Ex. 25 Prove that log₃ 5 is an irrational.

$$br_{3} = \frac{k}{q} + wrong$$

$$5 = 3^{\frac{k}{q}}$$

$$(5^{\frac{q}{2}}) = (3^{\frac{k}{2}}) \times$$

• Ex. 30 Given,
$$a^2 + b^2 = c^2$$
. Prove that
 $\log_{b+c} a + \log_{c-b} a = 2\log_{c+b} a \cdot \log_{c-b} a, \forall a > 0, a \neq 1$
 $c - b > 0, c + b > 0$
 $c - b \neq 1, c + b \neq 1.$
 $\log_y 2 = \frac{1}{\log_y 2}$
LHS = $\frac{1}{\log_x (b+c)} + \frac{1}{\log_a (c-b)}$
 $= \frac{\log_a (c-b) + \log_a (c+b)}{\log_a (c-b)} = \frac{\log_a (a^2)}{\log_a (c+b) \log_a (c-b)}$
 $= 2 \log_{a} (b + b) = \frac{1}{2} \log_a (b + b)$

• Ex. 32 If
$$a^x = b$$
, $b^y = c$, $c^y = a$, $x = \log_b a^{k_1}$, $y = \log_c b^{k_2}$,
 $1 = \log_a c^{k_3}$, find the minimum value of $3k_1 + 6k_2 + 12k_3$.
 $\chi = \log_a a^{k_1}$ $\chi = \log_a a^{k_1}$ $\chi = \log_c b^{k_2}$
 $\chi = \log_a a^{k_1}$ $\chi = \log_c b^{k_2}$
 $\chi = \log_a a^{k_1}$ $\chi = \log_c b^{k_2}$

• Ex. 36 Find the square of the sum of the roots of the equation $\log_2 x \cdot \log_3 x \cdot \log_5 x = \log_2 x \cdot \log_3 x$ + $\log_3 x \cdot \log_5 x + \log_5 x \cdot \log_2 x$.

$$\log n = \alpha \quad \log 3 n = b \quad \log 5 n = C.$$

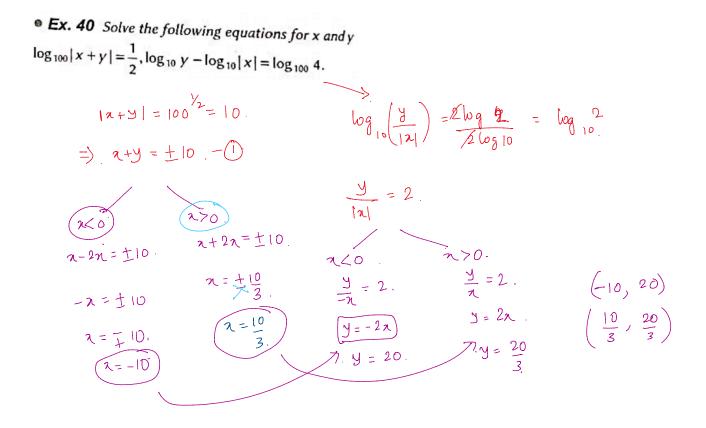
$$\perp = \log 2 \perp = \log 3 \quad \perp = \log 5$$

$$ug_{2} = u \quad v_{1} = u_{1} =$$

 $\log_2 b = 2\lambda^2$

 $\frac{2\log c}{3\log 2} = \frac{\lambda^3 + 1}{2}$ $\log c = \frac{3\lambda^3 + 3}{4}$

• Ex. 37 Given that
$$\log_2 a = \lambda \log_4 b = \lambda^*$$
 and
 $\log_{c^2}(8) = \frac{2}{\lambda^3 + 1}$, write $\log_2\left(\frac{a^2b^5}{c^4}\right)$ as a function of λ^*
(a, b, c > 0, c \neq 1).
 $\log_2 a^2 + \log_2 b^5 - \log_2 c^4$
 $\log_2 b = 2\lambda^2$.
 \log



• Ex. 43 Find all real numbers x which satisfy the equation $2\log_2(\log_2 x + \log_{1/2}\log_2(2\sqrt{2}x) = 1$.

$$\log_{2} x = a$$

$$2 \log_{2} a + \log_{1/2} \left[\log_{2} 2(1 + \log_{2} a^{2}) \right] = 1$$

$$2 \log_{2} a + \log_{1/2} \left[\frac{a}{2} + a \right] = 1$$

$$2 \log_{2} a + \log_{1/2} \left[\frac{a}{2} + a \right] = 1$$

$$2 \log_{2} a + \log_{1/2} \left[\frac{a}{2} + a \right] = 1$$

$$2 \log_{2} a + \log_{1/2} \left(\frac{a}{2} + a \right) = 1$$

$$2 \log_{2} a - \log_{2} \left(\frac{a}{2} + a \right) = 1$$

$$\log_{1/2} \left(\frac{a}{2} + a \right) = 1$$

$$\log_{2} \left(\frac{a^{2}}{2} + a \right) = 1$$

$$\log_{2} \left(\frac{a^{2}}{2} + a \right) = 1$$

$$a^{2} - 2a - 3 = 0.$$

$$(a - 3) (a + 1) = 0$$

$$a = 3, -1.$$

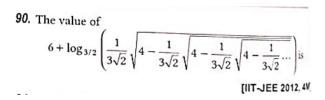
$$\log_{2} A = \frac{3}{2}, -1$$

$$(a-3)((a+1) = 0.$$

$$a = 3, -1.$$

$$b = a^{2}, -1.$$

$$c = a^$$



89. Let (x_0, y_0) be solution of the following equations $(2x)^{\ln 2} = (3y)^{\ln 3}$ and $3^{\ln x} = 2^{\ln y}$, then x_0 is

(a) $\frac{1}{6}$	(b) $\frac{1}{3}$	(c) $\frac{1}{2}$	[IIT-JEE 2011, 3M]
			(d) 6

[11 SEE 2012, **;

91. If
$$3^{x} = 4^{x-1}$$
, then x equals [JEE Advanced 2013.38]
(a) $\frac{2\log_{3}2}{2\log_{3}2 - 1}$ (b) $\frac{2}{2 - \log_{2}3}$
(c) $\frac{1}{1 - \log_{4}3}$ (d) $\frac{2\log_{2}3}{2\log_{2}3 - 1}$