Cosmo School

Work Sheet – 04 (Mathematics) for class – Ten (21.10.2020)

Chapter – Four, Exercise - 4.2 Exponents and Logarithms

Creative Questions:

1. **(i) $A = 125^p - 11 \times 25^p + 24$ and $B = 7 - 5 \times 5^p$**
(ii) $L = 2\log_3 x - \log_3(x+6) + 1$. **[Ctg.B.- 20]**

a) If $\log_7 2 = \alpha$, $\log_7 3 = \beta$ and $\log_7 5 = \gamma$ then express $\log_7 \frac{15}{2}$ in terms of α, β and γ.
b) If A = 7B then find the value of p.
c) If L = 2 then find the value of x.

2. **If $A = x^4 - 10x^2 + 1$, $B = \log_{10}\sqrt{27}$ $C = \log_{10}\sqrt{\frac{1}{8}}$ and $D = \frac{1}{2}\log_{10}125$.** **[R.B.- 19]**

a) Resolve into factors: $m^4 - 6m^2 + 1$.
b) If A = 0 then find the value of $x^4 + \frac{1}{x^4}$.
c) Prove that, $(B - C - D) \div \log_{10} 1.2 = \frac{3}{2}$.

3. **$a = \frac{x^p}{x^q}, b = \frac{x^q}{x^r}$ and $c = \frac{x^r}{x^p}$** **[D.B.- 17]**

a) Find the value of abc.
b) Prove that, $a^{\frac{1}{pq}} \times b^{\frac{1}{qr}} \times c^{\frac{1}{rp}} = 1$.
c) Show that, $(p+q)\log a + (q+r)\log b + (r+p)\log c = 0$.

4. **$A = x^p, B = x^q, C = x^r$ and $M = 2^{2x+1}$ are some expressions.** **[Dj.B.- 17]**

a) If M = 512 then find the value of x.
b) Find the value of $\left(\frac{A}{B}\right)^{p^2+pq+q^2} \times \left(\frac{B}{c}\right)^{q^2+qr+r^2} \times \left(\frac{C}{A}\right)^{r^2+rp+p^2}$
c) Prove that, $\log_x(ABC) = \log_x A + \log_x B + \log_x C$.

5. **If $A = 6^{p+q}, B = 6^{q+r}$ and $C = 6^{r+p}$ then -** **[B.B.- 15]**

a) Find the value of $\log_{3\sqrt{2}} 324$.
b) Find the value of $\left(\frac{A}{B}\right)^{p+r} \times \left(\frac{B}{C}\right)^{q+p} \times \left(\frac{C}{A}\right)^{r+q}$
c) Show that, $(AB)^{p-r} \times (BC)^{q-p} \times (CA)^{r-q} = 1$.

6. **Here $A = 6^{p+q}, B = 6^{q+r}$ and $C = 6^{p+r}$.**

a) Determine the value of $\log_6 A^2$.
b) Determine the value of $\left(\frac{A}{B}\right)^{p+r} \times \left(\frac{B}{C}\right)^{q+p} \times \left(\frac{C}{A}\right)^{r+q}$
c) Prove that, $\log_6\{(AB)^{p-r} \times (BC)^{q-p} \times (CA)^{r-q}\} = 0$.

7. **$A = \frac{2^{n+4} - 4.2^{n+1}}{2^{n+2} \div 2}$, $B = \log_{3\sqrt{2}} 324$, $C = (16)^{\frac{3}{4}} \div (16)^{\frac{1}{2}}$ and $D = 9^{\frac{1}{4}}.3^{\frac{1}{2}}$**

a) Simplify: C + D.
b) Show that, A = B.
c) Determine the value of $\log_{2\sqrt{5}} 400 + B - \log_A C + \log_3 D\sqrt{D} + 2$.

8. **Suppose, $\sqrt{\frac{p}{q}} + \sqrt{\frac{q}{p}} = 3$ then -**

a) Find the value of $(p+q)^2$.
b) Show that, $\log(p+q) = \log 3 + \frac{1}{2}\log p + \frac{1}{2}\log q$.
c) Find the value of $4\log(p+q)$.

9. **If $x = 2, y = 3, z = 5$ and $w = 7$ are give -**

a) Find the log $\sqrt[5]{y^3}$ to the base 3.
b) Find the value of $w\log\frac{xz}{y^2} - x\log\frac{z^2}{x^2y} + y\log\frac{y^4}{x^4z}$.
c) Show that, $\frac{\log\sqrt{y^3} + y\log x - \frac{y}{x}\log(xz)}{\log(xy) - \log z} = \log_y\sqrt{y^3}$.