

v) $\log 30$

$= \log 5 \times 6$

$= \log 5 \times 2 \times 3$

$= \log 5 + \log 2 + \log 3$

$= 0.6990 + 0.3010 + 0.4771$

$= 1.4771$