Work Sheet- 3 for Class- Ten (15.08.2020), Chapter- Nine

Exercise- 9.1

Exponential and Logarithmic Function

<u>Creative Questions</u>:

1. $P = \frac{\log_k(3+k)}{\log_k x}$ and $\frac{1}{N} = \frac{x-1}{2x}$. **[D.B.- 20]**

a) Solve the inequality: $3a - 2 > 2a - 1$.

b) If $6\sqrt{N} + 5\sqrt{\frac{1}{N}} = 13$ then find the value of x.

c) If p = 2 then show that $x = \frac{1+\sqrt{13}}{2}$.

2. $A = x^2 + 2, x \geq 0$ **and** $S = \{(x, y) : x^2 + y^2 - 6x + 10y - 47 = 0\}$. **[My.B.- 20]**

a) Resolve into factors: $4x^4 + 8x^3 - x^2 - 2x$.

b) If $A = 3^{\frac{2}{3}} + 3^{-\frac{2}{3}}$ then prove that, $3x^3 + 9x - 8 = 0$.

c) Sketch the graph of the relation S and determine from the graph whether the relation is a function.

3. **(i)** $px^2 + qx + r = 0$ **and (ii)** $m^2 + n^2 = 7mn$ **are two quadratic equations. [Ctg.B.- 20]**

a) Solve the inequality $4(3 - 2t) \geq 2(2 - 3t)$.

b) From the 2nd equation prove that, $\log\frac{m+n}{3} = \log\sqrt{m} + \log\sqrt{n}$.

c) If p = 1, q = −5 and r = 4 then solve the equation no. (i) with the help of graph.

4. **If** $x^{\frac{1}{p}} = y^{\frac{1}{q}} = z^{\frac{1}{r}}, m = 2, n = 3$ **and** $g^2 = h^3$ **then - [D.B.- 19]**

a) Find the nature of the roots of the equation $3 + 7x - 5x^2 = 0$.

b) Prove that, $\left(\frac{g}{h}\right)^{\frac{n}{m}} + \left(\frac{h}{g}\right)^{\frac{m}{n}} = \sqrt{g} + \frac{1}{\sqrt[3]{h}}$.

c) If xyz = 1 then prove that $\frac{1}{a^q + a^{-r} + 1} + \frac{1}{a^r + a^{-p} + 1} + \frac{1}{a^p + a^{-q} + 1} = 1$.

5. $A = \frac{1}{y^q + y^{-r} + 1} + \frac{1}{y^r + y^{-p} + 1} + \frac{1}{y^p + y^{-q} + 1}$ **and** $\log_e(3 + x) = 2\log_e x$. **[R.B.- 19]**

a) If $\log_{\sqrt{27}} m = 3\frac{1}{3}$ then determine the value of m.

b) If $p + q + r = 0$ then prove that, A = 1.

c) From 2nd equation then prove that, $x = \frac{\sqrt{13}+1}{2}$.

6. $\sqrt[x]{a} = \sqrt[y]{b} = \sqrt[z]{c}$ **[B.B.- 17]**

a) If a = c show that, x = z.

b) If $x = \frac{1}{2}$ and $y = \frac{1}{3}$ then show that, $\left(\frac{a}{b}\right)^{\frac{3}{2}} + \left(\frac{b}{a}\right)^{\frac{2}{3}} = a^{\frac{1}{2}} + b^{-\frac{1}{3}}$.

c) If abc = 1 then prove that, $\frac{1}{p^{-x} + p^y + 1} + \frac{1}{p^{-y} + p^z + 1} + \frac{1}{p^{-z} + p^x + 1} = 1$.

7. **If** $a^x = b^y = c^z$ **where** $a \neq b \neq c$. **[J.B.- 15]**

a) If $p^{p\sqrt{p}} = (p\sqrt{p})^p$ then find the value of P.

b) If $ab = c^2$ then prove that, $\frac{1}{x} + \frac{1}{y} = \frac{2}{z}$

c) If abc = 1 then prove that, $\frac{1}{x^3} + \frac{1}{y^3} + \frac{1}{z^3} = \frac{3}{xyz}$.

8. **If** $32y^x - y^{2x} = 256 \ldots\ldots(i)$, $4^x = y^2 \ldots\ldots(ii)$ **and** $F(z) = In\left(\frac{5+z}{5-z}\right) \ldots\ldots(iii)$

a) Show the solution in number line: $8 \geq 2 - 2x$.

b) Find (x, y) using (i) and (ii).

c) Find the domain and range of F(z).

9. $4^x - 3^{x-\frac{1}{2}} = 3^{x+\frac{1}{2}} - 2^{2x-1}$ **is an exponential equation.**

a) Express the equation in the form of $2^{2x}.a = 3^x.b$ where a and b are constants.

b) Solve the equation.

c) Verify the exactness of the equation and show that, $4^x - 3^{x+\frac{1}{2}} \neq 3^{x+\frac{1}{2}} - 2^{2x-1}$.