!! Logarithm !!

→ Every +ve real number N can be expressed in exponential form as.

$$a^x = N$$

$a \to$ +ve real ~~no~~ number > 0 but $\neq 1$

$x \to$ Exponent

eg. $2^2 = 4$, $\left(\frac{1}{2}\right)^4 = \frac{1}{16}$ etc

Reason I

$2^{y} = 4$, $\left(\frac{1}{2}\right)^{y} = \frac{1}{16}$ $(8.2)^{y} = 16.32$

To find y.

Reason II

(Base = 10)

1000	$\log = 3$
100	$\log = 2$
10	$\log = 1$
1	$\log = 0$

For the above reasons we introduced log. It is expressed as

$$\log_a N = x$$

$a \to$ Base
$x \to$ exponent

[a की Power को कितना Raise करें की N आ जाये.]

eg. $\log_2 8 = 3$ [2 की Power को कितने Raise करे कि 8 आये]

$\log_6 216 = 3$

$\log_2 \frac{1}{16} = -4$

$\log_{0.6}\left(\frac{25}{9}\right) = \cancel{2}$

$0.6 = \frac{6}{10}$

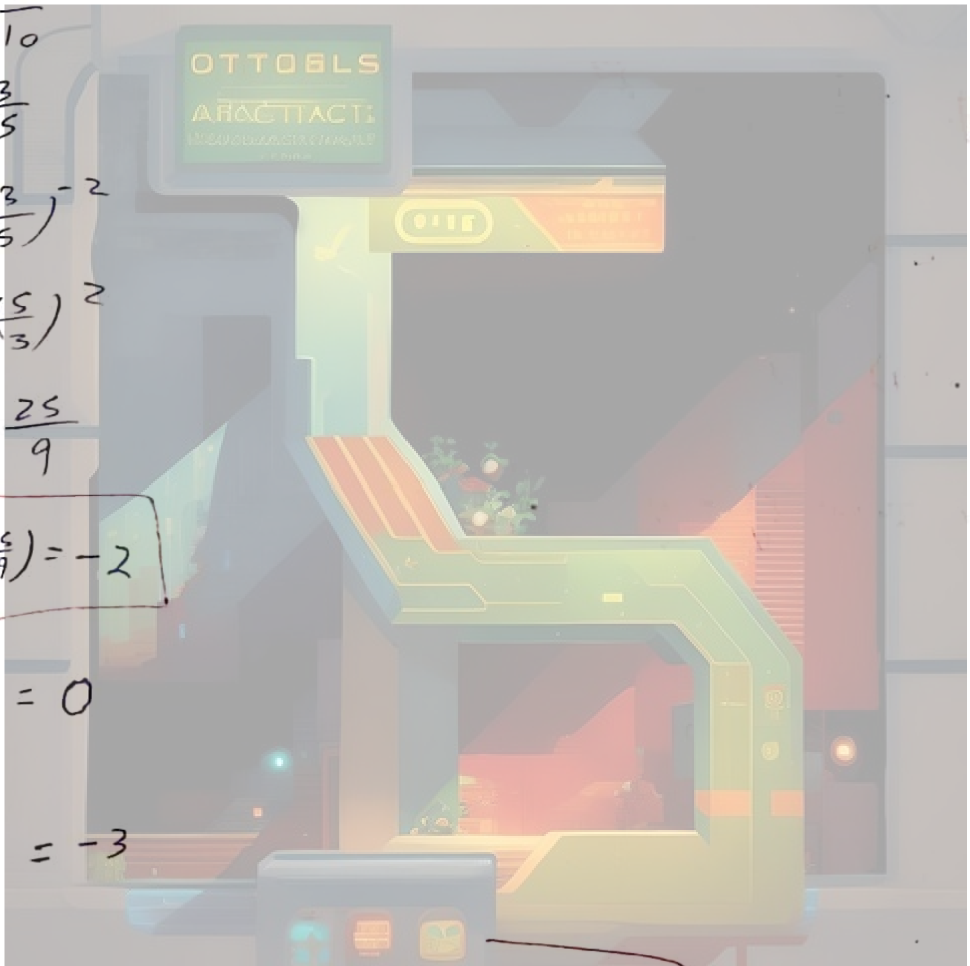
$= \frac{3}{5}$

$= \left(\frac{3}{5}\right)^{-2}$

$= \left(\frac{5}{3}\right)^{2}$

$= \frac{25}{9}$

$\boxed{\log_{0.6}\left(\frac{25}{9}\right) = -2}$



$\log_{\frac{1}{2}}(1) = 0$

$\log_{\frac{1}{3}} 27 = -3$

$\log_1\left(\frac{1}{2}\right) =$ Not Defined

$\log_{(-2)}(16) = 4$ (Wrong)

$(16)^{1/4} = \sqrt{4} = |\pm 2| = 2 \neq -2$

Thus Base is ⊕ve

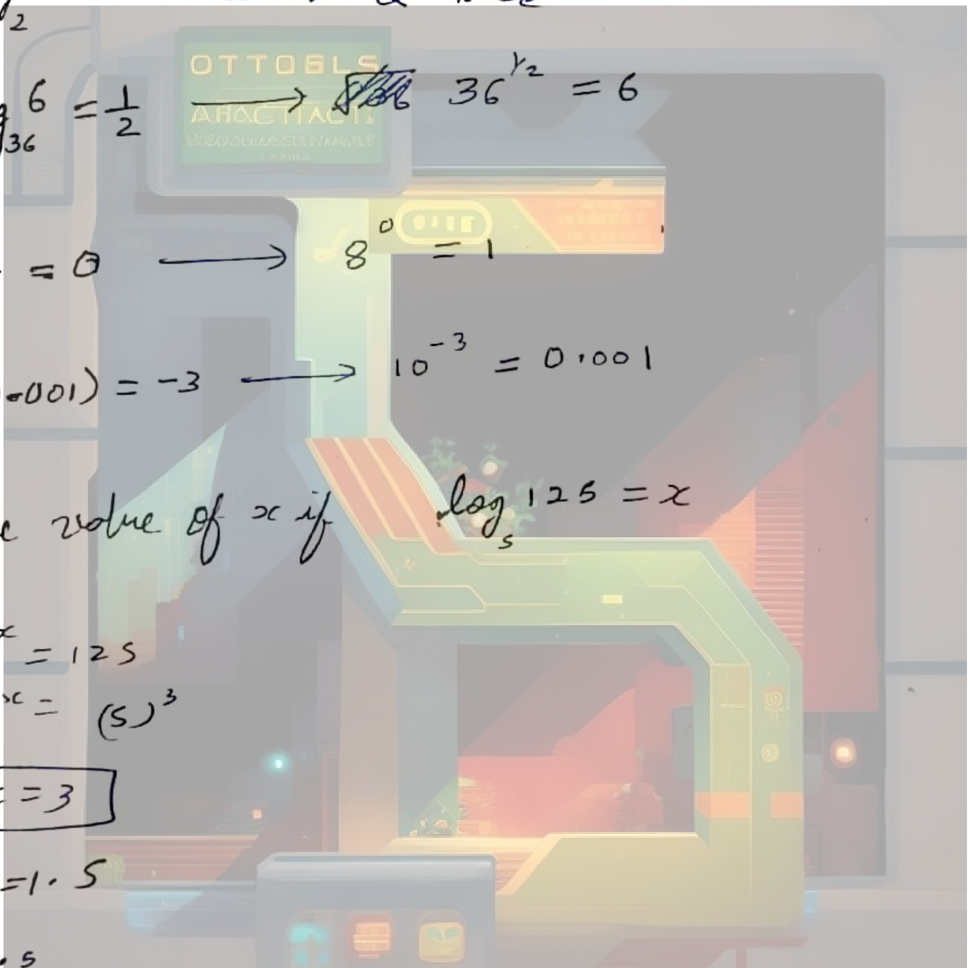
$\neq 1$

$$\log_a N = x$$

$a > 0$ $\quad$ $a \neq 1$ $\quad$ $N > 0$

Q Conversion of Logarithm form in exponential form.

① $\log_2 32 = 5 \longrightarrow 2^5 = 32$



② $\log_{36} 6 = \frac{1}{2} \longrightarrow \cancel{\sqrt{36}}\ 36^{1/2} = 6$

③ $\log_8 1 = 0 \longrightarrow 8^0 = 1$

④ $\log_{10}(0.001) = -3 \longrightarrow 10^{-3} = 0.001$

Q find the value of x if $\log_5 125 = x$

$5^x = 125$

$5^x = (5)^3$

$\boxed{x = 3}$

Q $\log_2 m = 1.5$

$2^{1.5} = m$

$2^{3/2} = m$

$\sqrt{2^3} = m$

$\sqrt{8} = m$

$\boxed{m = 2\sqrt{2}}$

Note - For some number different bases gives different answers.

Q Find log

(1) 32 (base $\frac{1}{2}$)

$$\log_{1/2} 32 = x$$

$$\left(\frac{1}{2}\right)^x = 32$$

$$\frac{1}{2^x} = 32$$

$$\frac{1}{2^x} = 2^5$$

$$2^{-x} = 2^5$$

$$-x = 5$$

$$\boxed{x = -5}$$

(2) 32 (base 2)

$$\log_2 32 = x$$

$$2^x = 32$$

$$2^x = 2^5$$

$$\boxed{x = 5}$$

(3) $3\sqrt{3}$ (base 3)

$$\log_3 3\sqrt{3} = x$$

$$3^x = 3\sqrt{3}$$

$$3^x = \sqrt{27}$$

$$3^x = \cancel{27}\,[(3)^3]^{1/2}$$

$$3^x = 3^{3/2}$$

$$\boxed{x = 3/2}$$

(4) $3\sqrt{3}$ (base $\frac{1}{3}$)

$$\log_{1/3} 3\sqrt{3} = x$$

$$\left(\frac{1}{3}\right)^x = 3\sqrt{3}$$

$$3^{-x} = 3^{3/2}$$

$$-x = \frac{3}{2}$$

$$\boxed{x = -3/2}$$

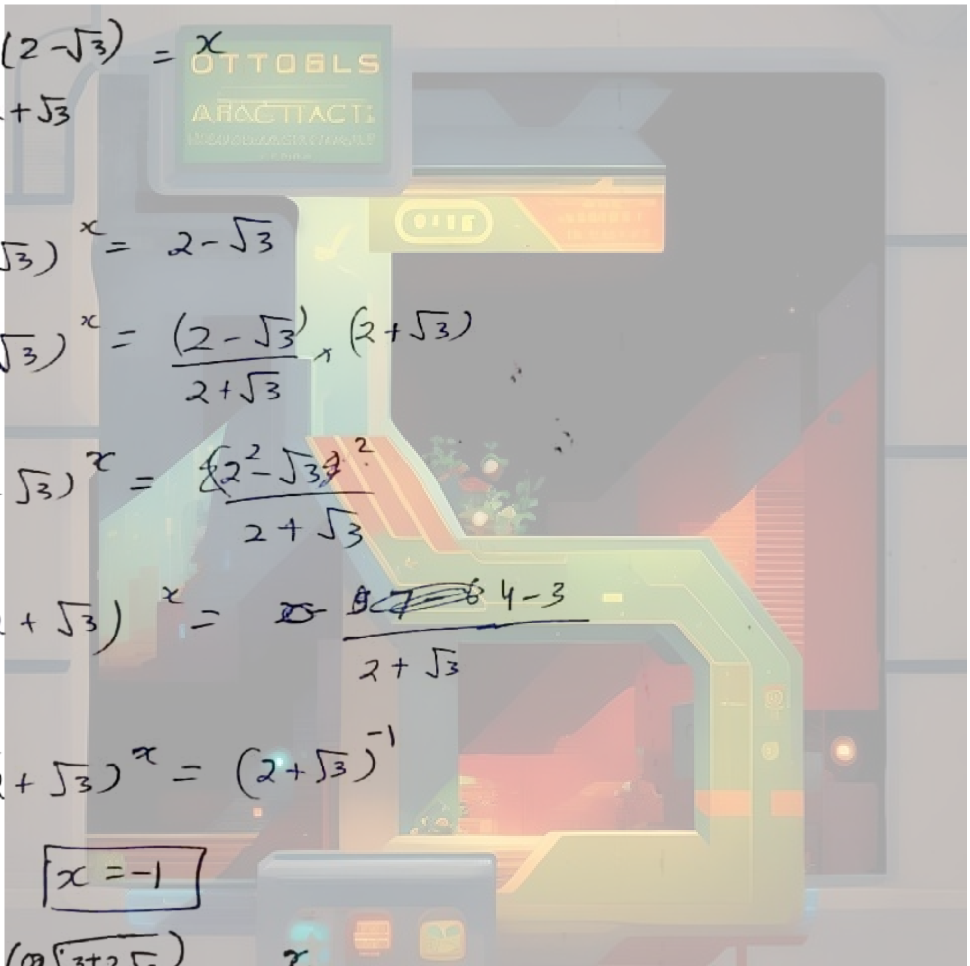
Note :-

① $\log_a 1 = 0 \quad (a > 0, a \neq 1)$

② $\log_N N = 1$

③ $\log_{\frac{1}{N}} N = -1$ or $\log_N \frac{1}{N} = -1 \quad (N \geq 0, N \neq 1)$

Q find value of



① $\log_{2+\sqrt{3}} (2-\sqrt{3}) = x$

$(2+\sqrt{3})^x = 2-\sqrt{3}$

$(2+\sqrt{3})^x = \frac{(2-\sqrt{3})}{2+\sqrt{3}} \times (2+\sqrt{3})$

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

$(2+\sqrt{3})^x = \frac{4-3}{2+\sqrt{3}}$

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

$\boxed{x = -1}$

② $\log_{(1+\sqrt{2})} (\sqrt{3+2\sqrt{2}}) = x$

$(1+\sqrt{2})^x = (\sqrt{2}+1)^1$

$\boxed{x = 1}$

H.W. 03-06-2024

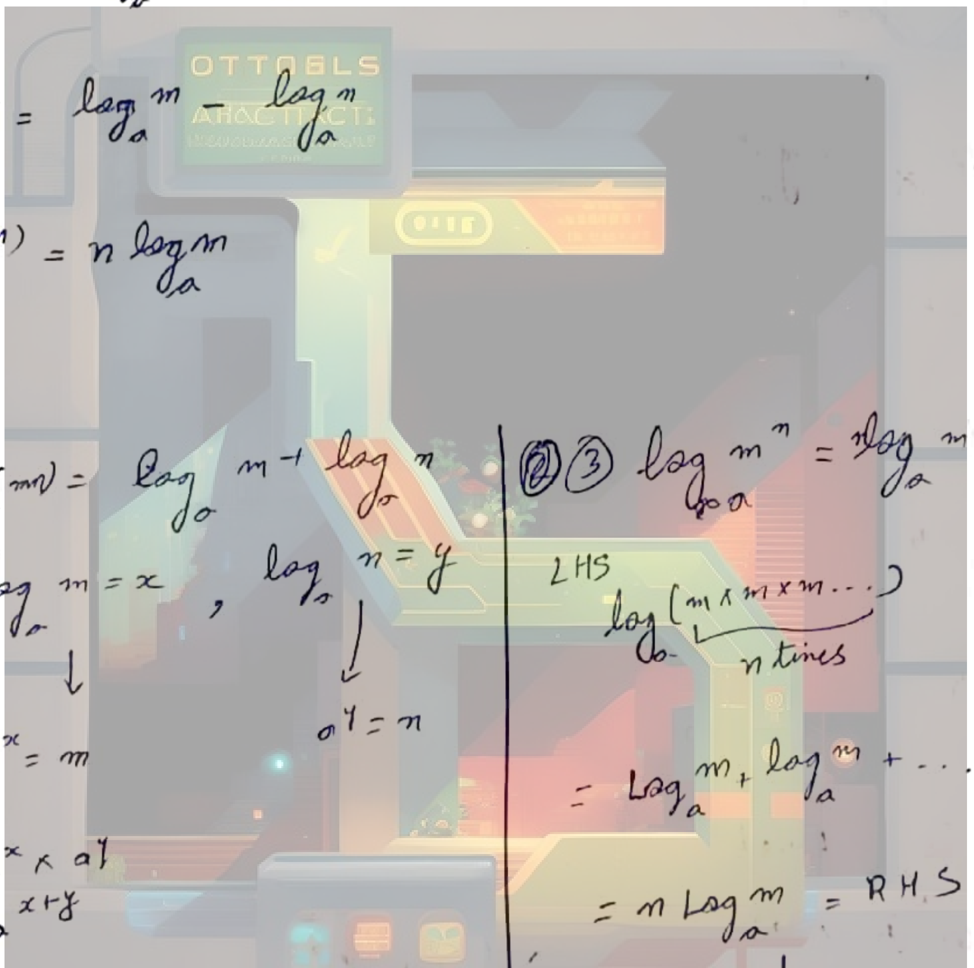
DYS-1 {Q1, 2, 3, 4, 5, 6, 7, 8, 9, 10}

Principle Properties of log $\{a>0, \neq 1 ;\ m \,\&\, n>0\}$

① $\log_a(mn) = \log_a m + \log_a n$ (can put more than two terms)

② $\log_a\left(\frac{m}{n}\right) = \log_a m - \log_a n$

③ $\log_a(m^n) = n\log_a m$



Proof :-

① $\log_a(mn) = \log_a m + \log_a n$

let $\log_a m = x$, $\log_a n = y$

$\downarrow \qquad\qquad \downarrow$

$a^x = m \qquad a^y = n$

$\therefore mn = a^x \times a^y$

$= a^{x+y}$

$\log_a(mn) = x+y$

$= \log_a m + \log_a n$

③ $\log_a m^n = n\log_a m$

LHS

$\log_a(\underbrace{m \times m \times m \ldots}_{n \text{ times}})$

$= \log_a m + \log_a m + \ldots\ldots n$ times

$= n\log_a m$ = RHS

Hence Proved

Note -

① $\log_{1/2} \log_4 2$

$\log_4 2 = \frac{1}{2}$

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

$\boxed{x = 1}$

② $\log_a N \cdot \log_b M$

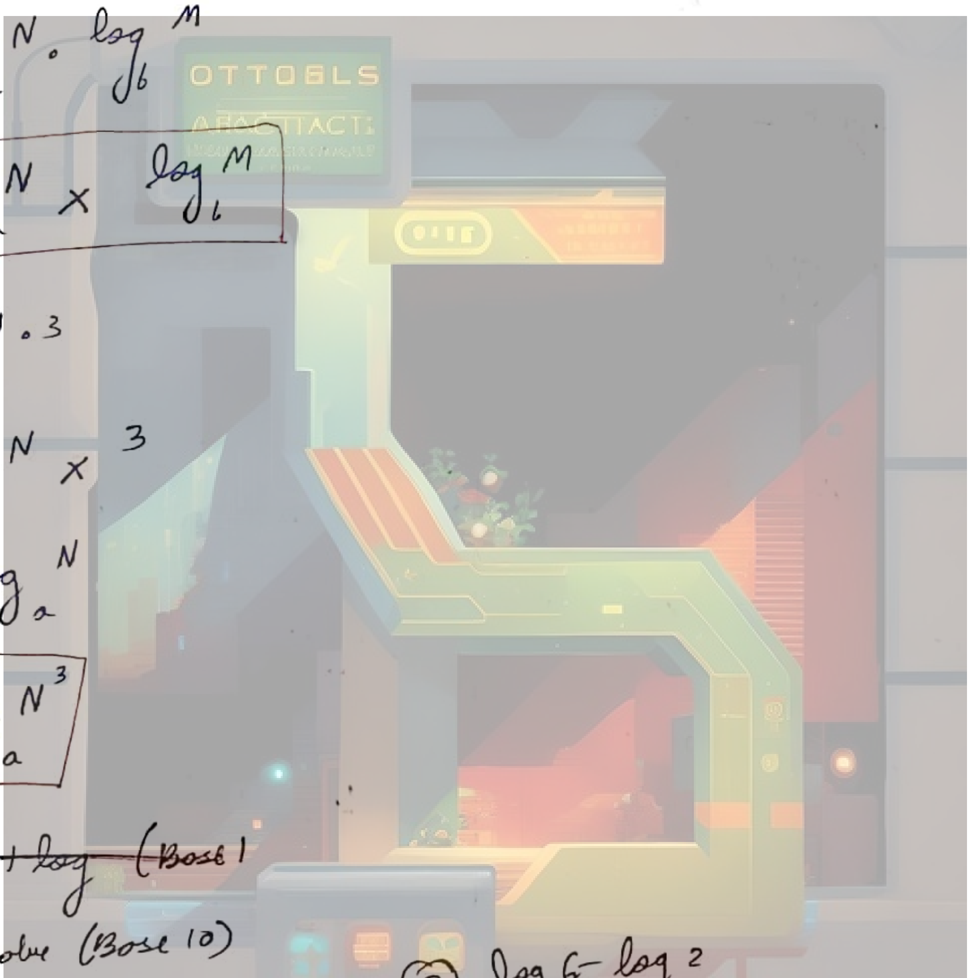
$\boxed{\log_a N \times \log_b M}$

③ $\log_a N \cdot 3$

$\log_a N \times 3$

$3\log_a N$

$\boxed{\log_a N^3}$



~~① log 3 + log (Base 1~~

Q Find value (Base 10)

① $\log 3 + \log 5$

$\log_{10} (3 \times 5)$

$\boxed{\log_{10} 15}$

② $\log 6 - \log 2$

$\log\left(\frac{6}{2}\right)$

$\log_{10} 3$

(3) $3 \log 4$

$\log (4^3)$

$\cancel{\log (64)}$

$\log_{10} 64$

(4) $\log 2\,36 - \log 1$

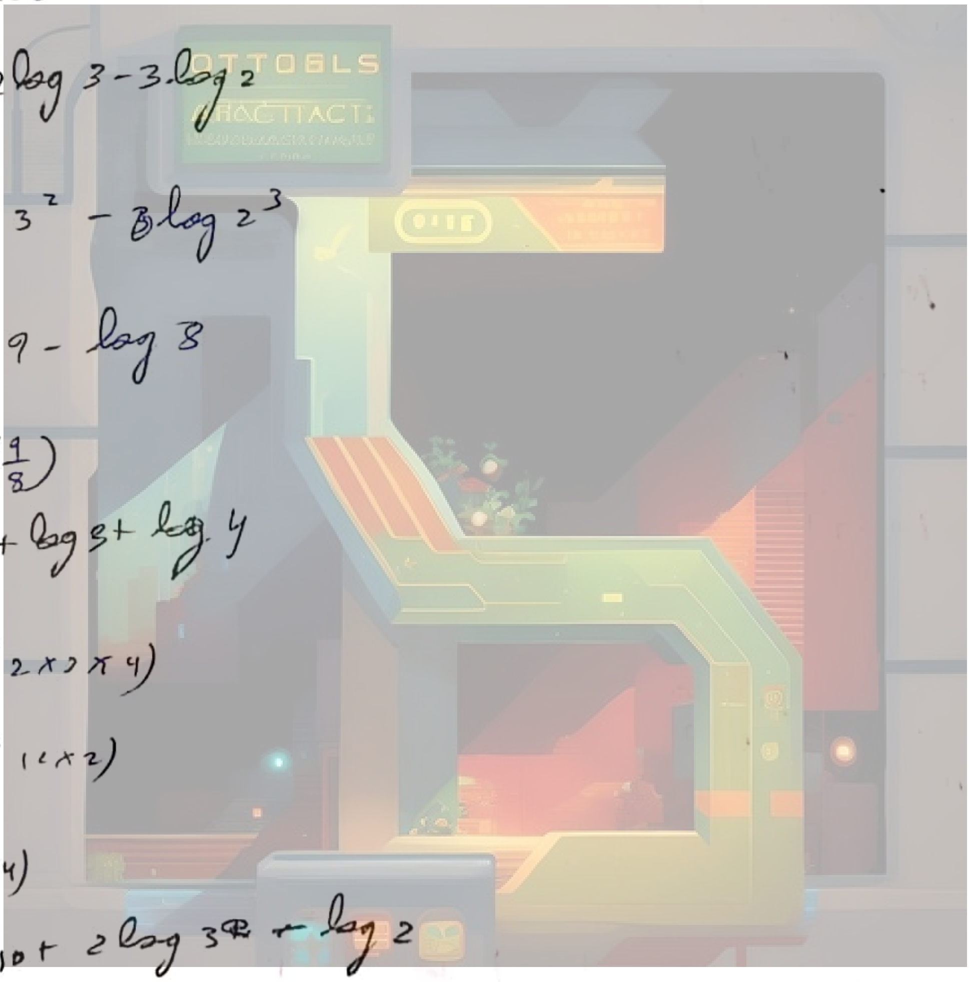
$\log_{10} 236$

(5) $\cancel{2} \; 2 \log 3 - 3 \log 2$

$\log 3^2 - \cancel{3} \log 2^3$

$\log 9 - \log 8$

$\log_{10} \left(\frac{9}{8}\right)$



(6) $\log 2 + \log 3 + \log 4$

$\log (2 \times 3 \times 4)$

$-\log (12 \times 2)$

$\log_{10} (24)$

(7) $5 \log 10 + 2 \log 3 - \log 2$

$\log 10^5 + 2 \log 3^2 - \log 2$

$\log 10^5 + \log 9 - \log 2$

$\log 10^5 + \log \frac{9}{2}$

$\log_{10} (4.5 \times 10^5)$

Properties

④ fundamental log. Identity

$$\boxed{a^{(\log_a N)} = N}$$

→ in power

Proof:- $a^{(\log_a N)} = N$

Taking $\log_a$ both sides

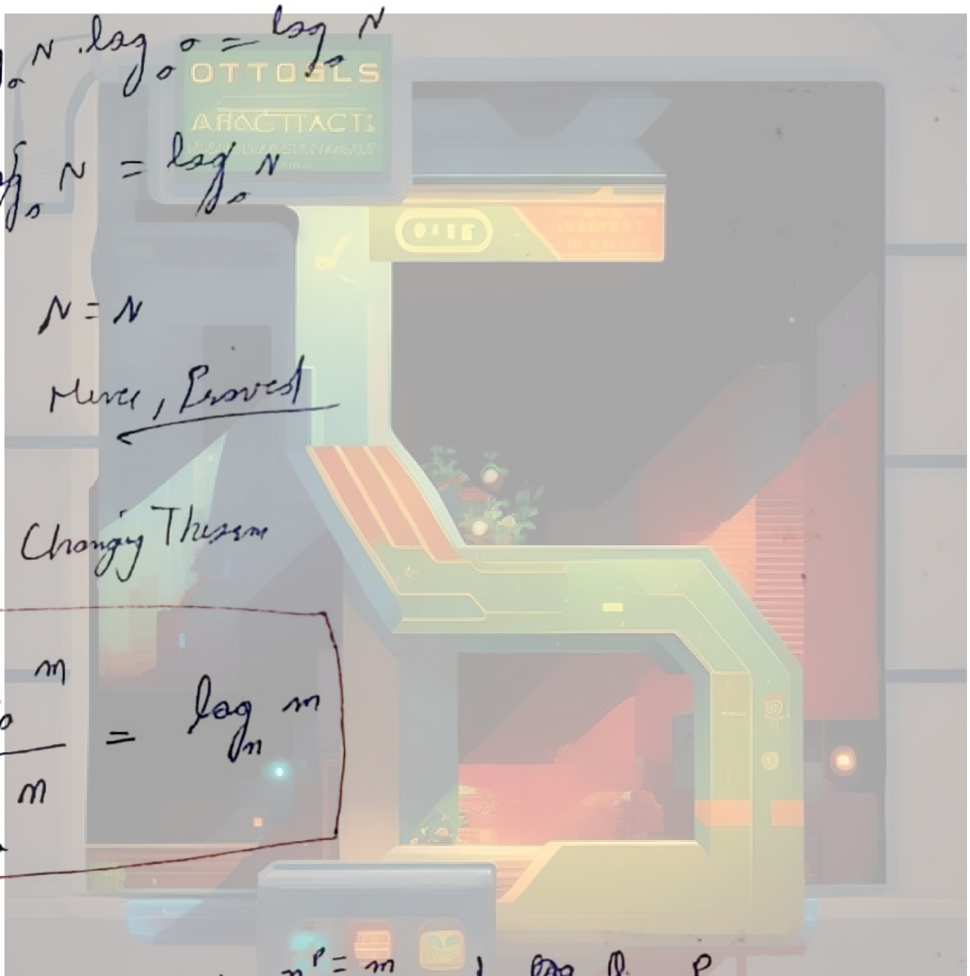
$$\log_a\left(a^{\log_a N}\right) = \log_a N$$

$$\log_a N \cdot \log_a a = \log_a N$$

$$\log_a N = \log_a N$$

$$N = N$$

Hence, Proved



⑤ Base Changing Theorem

$$\boxed{\frac{\log_a m}{\log_a n} = \log_n m}$$

Proof:-

$\log_n m = p \Leftrightarrow n^p = m$

$\log_a m = q \Leftrightarrow a^q = m$

$\log_a n = r \Leftrightarrow a^r = n$

$n^p = a^q$

$(a^r)^p = a^q$

$a^q = a^{rp}$

$q = rp$

$\cancel{\log}\ \frac{q}{r} = p$

$$\frac{\log_a m}{\log_a n} = \log_n m$$

(6) DDF

$$\boxed{a^{\log_b c} = \cancel{a^{\log}}\, c^{\log_b a}}$$

Proof

$\log_b c = x \Leftrightarrow b^x = c$

L.H.S

a^x

RHS

$c^{\log_b a}$

$b^{x \log_b a}$

$b^{\log_b a^x}$

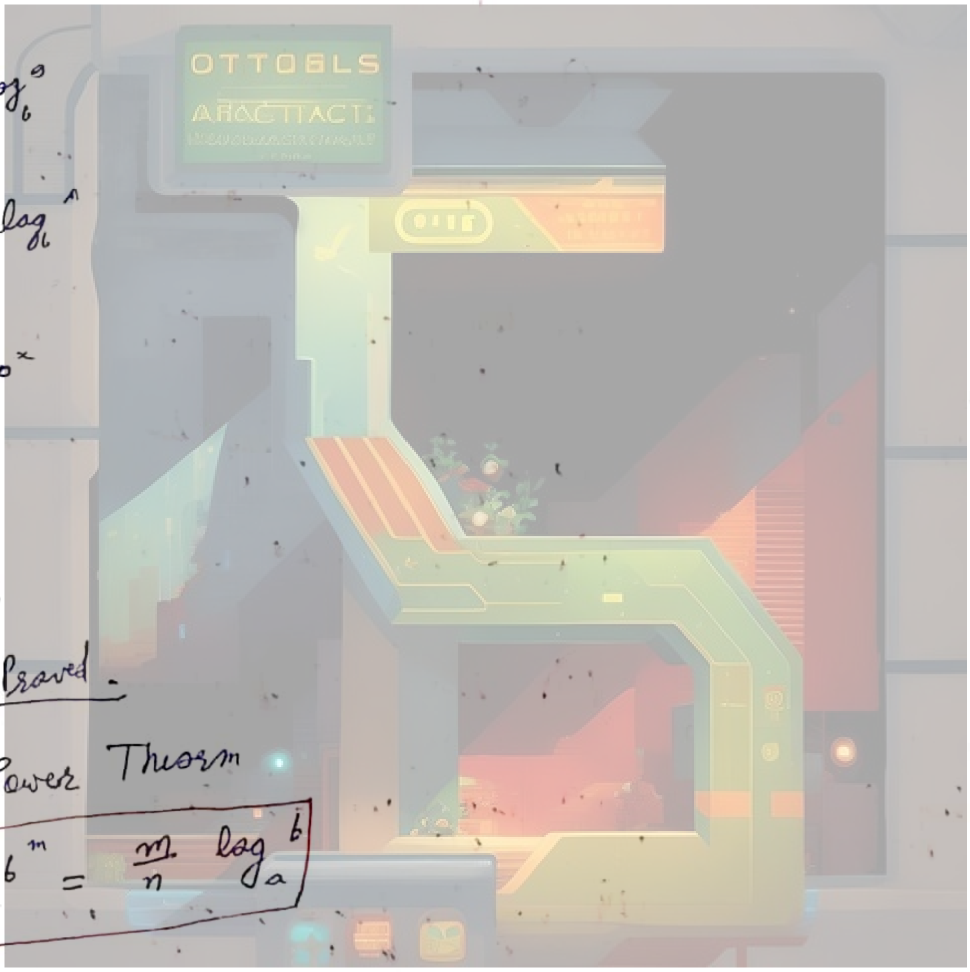
a^x

LHS = RHS

Hence, Proved.

(7) Base - Power Theorm

$$\boxed{\log_{a^n} b^m = \frac{m}{n} \log_a b}$$



Q find value (Base 10)

① $2^{\log_2 5}$

$\boxed{5}$

② $\pi^{\log_\pi 60}$

$\boxed{60}$

③ $25^{\log_5 8}$

$5^{2\log_5 8}$

$5^{\log_5 8^2}$

8^2

$\boxed{64}$

④ $\left(\frac{1}{16}\right)^{\log_2 \pi}$

$2^{\log_2 \pi^{-4}}$

$\boxed{\pi^{-4}}$

⑤ $\cancel{\log_{64} 8}$ $\log_{64} 8$

$\log_{2^6} 2^3$

$\frac{3}{6}\log_2 2$

$\frac{3}{6}$

$\boxed{\frac{1}{2}}$

⑥ $\log_3 2 \times \log_4 3 \times \log_5 4$

$\log_4 3^{\log_3 2} \times \log_5 4$

$\log_5 4^{\log_4 3^{\log_3 2}}$

$\log_5 2$

⑦ $4^{\log_3 7} - 7^{\log_3 4}$

⑧ $2^{\log_3 5} + 3^{\log_7 6} - 5^{\log_3 2} - 6^{\log_7 3}$

⑨ $\log_2\left[\log_2\{\log_3(\log_3 27^3)\}\right]$

⑩ $\log(\tan 1^\circ).\log(\tan 2^\circ)\ldots\ldots\log(\tan 89^\circ)$

⑪ $7^{\log_7 x^2} + x - 2 = 0$

⑫ $\log(\sin 1^\circ).\log(\sin 2^\circ)\ldots\log(\sin 90^\circ)$

⑬ $\log_{10}\{(\sqrt{a^{-2}b})(\sqrt[3]{ab^{-3}})\}$

⑭ $\log_2 3 . \log_3 4 . \log_4 5 \ldots \log_n (n+1) = 5$

⑮ Prove: $2^{\sqrt{\log_2 3}} = 3^{\sqrt{\log_3 2}}$

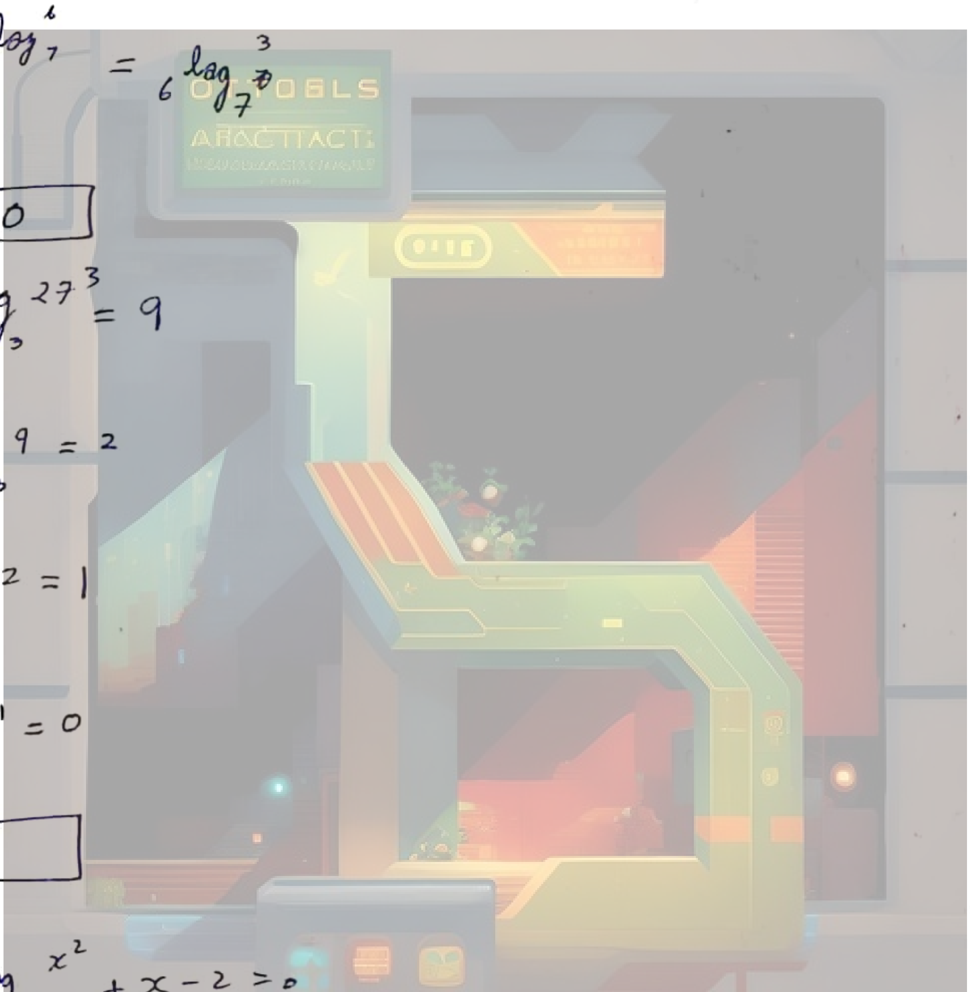
Q7. $4^{\log_3 7} - 7^{\log_3 4}$

$4^{\log_3 7} = 7^{\log_3 4}$

$\boxed{0}$

Q8. $2^{\log_3 5} = 5^{\log_3 2}$

$3^{\log_7 6} = 6^{\log_7 3}$



$\boxed{0}$

Q9. $\log_3 27^3 = 9$

$\log_3 9 = 2$

$\log_2 2 = 1$

$\log_2 1 = 0$

$\boxed{0}$

Q11. $7^{\log_7 x^2} + x - 2 = 0$

$x^2 + x - 2 = 0$

$x^2 + 2x - x - 2 = 0$

$x(x+2) - 1(x+2) = 0$

$\boxed{x = 1, -2}$

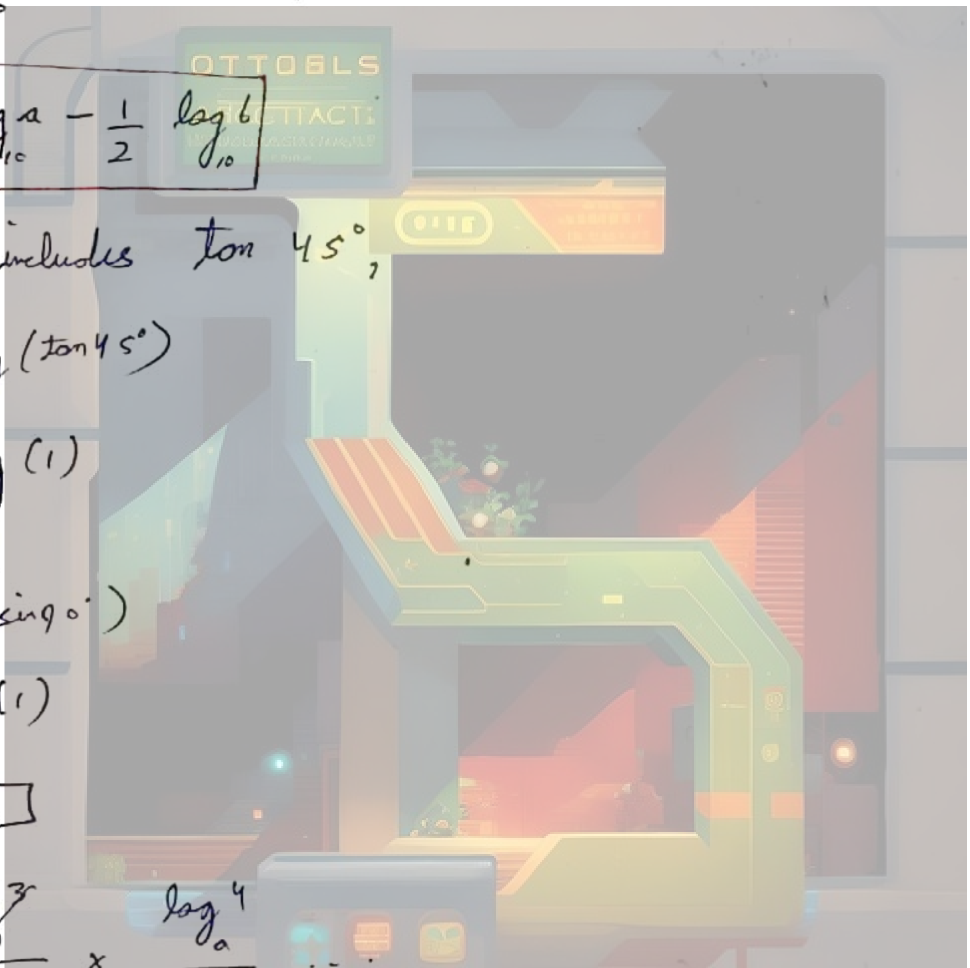
(13) $\cancel{10^x = \left(\sqrt{a^{-2}} \cdot b\right)\left(\sqrt[3]{ab^{-3}}\right)}$

$\cancel{10^x = a^{-1} \cdot b^{1/2} \cdot a^{1/3} \cdot b^{-1}}$

$\cancel{10^x = a^{-2/3} \cdot b^{-1/2}}$

(13) $10^x = a^{-2/3} \cdot b^{-1/2}$

$\log_{10}\left(a^{-2/3}\right) + \log_{10}\left(b^{-1/2}\right)$



$\boxed{\frac{-2}{3}\log_{10} a - \frac{1}{2}\log_{10} b}$

(10) It includes $\tan 45°$,

$\log(\tan 45°)$

$= \log(1)$

$\boxed{= 0}$

(12) $\log(\sin 90°)$

$\log(1)$

$\boxed{0}$

(14) $\frac{\log_a 3}{\log_a 2} \times \frac{\log_a 4}{\log_a 3} \cdot \cdot \cdot$

$\frac{\log_a 4}{\log_a 2} \cdot \cdot \cdot \cdot$

$\frac{\log_a n+1}{\log_a 2} = \boxed{\log_2 (n+1)}$

(86)

~~Q15. LHS~~

$\cancel{2^{\sqrt{\log_2 3}}}$

$$\log_2 (n+1) = 5$$

$$2^5 = n+1$$

$$32 = n+1$$

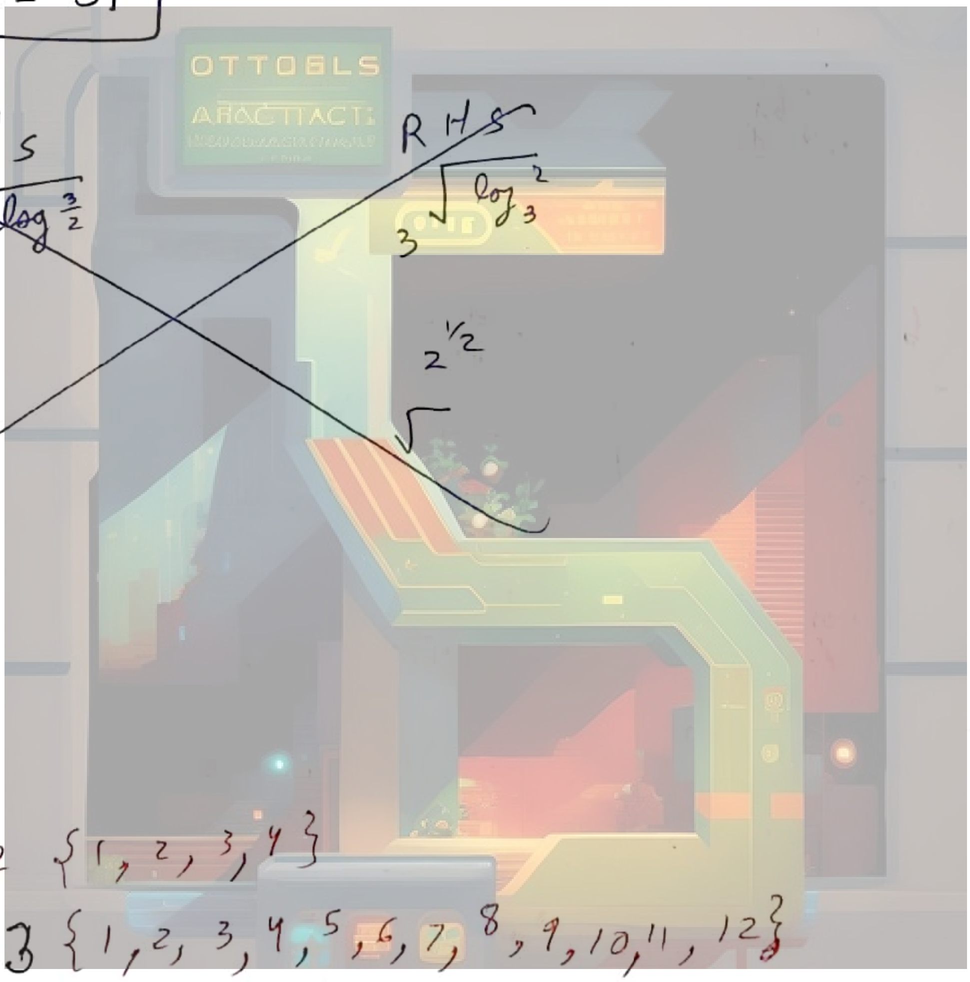
$$\boxed{n = 31}$$

~~Q 15~~

~~LHS~~ $\cancel{2^{\sqrt{\log_2 3}}}$ ~~RHS~~ $\cancel{3^{\sqrt{\log_3 2}}}$

$\cancel{3^{1/2}}$ $\cancel{2^{1/2}}$

$\cancel{\sqrt{3}}$ $\cancel{\sqrt{}}$



H.W.

DYS-2 {1, 2, 3, 4}

DYS-3 {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12}

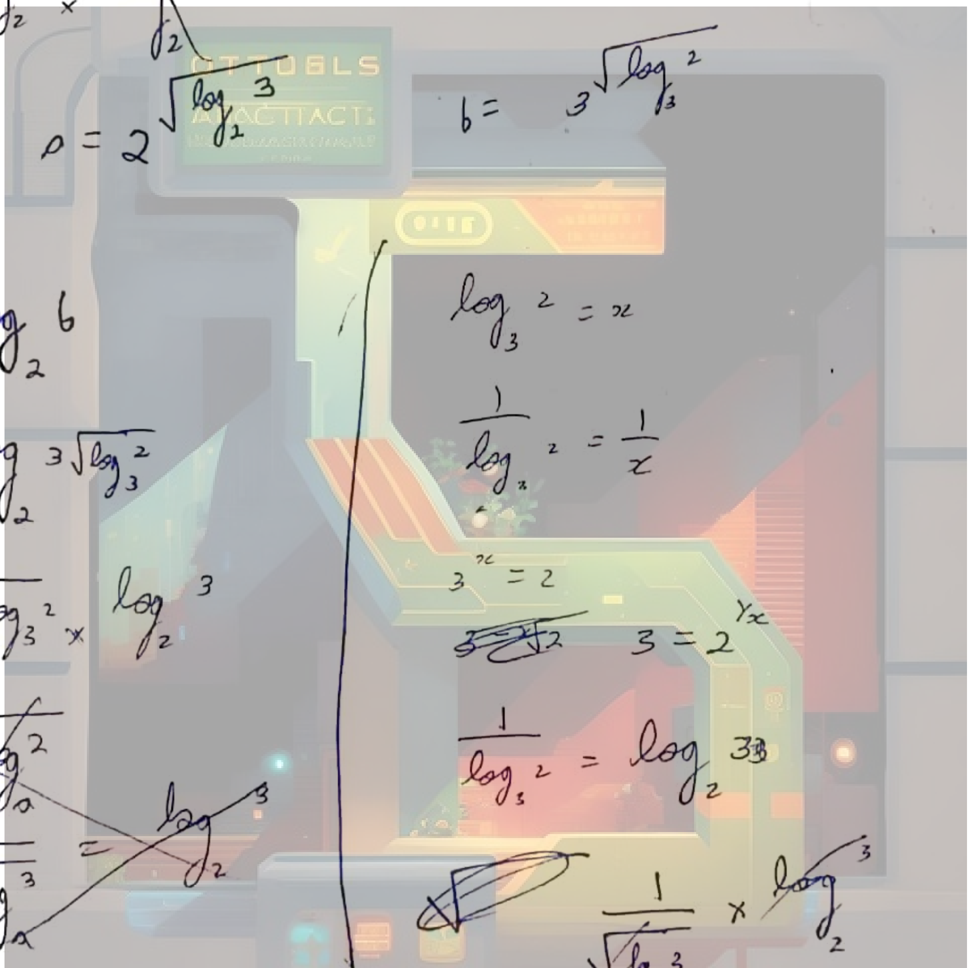
O-1 {1, 2, 3, 4, 5, 6}

Q15. $\log_2 a = \sqrt{\log_2 3}$

$a = 2^{\sqrt{\log_2 3}}$

$\log_2 2^{\sqrt{\log_2 3}}$

$\sqrt{\log_2 3} \times \log_2 2$



Q15. $a = 2^{\sqrt{\log_2 3}}$ $\quad b = 3^{\sqrt{\log_3 2}}$

$= \log_2 b$

$= \log_2 3^{\sqrt{\log_3 2}}$

$= \sqrt{\log_3 2} \times \log_2 3$

$= \frac{\sqrt{\log_a 2}}{\sqrt{\log_a 3}} = \log_2 3$

$\log_3 2 = x$

$\frac{1}{\log_x 2} = \frac{1}{x}$

$3^x = 2$

$3 = 2^{1/x}$

$\frac{1}{\log_3 2} = \log_2 3$

$\frac{1}{\sqrt{\log_2 3}} \times \log_2 3$

$\sqrt{\log_2 3} = \log_2 b$

$2^{\sqrt{\log_2 3}} = b$

$\boxed{a = b}$

Hence, Proved

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Antilog

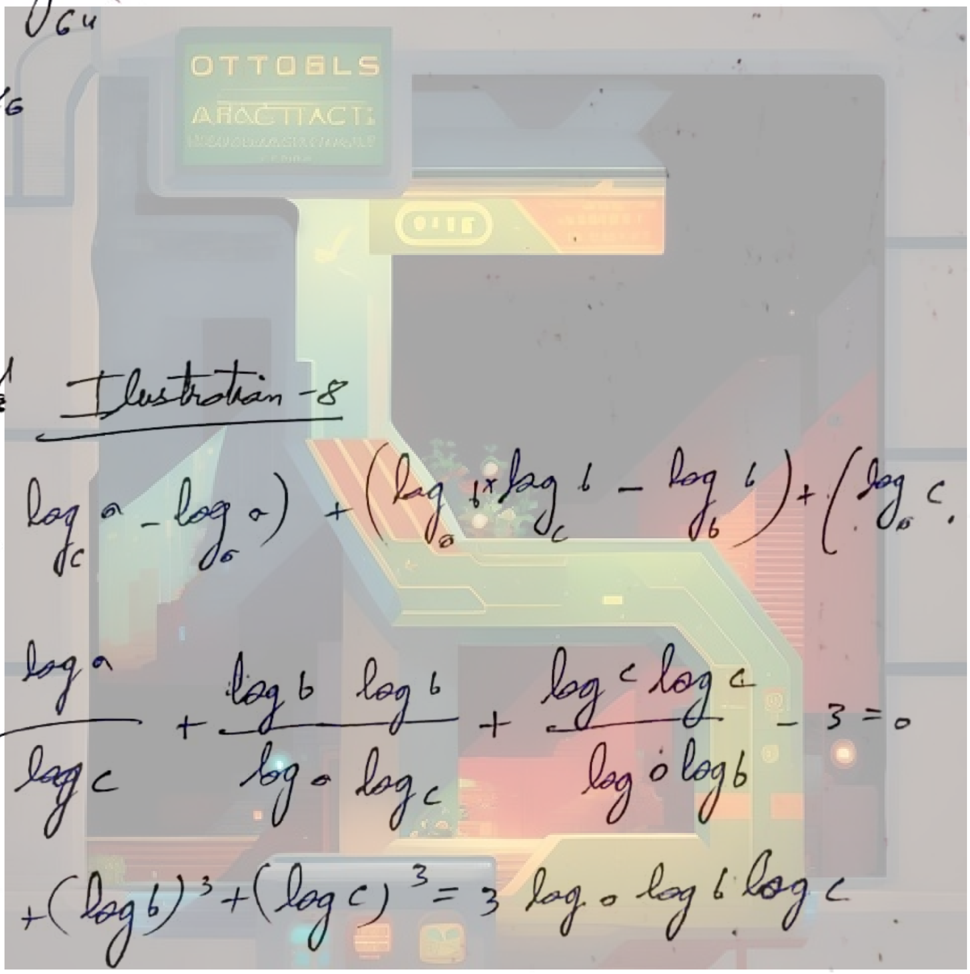
$$\boxed{\text{Antilog}_a x = a^x}$$

$$\log_a N = x$$

$$\text{Antilog}_a(\log_a N) = \text{Antilog}_a x$$

DYS - 3

Q13 $\text{Antilog}_{64}\left(\frac{5}{6}\right)$



$$(64)^{5/6}$$

$$(2)^5$$

$$\boxed{32}$$

~~Illustrati~~ Illustration - 8

$$\left(\log_b a \cdot \log_c a - \log_a a\right) + \left(\log_a b \times \log_c b - \log_b b\right) + \left(\log_a c \cdot \log_b c - \log_c c\right) = 0$$

$$\frac{\log a}{\log b} \times \frac{\log a}{\log c} + \frac{\log b}{\log a}\frac{\log b}{\log c} + \frac{\log c \log c}{\log a \log b} - 3 = 0$$

$$(\log a)^3 + (\log b)^3 + (\log c)^3 = 3 \log a \log b \log c$$

$$\log a + \log b + \log c = 0$$

$$\log(abc) = 0$$

$$\boxed{abc = 1}$$

Illustration 10

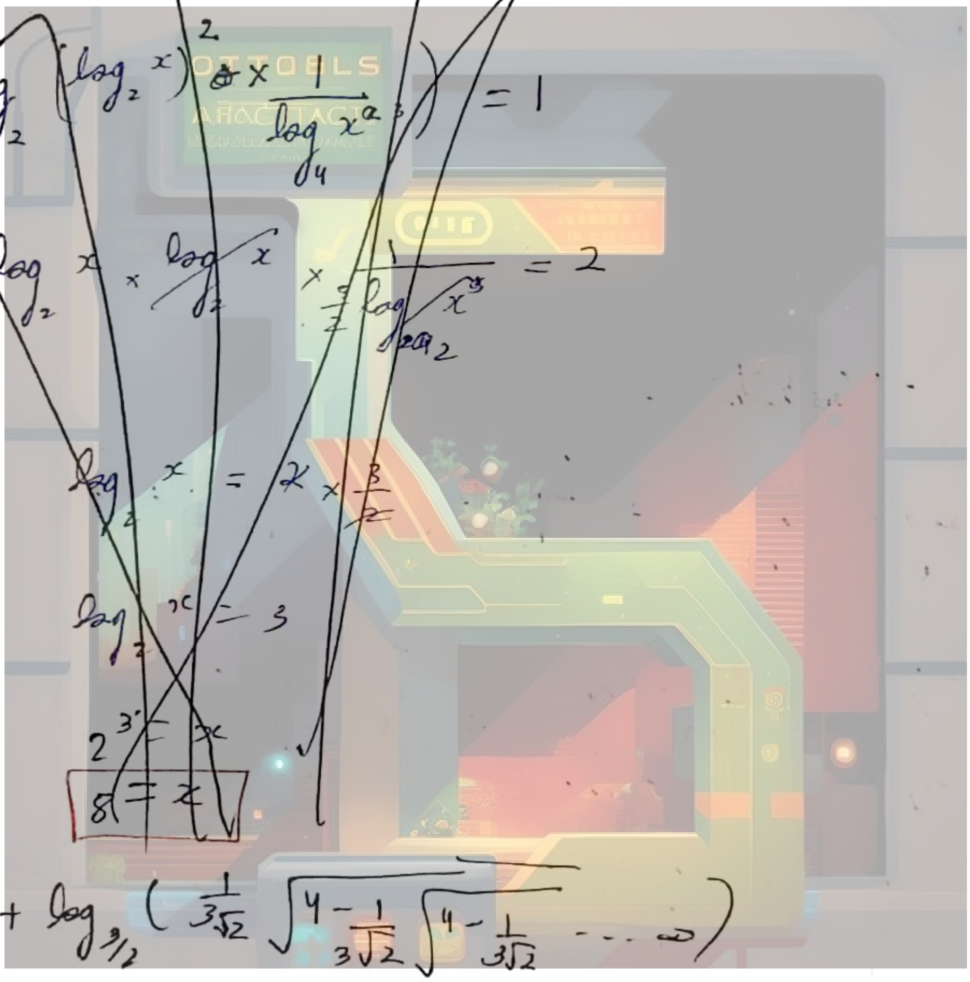
$\log_4 18 = x$

$4^x = 18$

$2^{2x} = \cancel{8}9^2$

thus irrational.

Q $2\log_2(\log_2 x) + \log_{1/2}\left(\frac{3}{2} + \log_2 x\right) = 1$



$\log_2 (\log_2 x)^2 \cancel{+} \times \frac{1}{\log_4 x^3} = 1$

$\log_2 x \times \log_2 x \times \frac{1}{\frac{3}{2}\log_2 x^3} = 2$

$\log_2 x = x \times \frac{3}{2}$

$\log_2 x = 3$

$2^3 = x$

$\boxed{8 = x}$

Q 3. $6 + \log_{3/2}\left(\frac{1}{3\sqrt{2}}\sqrt{4 - \frac{1}{3\sqrt{2}}\sqrt{4 - \frac{1}{3\sqrt{2}} \cdots \infty}}\right)$

$x = \sqrt{4 - \frac{x}{3\sqrt{2}}}$

$x^2 = 4 - \frac{x}{3\sqrt{2}}$

$3\sqrt{2}x^2 = 12\sqrt{2} - x$

$3\sqrt{2}x^2 + x - 12\sqrt{2} = 0$

$x = -1 \pm \sqrt{1 + 287}$

$x = \frac{-1 \pm 17}{2 \times 3\sqrt{2}}$

$x = \frac{16}{6\sqrt{2}}$

$6 + \log_{3/2} \frac{4}{9}$

$6 - 2$

$\boxed{4}$

$6 + \log_{3/2}\left(\frac{1}{3\sqrt{2}} \times \frac{16}{3\sqrt{2}}\right)$

$6 + \log_{3/2} \frac{8}{9} \times 2$

$\left(\frac{3}{2}\right)^x = \frac{8}{9}$

$\left(\frac{2}{3}\right)^x = \frac{8}{9}$

$6 - 2 + \log_{1/2} 2$

$4 + \sqrt{8}$

$\boxed{4 + 2\sqrt{2}}$

Q. $2\log_2(\log_2 x) + \log_{1/2}\left(\frac{3}{2} + \log_2 x\right) = 1$

$\log_2 t^2 + \log_2\left(\frac{1}{\frac{3}{2}+t}\right) = 1$

$\frac{t^2 \times 2}{\frac{3+2t}{2}} = 1$

$\frac{2t^2}{3+2t} = 1$

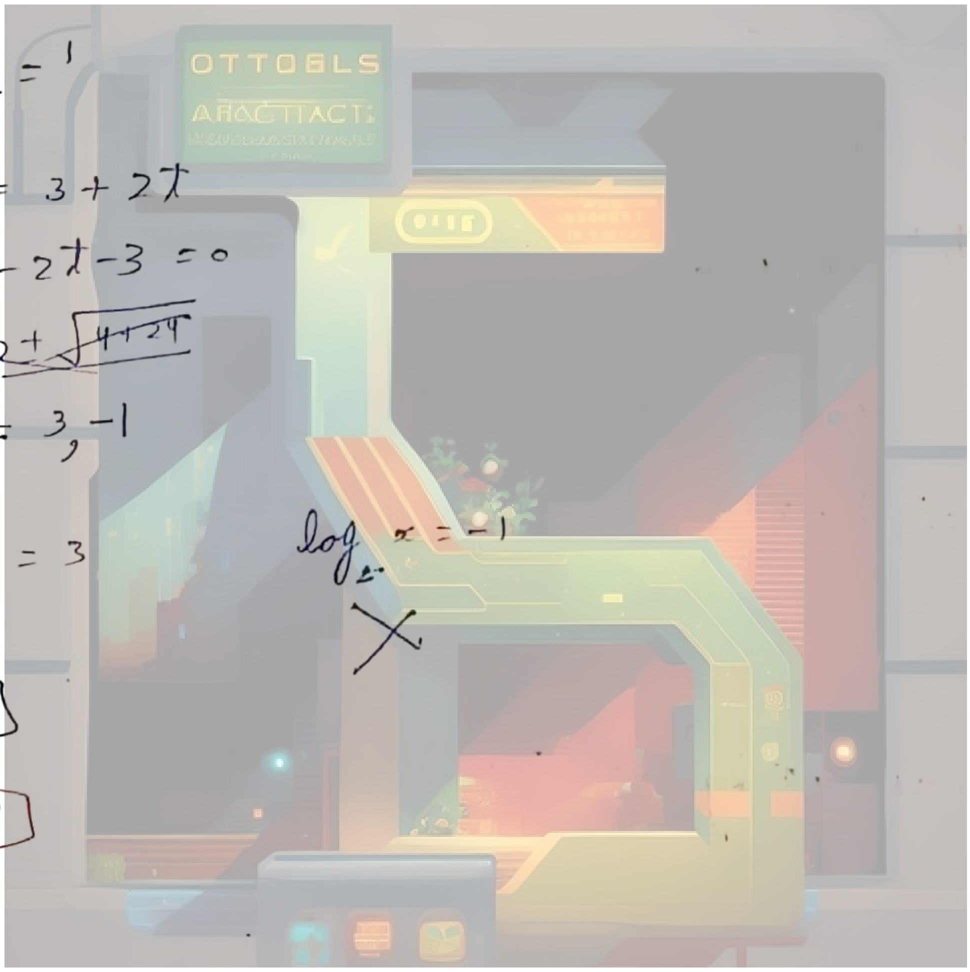
$2t^2 = 3 + 2t$

$2t^2 - 2t - 3 = 0$

$\cancel{t = 2 \pm \sqrt{4+24}}$

$t = 3, -1$

$\log_2 x = 3$ $\quad$ $\cancel{\log_2 x = -1}$



$\boxed{x = 8}$

$\boxed{x = 8}$

H.W

J.A - {5,6}

DYS-4 [1, 10]

Q

① $\cancel{2\log_2}\ 2^{\log_2 x^2} - 3x - 4 = 0$

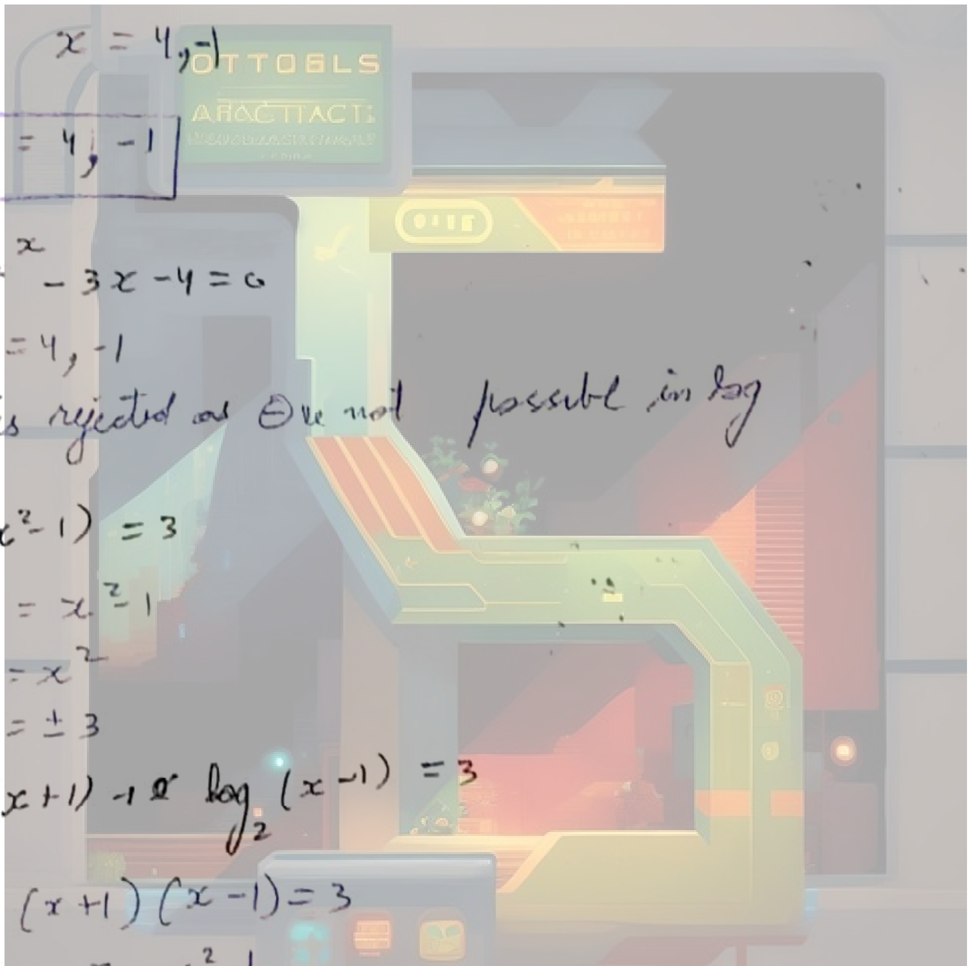
$2^{\log_2 x^2} = 3x + 4$

$\log_2 3x+4 = \log_2 x^2$

$3x + 4 = x^2$

$x^2 - 3x - 4 = 0$

$x = 4, -1$



$\boxed{x = 4, -1}$

② $2^{2\log_2 x} - 3x - 4 = 0$

$x = 4, -1$

-1 is rejected as ⊖ve not possible in log

③ $\log_2 (x^2 - 1) = 3$

$8 = x^2 - 1$

$9 = x^2$

$x = \pm 3$

④ $\log_2 (x+1) + \log_2 (x-1) = 3$

$\log_2 (x+1)(x-1) = 3$

$8 = x^2 - 1$

$x^2 + 9$

$x = \pm 3$

-3 is reject

$\boxed{x = 3}$

Q 5 $x^2 + 7^{\log_7 x} - 2 = 0$

$x^2 + x - 2 = 0$

$x^2 + 2x - x - 2 = 0$

$x(x+2) - 1(x+2) = 0$

$x = 1, -2$

-2 reject

$\boxed{x = 1}$

Q 7. $5^{(\log_5 x)^2} + x^{\log_5 x}$

$5^{y^2} + x^y = 1250$ $\boxed{x = 25, \frac{1}{25}}$

$\log_5 x = y$

$5^y = x$

$5^{y^2} + 5^{y^2} = 1250$

$5^{y^2} = 625$

$5^{y^2} = 5^4$

$y^2 = 4$ $y = \pm 2$

Q 6. $\log_4 (2 \log_3 (1 + \log_2 (1 + 3\log_2 x))) = \frac{1}{2}$

$4^{1/2} = 2 \log_3 (1 + \log_2 (1 + 3 \log_3 2))$

$2 = \log_2 (1 + 3 \log_2 x)$

$1 = \log_2 x$

$1 = \log_2 x$

$\boxed{x = 2}$

Q 8. $\log_2 (9 - 2^x) = 10^{\log_{10}(3-x)}$

$2^{3-x} = 9 - 2^x$

$2^3 \times 2^x = 9 - 2^x$

$8y = 9 - y$

$y = 8, 1$

$x = 3, 0$ $\boxed{x = 0}$

3 reject

Q9. $\log_7 \log_5 (\sqrt{x+5}+\sqrt{x}) = 0$

$\sqrt{x+5}+\sqrt{x}=5$

$5=\sqrt{x+5}+\sqrt{x}$

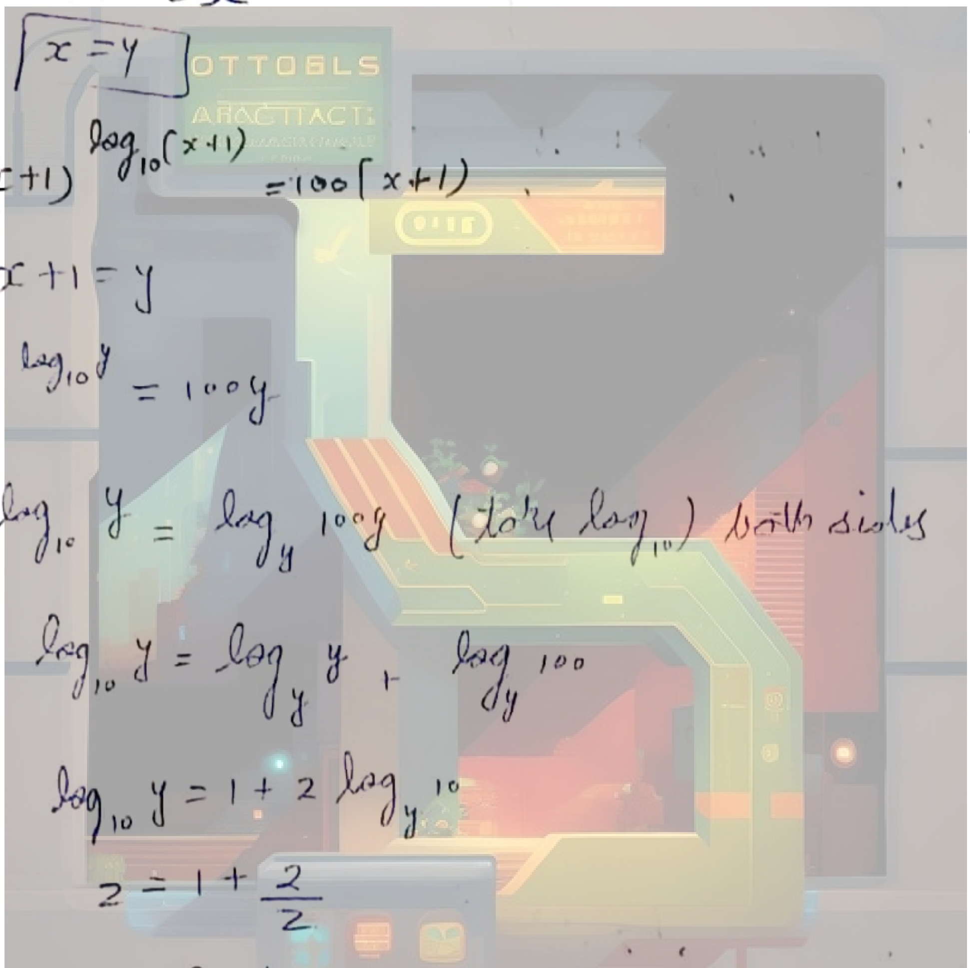
$25 = x+5+x+2\sqrt{(x+5)(x)}$

$\cancel{25}\ 10 = x+\sqrt{x^2+5x}$

$10-x=\sqrt{x^2+5x}$

$100 = 25x$

$\boxed{x=4}$



Q10. $(x+1)^{\log_{10}(x+1)} = 100(x+1)$

$x+1=y$

$y^{\log_{10}y}=100y$

$\log_{10}y = \log_y 100y$ (take $\log_{10}$) both sides

$\log_{10}y=\log_y y+\log_y 100$

$\log_{10}y = 1+2\log_y 10$

$z = 1+\frac{2}{z}$

$z=2,-1$

$\log_{10}y=-1$

$y=\frac{1}{10}$

$x+1=\frac{1}{10}$

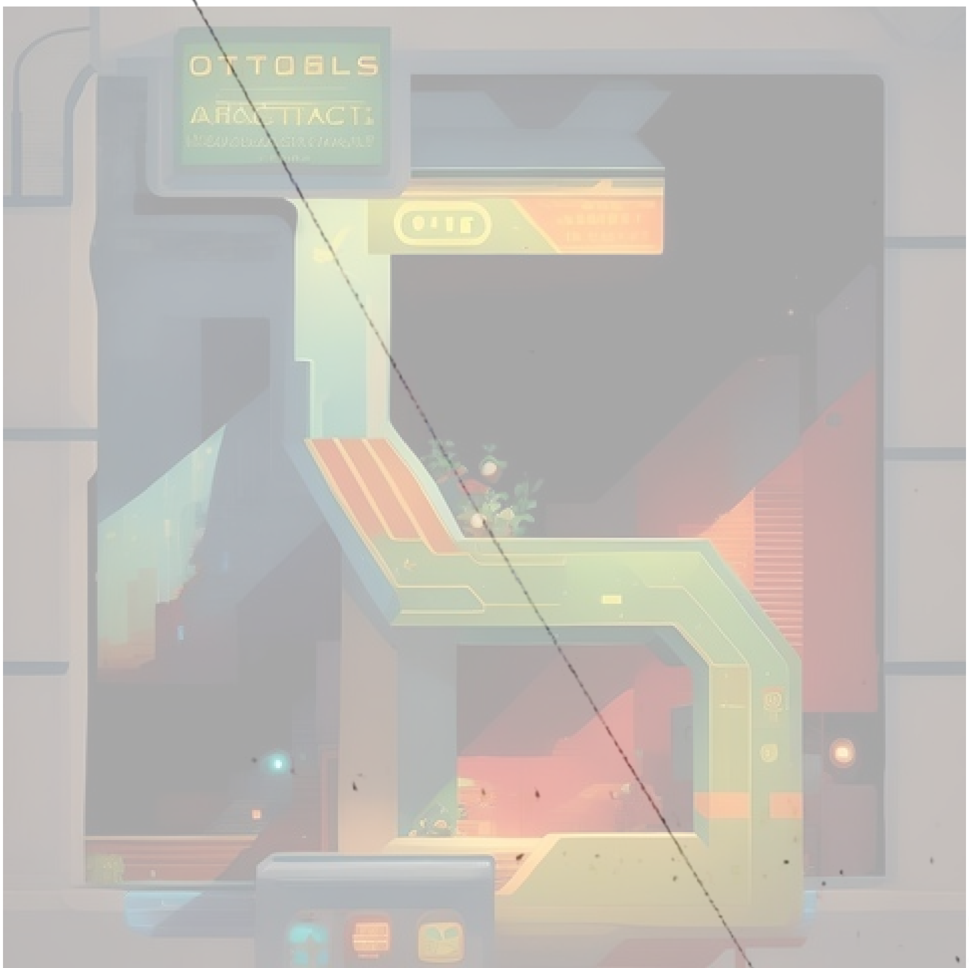
$\boxed{x=\frac{-9}{10}}$

$\log_{10}y=2$

$y=100$

$x+1=100$

$\boxed{x=99}$



Q (11) $\log_{x-1}(4) = 1 + \log_2(x-1)$

$\log_y 4 = 1 + \log_2 y$

$\cancel{y^{1+\log_2 y}}$

$2\log_y 2 = 1 + \log_2 y$

$\log_2 y = z$

$\frac{2}{z} = 1 + z$

$2 = z + z^2$

$z^2 + z - 2 = 0$

$z = \frac{-1 \pm \sqrt{1+8}}{2}$

$z = \frac{-1 \pm 3}{2}$

$z = -2, 1$

$\log_2 y = -2$

$\frac{1}{4} = y$

$x - 1 = y$

$x - 1 = \frac{1}{4}$

$x = \frac{1}{4} + \frac{4}{4}$

$x = \frac{5}{4}$

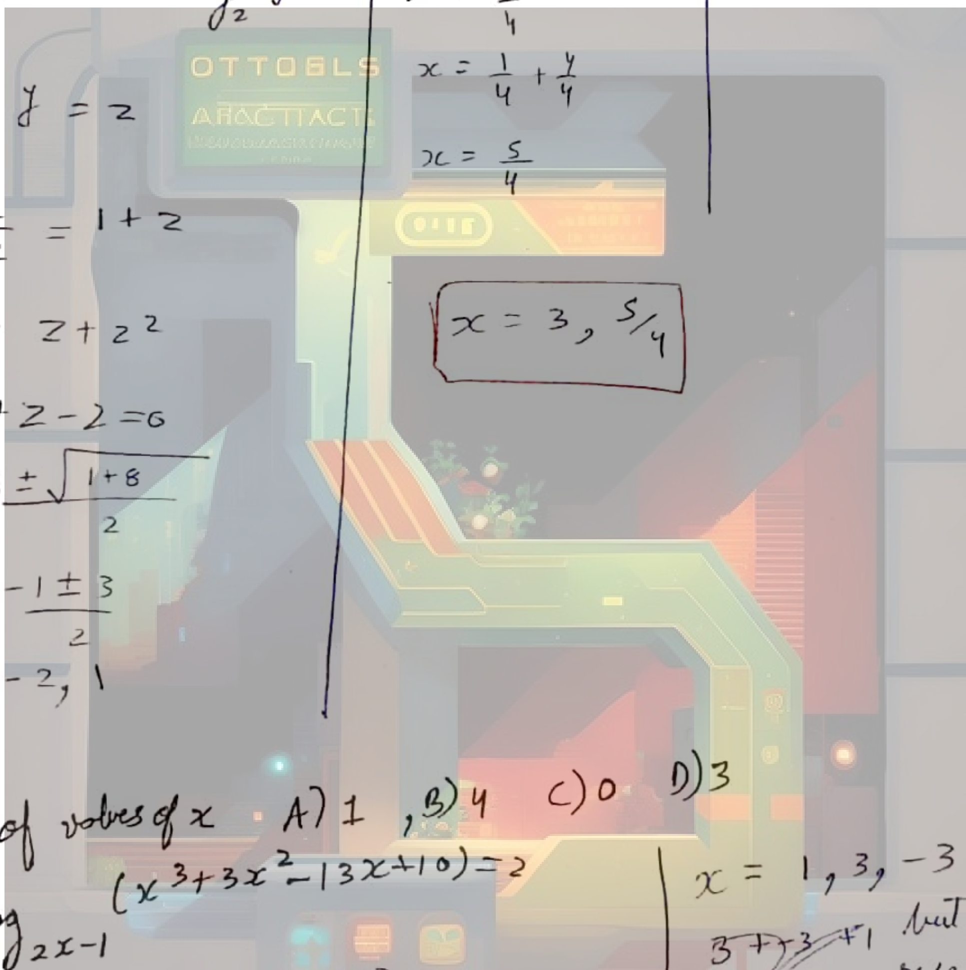
$\log_2 y = 1$

$y = 2$

$x - 1 = 2$

$x = 3$

$\boxed{x = 3, 5/4}$



(12) sum of values of x A) 1 , B) 4 C) 0 D) 3

$\log_{2x-1}(x^3+3x^2-13x+10) = 2$

$(2x-1)^2 = x^3+3x^2-13x+10$

$4x^2+1-4x = x^3+3x^2-13x+10$

$x^3 - x^2 - 9x + 9 = 0$

$x = 1$

$(x-1)$

$x^2 - 9 = 0$

$x = \pm 3$

$x = 1, 3, -3$

$\cancel{3+(-3)+1}$

$\cancel{1}$

but, -3 is reject as $2x-1$ will be $\ominus$ve

$\cancel{\boxed{A}}$

$\cancel{\boxed{A}}$

1 reject as $2x-1$ would be 1

$x = 3$

$\boxed{D)}$

13

$$5^{1+\log_4 x} + 5^{(\log_{1/4} x)-1} = \frac{26}{5}$$

$$5^{1+\log_4 x} + 5^{-(\log_4 x+1)} = \frac{26}{5}$$

$$5^{y} + \frac{1}{5^{y}} = \frac{26}{5}.$$

$$5^{2y}+1 = \cancel{26\,5^y}\ \frac{26\times 5^y}{5}$$

$$\cancel{5^{2y}}$$

$$5\times 5^{2y}+1 = 26\times 5^{y}$$

$$\cancel{5\times 5^{x^2}+1=26}$$

$$5\times z^2+1 = 26\, z$$

$$5z^2-26z+1=0$$

$$z = \frac{26\pm\sqrt{676-20}}{2}$$

$$z = \frac{26\pm\sqrt{656}}{2}$$

$$5_a t + \frac{1}{5t} = \frac{26}{5}$$

$$25t^2+1 = \frac{26\times 5t}{5}$$

$$25t^2-26t+1$$

$$25t^2-25t-t+1$$

$$25t(t-1)-1(t-1)$$

$$t = 1,\ 1/25$$

$$t + \frac{1}{t} = \frac{26}{5}$$

$$t^2+1 = \frac{26t}{5}$$

$$5t^2-26t+1=0$$

$$5^{\log_4 x} = 1$$

$$\cancel{\log_5 1 = \log_4 x}$$

$$\log_4 x = 0$$

$$4^0 = x$$

$$\boxed{x=1}$$

$$5^{\log_4 x} = \frac{1}{25}$$

$$\log_4 x = -2$$

$$\boxed{\frac{1}{16} = x}$$

$$\boxed{x = 1,\ 1/16}$$

3
26
26
156
420
576

31
26
26
156
520
676

(12) $(x-2)^{\log^2(x-2)+\log(x-2)^5-12} = 10^{2\log(x-2)}$

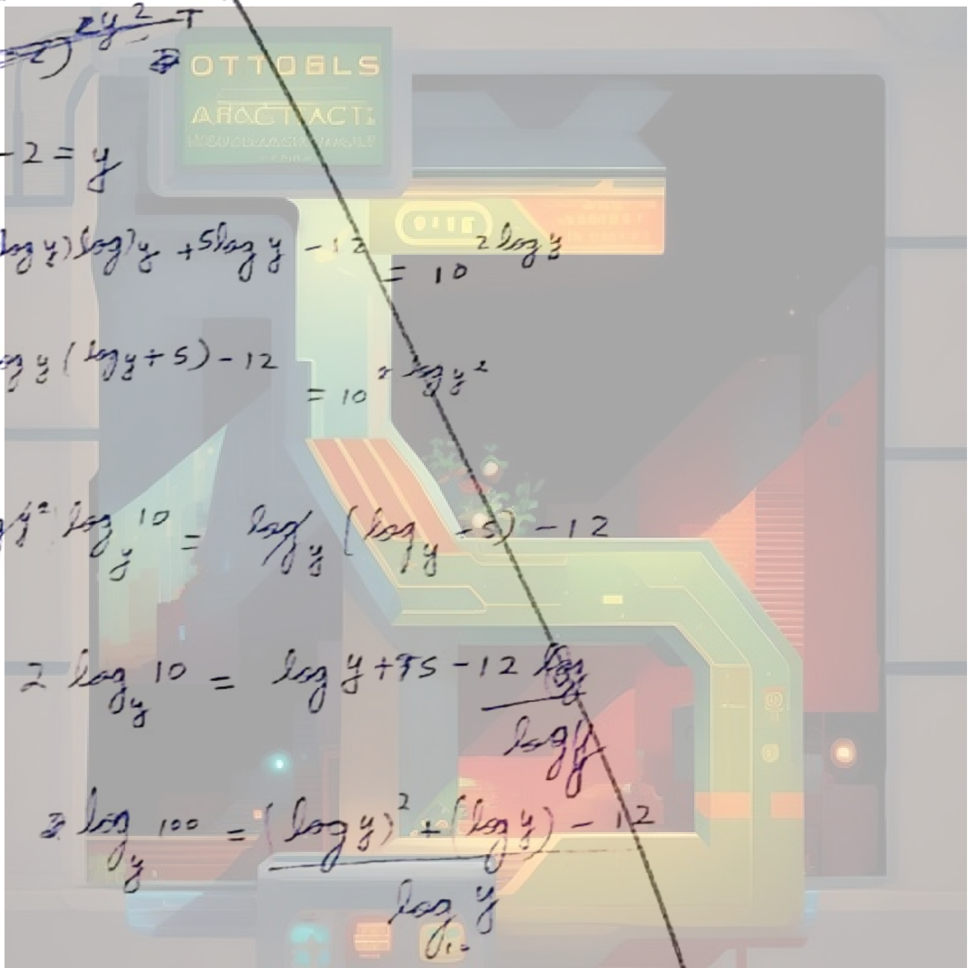
$\cancel{(x-2)^{y^2}}$

$\cancel{x-2=y}$

$y^{(\log y)^2(\log y)+\log y^5-12} = 10^{2\log y}$

$\cancel{\log y = 2}$

$\cancel{(x-2)^{2y^2}}$



$x-2=y$

$y^{(\log y)(\log y)+5\log y-12} = 10^{2\log y}$

$y^{\log y(\log y+5)-12} = 10^{2\log y^2}$

$2\log y^2 \log_y 10 = \log_y(\log_y+5)-12$

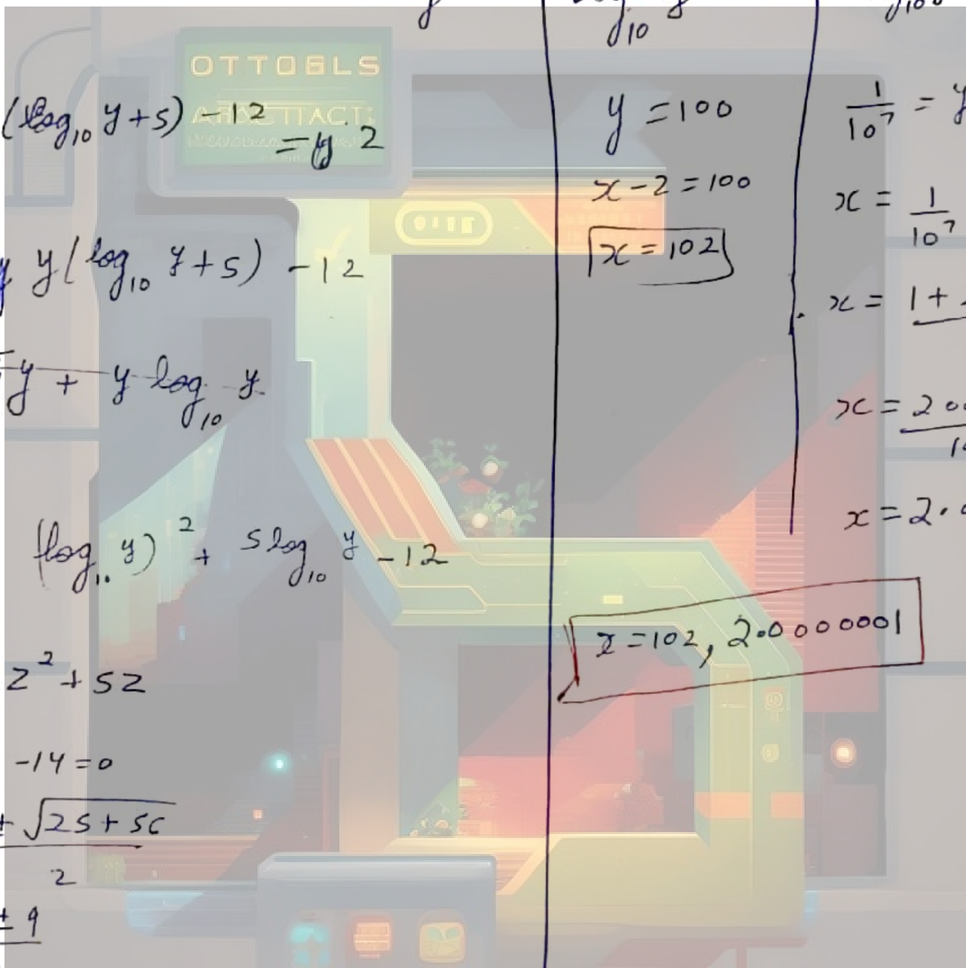
$2\log_y 10 = \log y + 5 - \frac{12\log}{\log y}$

$2\log_y 100 = \frac{(\log y)^2+(\log y)-12}{\log_{10} y}$

Q 12. $(x-2)^{\log(x-2)(\log(x-2)+\log(x-2)^5-12} = 10^{2\log(x-2)}$

Note - can assume same base on both sides.

$$y^{\log_{10}y \times \log_{10}y + 5\log_{10}y^{0} - 12} = 10^{\log_{10}y^2}$$



$$y^{\log_{10}y(\log_{10}y+5)-12} = y^2$$

$$\log_{10}y(\cancel{\log_{10}}y+5)-12 = y\,2$$

$$100 = \cancel{y}\,y(\log_{10}y+5)-12$$

$$\cancel{100 = 5y + y\log_{10}y}$$

$$\cancel{100 =}$$

$$2\,\cancel{k+2} = (\log_{10}y)^2 + 5\log_{10}y - 12$$

$$14 = \cancel{a}z^2 + 5z$$

$$z^2+5z-14=0$$

$$z = \frac{-5\pm\sqrt{25+56}}{2}$$

$$z = \frac{-5\pm 9}{2}$$

$$z = -7, 2$$

$\log_{10}y = 2$

$y = 100$

$x-2 = 100$

$\boxed{x = 102}$

$\log_{10}y = -7$

$\frac{1}{10^7} = y$

$x = \frac{1}{10^7} + 2$

$x = \frac{1+20000000}{10000000}$

$x = \frac{20000001}{10000000}$

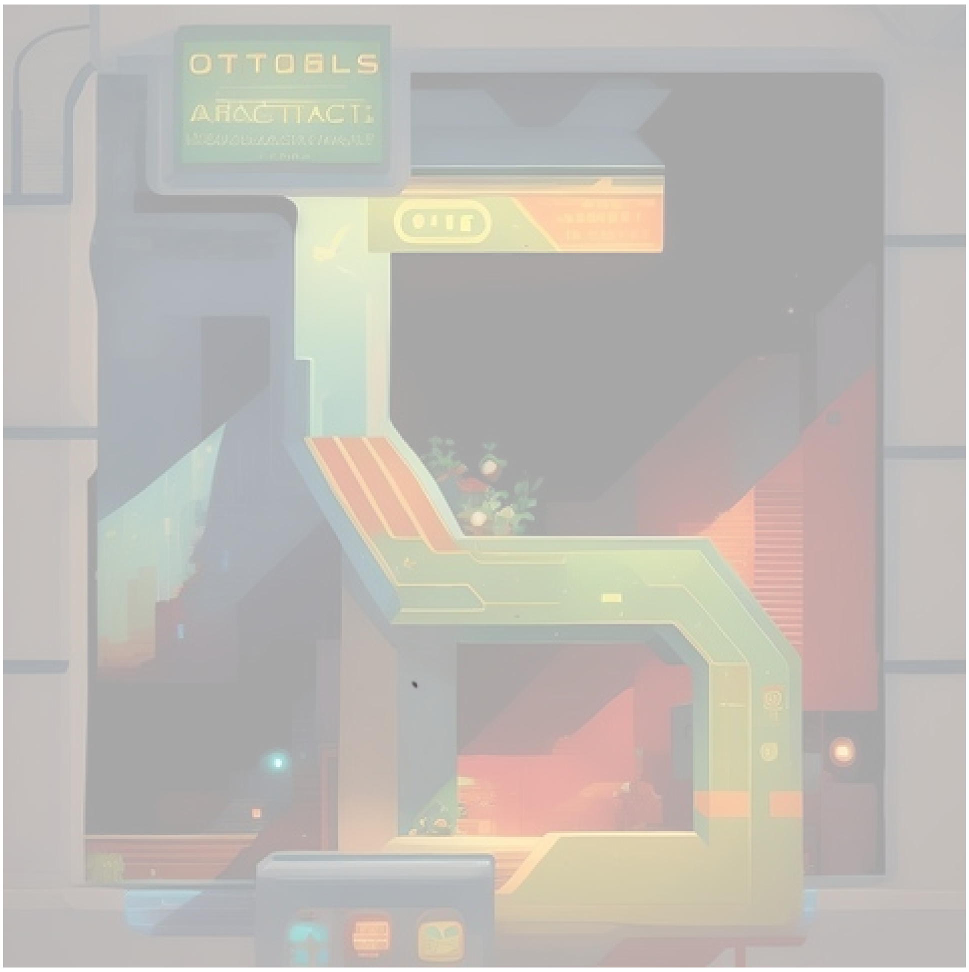
$x = 2.0000001$

$\boxed{x = 102, 2.0000001}$

H.W. 07-06-2024

DYS-4 [10:]

~~Logarithmic~~



100

Logarithmic Inequalities

Constant Base

- $\in (0,1)$ — sign change
- $(1, \infty)$ — no sign change

Variable Base

- case 1: Base $\in (0,1)$
- union
- case 2: $\in (1, \infty)$

eg. $\log_{1/2} x > \log_{1/2}(2x-1)$

$x < 2x - 1$

$1 < x$

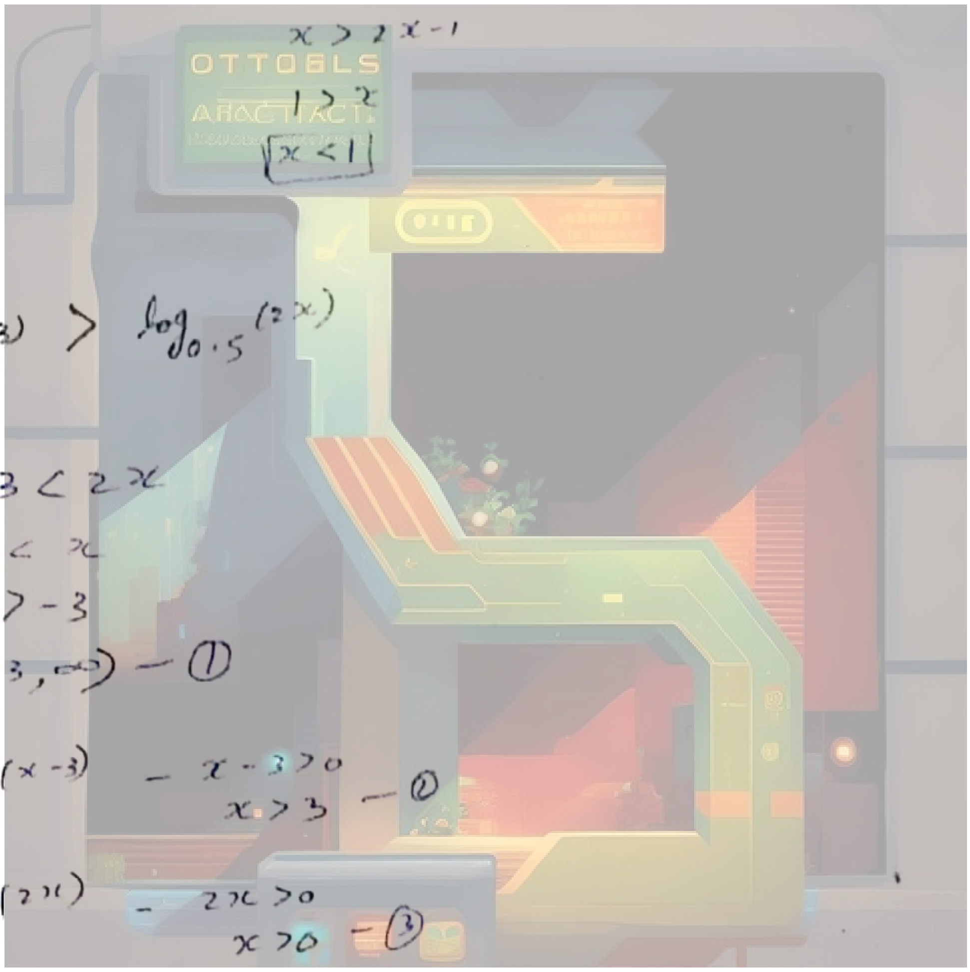
$\boxed{x > 1}$

eg. $\log_5 x > \log_5 (2x-1)$

$x > 2x - 1$

$1 > x$

$\boxed{x < 1}$



Q $\log_{0.5}(x-3) > \log_{0.5}(2x)$

$x - 3 < 2x$

$-3 < x$

$x > -3$

$\therefore x \in (-3, \infty)$ — (1)

For $\log_{0.5}(x-3)$ — $x - 3 > 0$

$x > 3$ — (2)

$\log_{0.5}(2x)$ — $2x > 0$

$x > 0$ — (3)

$\therefore$ (1) $\cap$ (2) $\cap$ (3)

$\boxed{x \in (3, \infty)}$

Q2. $\log_7(x^2-3x) \geq \log_7(2x-6)$

$x^2-3x \geq 2x-6$

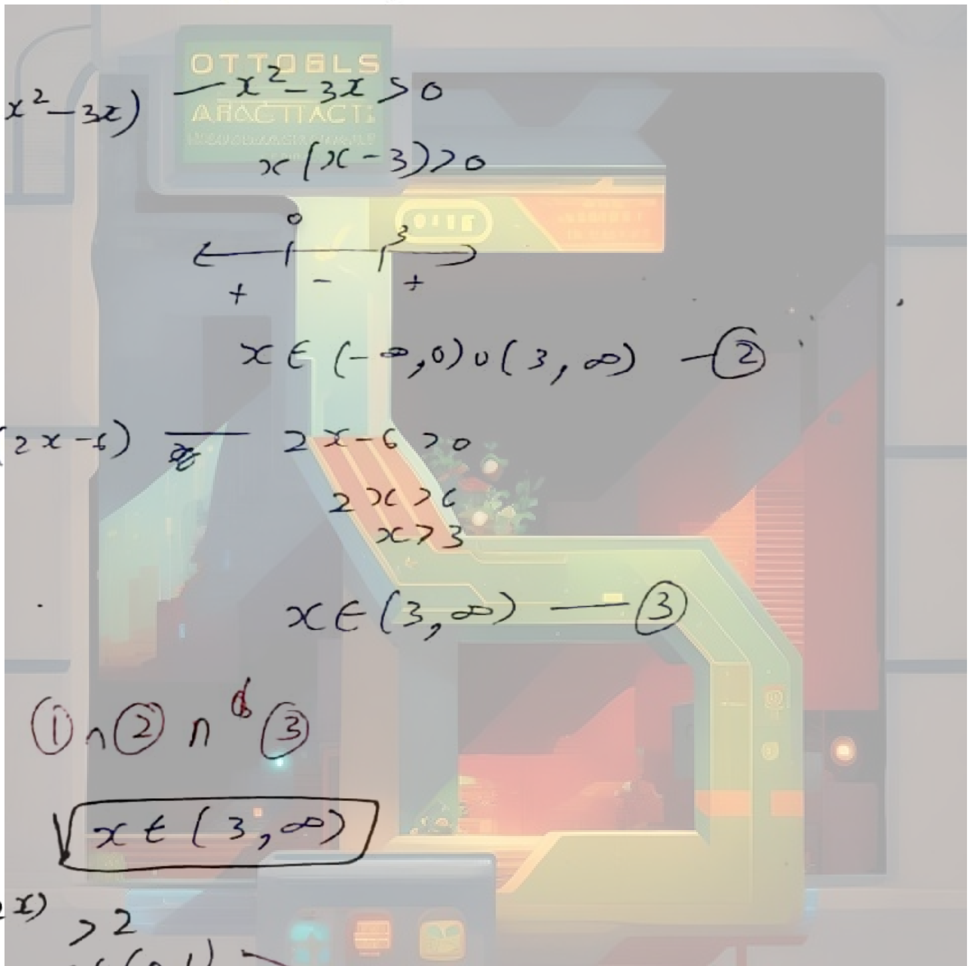
$x^2-5x+6 \geq 0$

$(x-2)(x-3) \geq 0$

$+ \quad - \quad +$

$2 \quad 3$

$x \in (-\infty, 2] \cup [3, \infty)$ — ①



$\log_7(x^2-3x)$ — $x^2-3x>0$

$x(x-3)>0$

$0 \quad 3$

$+ \quad - \quad +$

$x \in (-\infty, 0) \cup (3, \infty)$ — ②

$\log_7(2x-6)$ — $2x-6>0$

$2x>6$

$x>3$

$x \in (3, \infty)$ — ③

① ∩ ② ∩ ③

$\boxed{x \in (3, \infty)}$

Q $\log_x(2x) > 2$

$x \in (0,1)$

Case 1 $\quad 2x < x^2$

$0 < x^2-2x$

$x(x-2) > 0$ $\quad \xrightarrow{\cap} x \in \phi$

$+ \quad - \quad +$

$0 \quad 2$

$x \in (-\infty, 0) \cup (2, \infty)$

Case 2:-

$x \in (1, \infty)$

$2x > x^2$

$0 > x^2 - 2x$

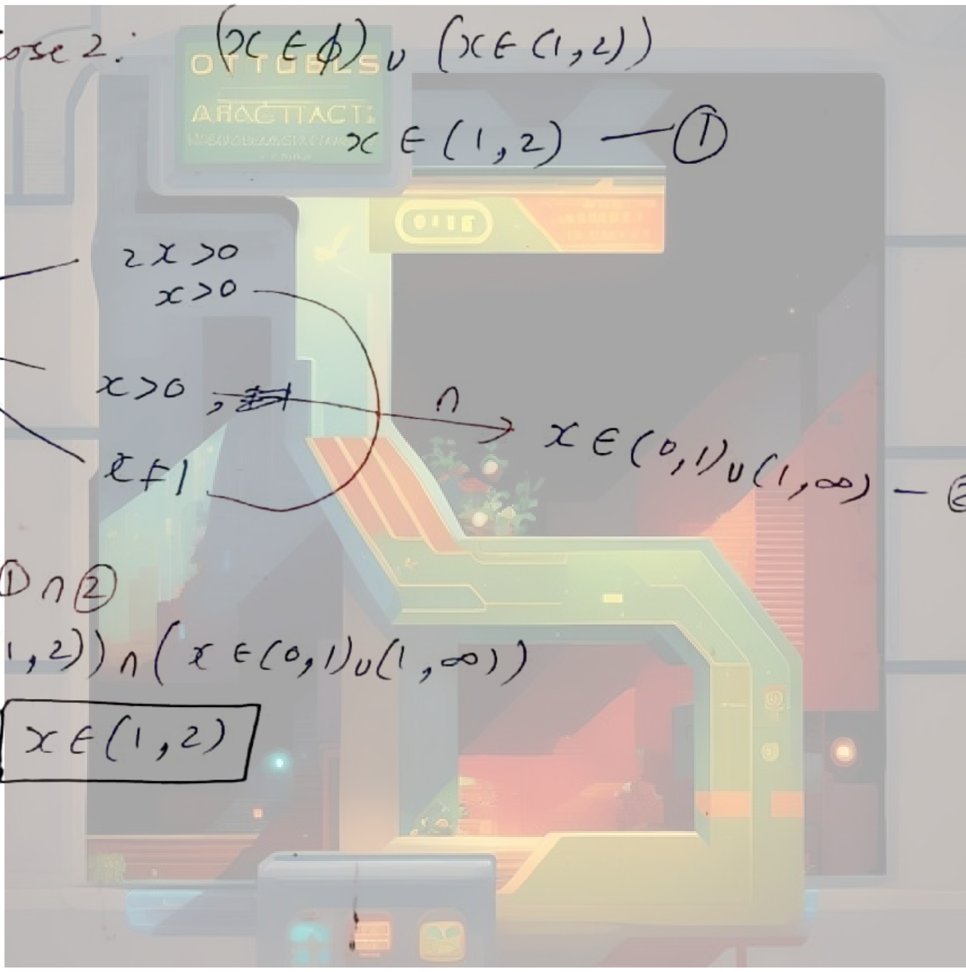
$x(x-2) < 0$

$+ \quad - \quad +$

$0 \quad 2$

$x \in (0, 2)$

$\xrightarrow{\cap} x \in (1, 2)$



Case 1 $\cup$ Case 2: $(x \in \phi) \cup (x \in (1,2))$

$x \in (1, 2)$ — ①

$\log_x 2x$

$2x > 0$
$x > 0$

$x > 0$, $x \neq 1$ $\xrightarrow{\cap} x \in (0,1) \cup (1, \infty)$ — ②

① $\cap$ ②

$(x \in (1,2)) \cap (x \in (0,1) \cup (1,\infty))$

$\boxed{x \in (1,2)}$

Q ① $\log_{1/3}\left(\frac{1-2x}{x}\right) \le 0$

~~$\left(\frac{1}{3}\right)^0 \le \frac{1-2x}{3}$~~

~~$\frac{1-2x}{3} \le 1$~~

~~$1-2x \le 3$~~

~~$-2x \le 3-1$~~

~~$-2x = -2$~~

~~$2x = 2$~~

~~$x = \frac{2}{2}$~~

~~$x = 1$~~ $x = 1$

~~$1-2x \le 3$~~

~~$-2x \le -2$~~

~~$2x \ge 2$~~

~~$x \ge 1$~~

~~$\log_{1/3}\left(\frac{1-2x}{3}\right) \longrightarrow 1-\frac{2x}{3} > 0$~~

~~$1 > \frac{2x}{3}$~~

~~$3 > 2x$~~

~~$x < \frac{3}{2}$~~

~~$\boxed{x \in [1, 1.5)}$~~

$\frac{1-2x}{x} \ge 1$

$\frac{1-2x-x}{x} \ge 0$

$\frac{1-3x}{x} \ge 0$

$-$ 0 $+$ $1/3$ $-$

~~$(-\infty, 0) \cup (1/3, \infty)$~~

$x \in (0, 1/3]$ — ①

$\log_{1/3}\left(\frac{1-2x}{x}\right) \longrightarrow \frac{1-2x}{x} > 0$

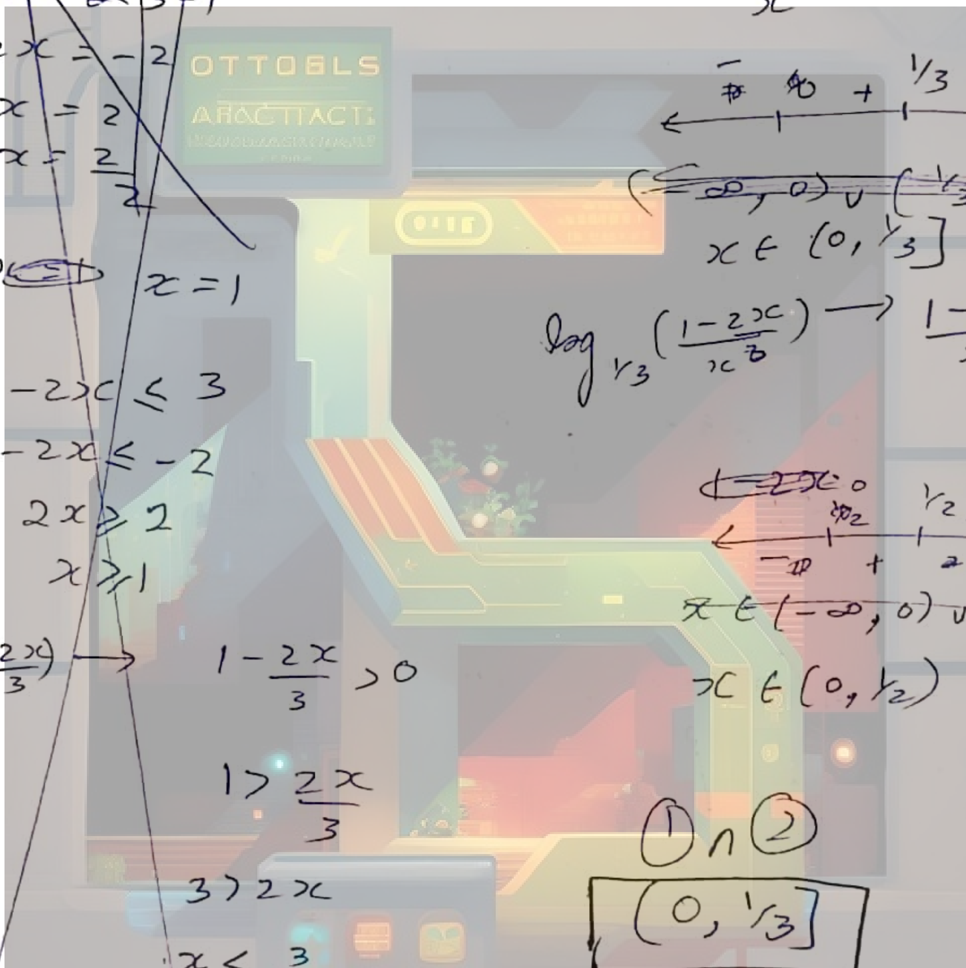
$-$ 0 $+$ $1/2$ $-$

~~$x \in (-\infty, 0) \cup (1/2, \infty)$~~

$x \in (0, 1/2)$ — ②

① $\cap$ ②

$\boxed{(0, 1/3]}$



② $\log_{2x}(x^2-5x+6) < 1$

Case 1 $\quad 2x \in (0,1)$

$x \in (0, \tfrac{1}{2})$

$x^2-5x+6 > 2x$

$x^2-7x+6 > 0$

$x^2-6x-x+6 > 0$

$(x-6)(x-1) > 0$

$+ \quad 1 \quad - \quad 6 \quad +$

$x \in (-\infty, 1) \cup (6, \infty)$

$x \in (0, \tfrac{1}{2})$ — ①

Case 2 $\quad 2x \in (1, \infty)$

$x \in (\tfrac{1}{2}, \infty)$

$(x-6)(x-1) < 0$

$+ \quad 1 \quad - \quad 6 \quad +$

$x \in (1, 6)$

$x \in (1, 6)$ — ②

① $\cup$ ②

$x \in (0, \tfrac{1}{2}) \cup (1, 6)$ — ③

$x^2-5x+6 > 0$

$x^2-3x-2x+6 > 0$

$x(x-3)-2(x-3) > 0$

$(x-2)(x-3) > 0$

$+ \quad 2 \quad - \quad 3 \quad +$

$x \in (-\infty, 2) \cup (3, \infty)$

$\cap$

$2x > 0$

$x > 0, \neq \tfrac{1}{2}$

$x \in (0, \tfrac{1}{2}) \cup (\tfrac{1}{2}, \infty)$

$x \in (0, \tfrac{1}{2}) \cup (\tfrac{1}{2}, 2) \cup (3, \infty)$ — ④

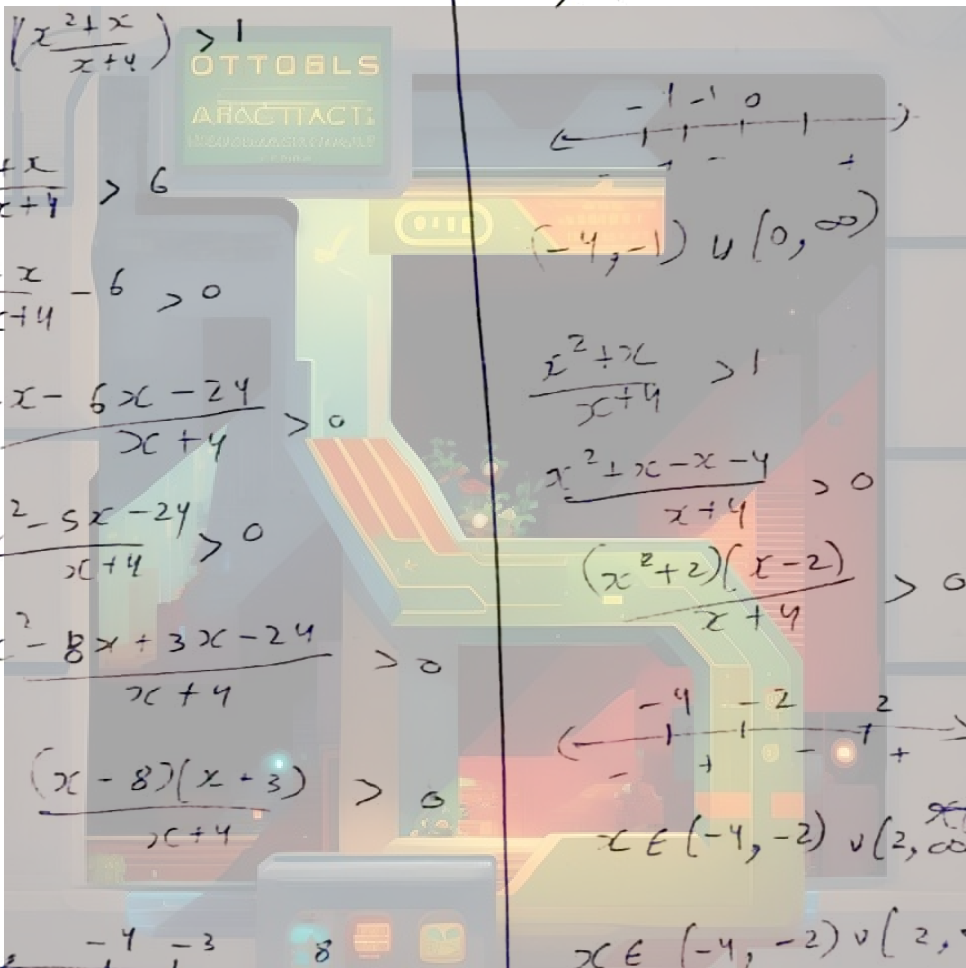
③ $\cap$ ④

$\boxed{(0, \tfrac{1}{2}) \cup (1, 2) \cup (3, 6)}$

H.W. 08-06-2024

DYS-5 [1, 2, 3, 5, 7, 8, 9, 10]

O-1 [7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20]



Q $\log_{0.5}\left(\log_6\left(\frac{x^2+x}{x+4}\right)\right) < 0$

$\cancel{\log_{0.5}(\ 2\ )}$

$\log_6\left(\frac{x^2+x}{x+4}\right) > 1$

$\frac{x^2+x}{x+4} > 6$

$\frac{x^2+x}{x+4} - 6 > 0$

$\frac{x^2+x-6x-24}{x+4} > 0$

$\frac{x^2-5x-24}{x+4} > 0$

$\frac{x^2-8x+3x-24}{x+4} > 0$

$\frac{(x-8)(x+3)}{x+4} > 0$

$-4 \quad -3 \quad 8$

$- \quad + \quad - \quad +$

$x \in (-4,-3) \cup (8,\infty)$

$\frac{x^2+x}{x+4} > 0$

$\frac{x(x+1)}{x+4} > 0$

$-4 \quad -1 \quad 0$

$- \quad + \quad - \quad +$

$(-4,-1) \cup (0,\infty)$

$\frac{x^2+x}{x+4} > 1$

$\frac{x^2+x-x-4}{x+4} > 0$

$\frac{(x+2)(x-2)}{x+4} > 0$

$-4 \quad -2 \quad 2$

$- \quad + \quad - \quad +$

$\cancel{x(x-8)+3(x-8)}$

$x \in (-4,-2) \cup (2,\infty)$

$x \in (-4,-2) \cup (2,\infty)$

$x \in (-4,-3) \cup (8,\infty)$

$\boxed{x \in (-4,-3) \cup (8,\infty)}$

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Q $\log_2 \log_{1/2} \log_7 \log_{1/3} (2x-3) > 0$

$\log_{1/2} \log_7 \log_{1/3} (2x-3) > 1$

$\log_7 \log_{1/3} (2x-3) < \frac{1}{2}$

$\log_{1/3} (2x-3) < \sqrt{7}$

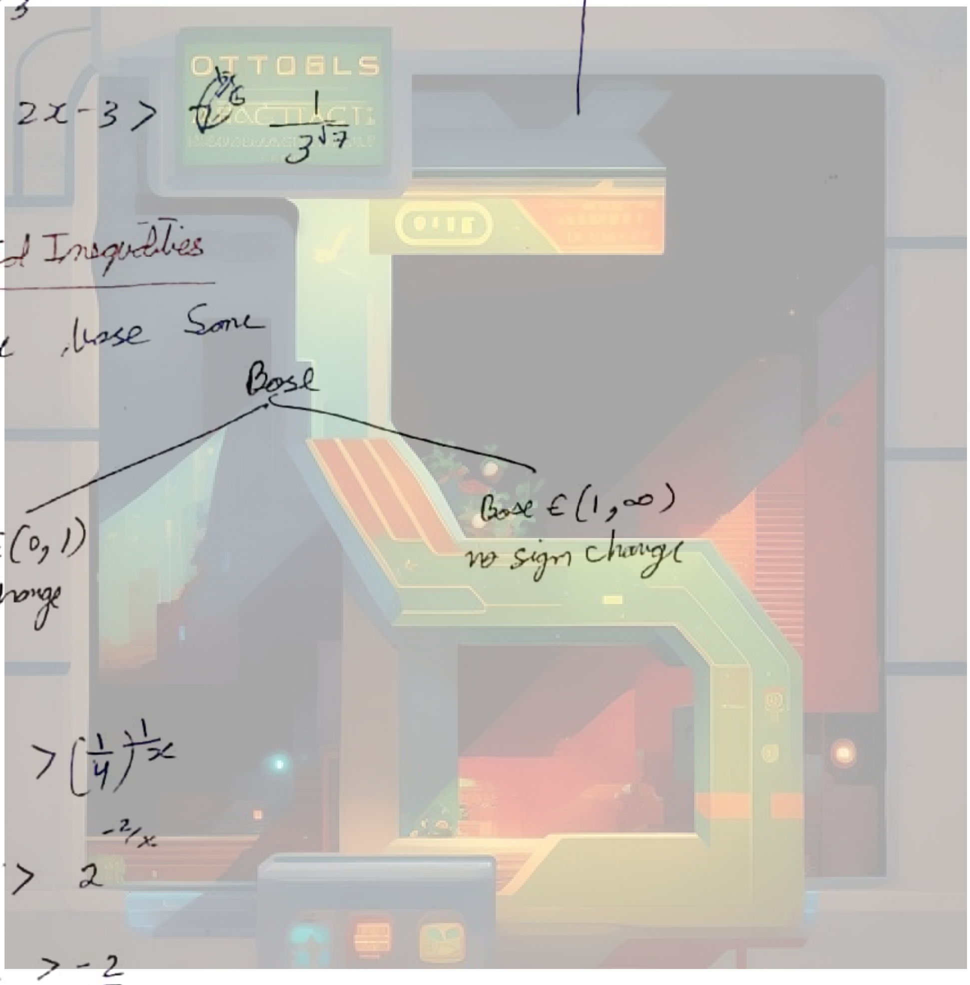
$2x-3 > \frac{1}{3^{\sqrt{7}}}$

$2x-3 > 0$

$\log_{1/3}(2x-3) > 0$

$\log_7 \log_{1/3}(2x-3) > 0$

$\log_{1/2} \log_7 \log_{1/3}(2x-3) > 0$



Exponential Inequalities

→ Make the base same

→

Base

Base $\in (0,1)$
Sign change

Base $\in (1,\infty)$
no sign change

Q1. $2^{x+2} > \left(\frac{1}{4}\right)^{\frac{1}{x}}$

$2^{x+2} > 2^{-2/x}$

$x+2 > -\frac{2}{x}$

$x+2+\frac{2}{x} > 0$

$\frac{x^2+2x+2}{x} > 0$

$\frac{1}{x} > 0$

0

$\boxed{x \in (0,\infty)}$

Q 2. $(1.25)^{1-x} < (0.64)^{2(1+\sqrt{x})}$

Q 3. $\left(\frac{2}{5}\right)^{\frac{6-5x}{2+5x}} < \frac{25}{4}$

$\cancel{\frac{5}{2}}\ \frac{2}{5} > \left(\frac{2}{5}\right)^{\frac{1}{2}\left(\frac{6-5x}{2+5x}\right)}$

$1 < \frac{1}{2}\left(\frac{6-5x}{2+5x}\right)$

$\frac{6-5x-2-5x}{2+5x} > 0$

$\frac{4-10x}{2+5x} > 0$

$\frac{10x-4}{5x+2} < 0$

p

$1 + \frac{12-5x}{2+5x} < 0$

$\frac{2+5x+12-5x}{2+5x} < 0$

$\frac{6+x}{5x+2} < 0$

-6

$\left(\frac{2}{5}\right)^{\frac{6-5x}{2+5x}} < \left(\frac{2}{5}\right)^{-2}$

$\frac{5x-6}{5x-2} < 2$

$\frac{5x-6-10x+4}{5x-2} < 0$

$\frac{5x+2}{5x-2} > 0$

$-2/5 \qquad 2/5$

$+ \qquad - \qquad +$

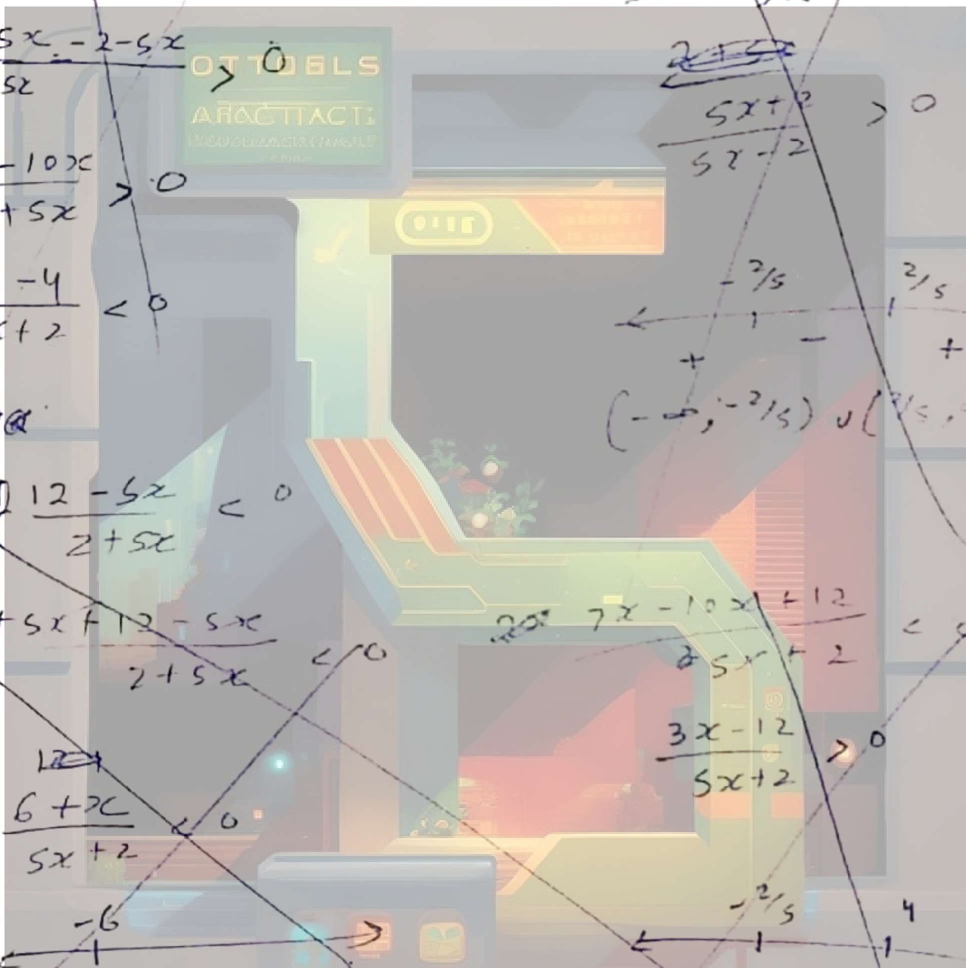
$(-\infty, -2/5) \cup (2/5, \infty)$

$\frac{7x-10x+12}{5x+2} < 0$

$\frac{3x-12}{5x+2} > 0$

$-2/5 \qquad 4$

$(-\infty, -2/5) \cup (4, \infty)$



Scanned with CamScanner

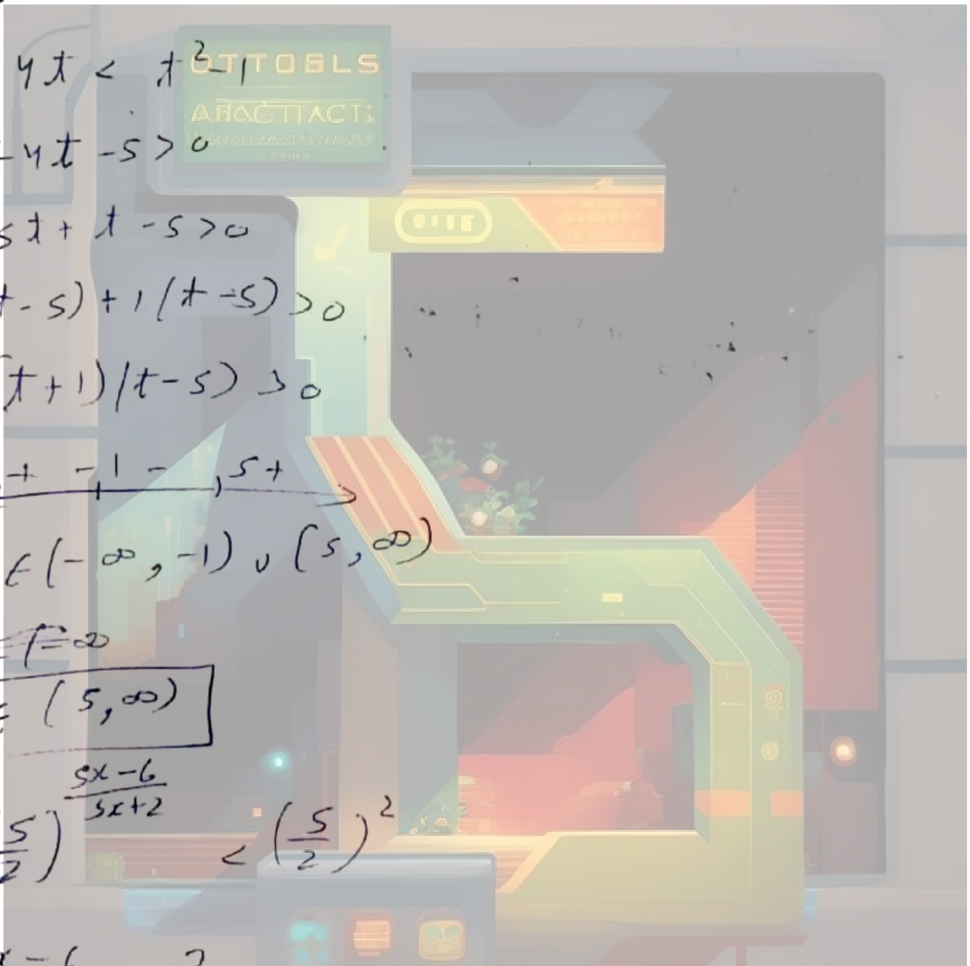
② $(1.25)^{1-x} < (0.64)^{2(1+\sqrt{x})}$

$\left(\frac{125}{100}\right)^{1-x} < \left(\frac{64}{100}\right)^{2(1+\sqrt{x})}$

$\left(\frac{5}{4}\right)^{1-x} < \left(\frac{5}{4}\right)^{-4(1+\sqrt{x})}$

$1-x < -4(1+\sqrt{x})$

$4(1+\sqrt{x}) < x-1$



$4+4t < t^2-1$

$t^2-4t-5>0$

$t-5t+t-5>0$

$t(t-5)+1(t-5)>0$

$(t+1)(t-5)>0$

$+ \quad -1 \quad - \quad 5 \quad +$

$t \in (-\infty,-1) \cup (5,\infty)$

$\cancel{x \in (-\infty}$

$\boxed{x \in (5,\infty)}$

③ $2\left(\frac{5}{2}\right)^{\frac{5x-6}{5x+2}} < \left(\frac{5}{2}\right)^2$

$\frac{5x-6}{5x+2} < 2$

$\frac{5x-10}{5x+2} < 0$

$\frac{x+2}{5x+2} > 0$

$x \in (-\infty,-2) \cup (-2/5,\infty)$

DYS-6

(8) $\left(\frac{2}{3}\right)^{\frac{|x|-1}{|x|+1}} > 1$

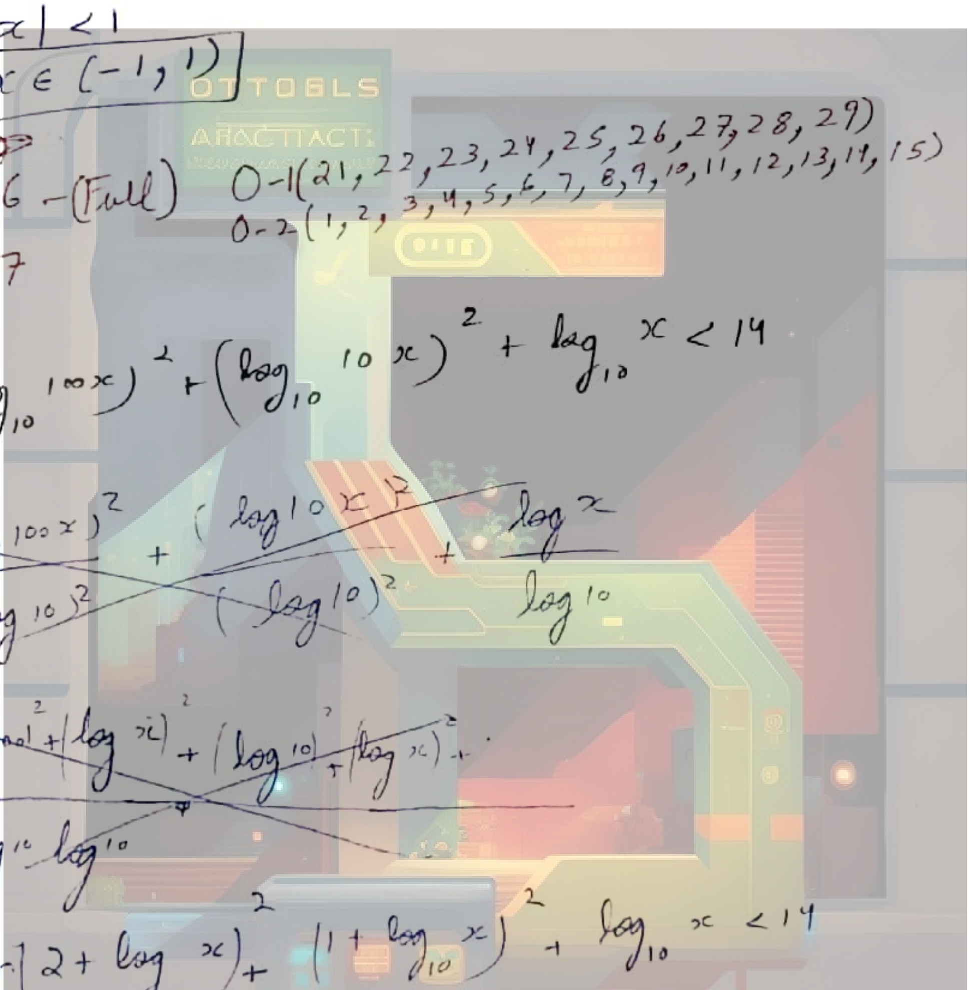
$$\left(\frac{2}{3}\right)^{\frac{|x|-1}{|x|+1}} > \left(\frac{2}{3}\right)^{0}$$

$$\frac{|x|-1}{|x|+1} < 0$$

$$|x|-1 < 0$$

$$|x| < 1$$

$$\boxed{x \in (-1, 1)}$$



H.W. DYS-6 -(Full) O-1(21, 22, 23, 24, 25, 26, 27, 28, 29)

O-2(1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15)

$e = 2.7$

DYS-5

(4) $(\log_{10} 100x)^2 + (\log_{10} 10x)^2 + \log_{10} x < 14$

$$\cancel{\frac{(\log 100x)^2}{(\log 10)^2} + \frac{(\log 10x)^2}{(\log 10)^2} + \frac{\log x}{\log 10}}$$

$$\cancel{\frac{(\log 100)^2 + (\log x)^2 + (\log 10)^2 + (\log x)^2 + \cdots}{\log 10 \, \log 10}}$$

Q 9: $(2 + \log_{10} x)^2 + (1 + \log_{10} x)^2 + \log_{10} x < 14$

$$4 + y^2 + 4y + 1 + y^2 + 2y + y < 14$$

$$2y^2 + 7y - 9 < 0 \qquad 2y^2 + 9y - 2y - 9 < 0$$

$-9/2$ $\quad$ 1

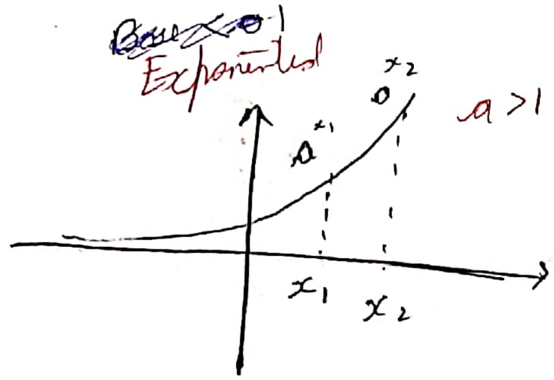
$$\log_{10} x \in \left(-\frac{9}{2}, 1\right)$$

$$\boxed{x \in \left(10^{-9/2}, 10\right)}$$

(110)

Exponential graphs and Logarithmic graphs

~~Base < 1~~ Exponential



$a > 1$ $\qquad$ ~~$\log_a y = x$~~

$x_1 < x_2$

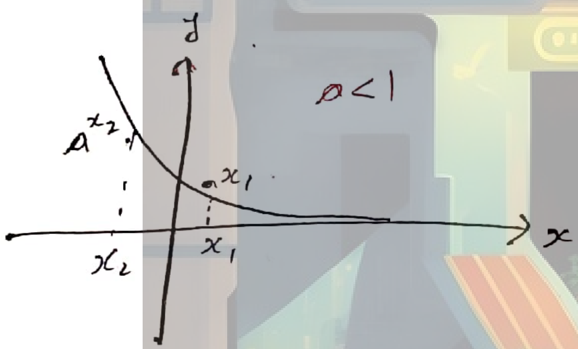
$a^{x_1} < a^{x_2}$

$a^{f(x)} > b$

$\log_a a^{f(x)} > \log_a b$

$a > 1 \Rightarrow f(x) > \log_a b$

$0 < a < 1 \Rightarrow f(x) < \log_a b$



$a < 1$

$x_2 < x_1$

$a^{x_2} > a^{x_1}$

Domain (Range of x) $\rightarrow (-\infty, \infty)$

Range $\rightarrow (0, \infty)$

log

$y = \log_a x$

$a > 0 \quad x > 0$

$a = 2$ $\quad x = 2, y = 1$, $\quad x = 4, y = 2$, $\quad x = 8, y = 3$, $\quad x = 16, y = 4$

$a = 4$ $\quad x = 4, y = 1$, $\quad x = 16, y = 2$, $\quad x = 64, y = 3$, $\quad x = 256, y = 4$

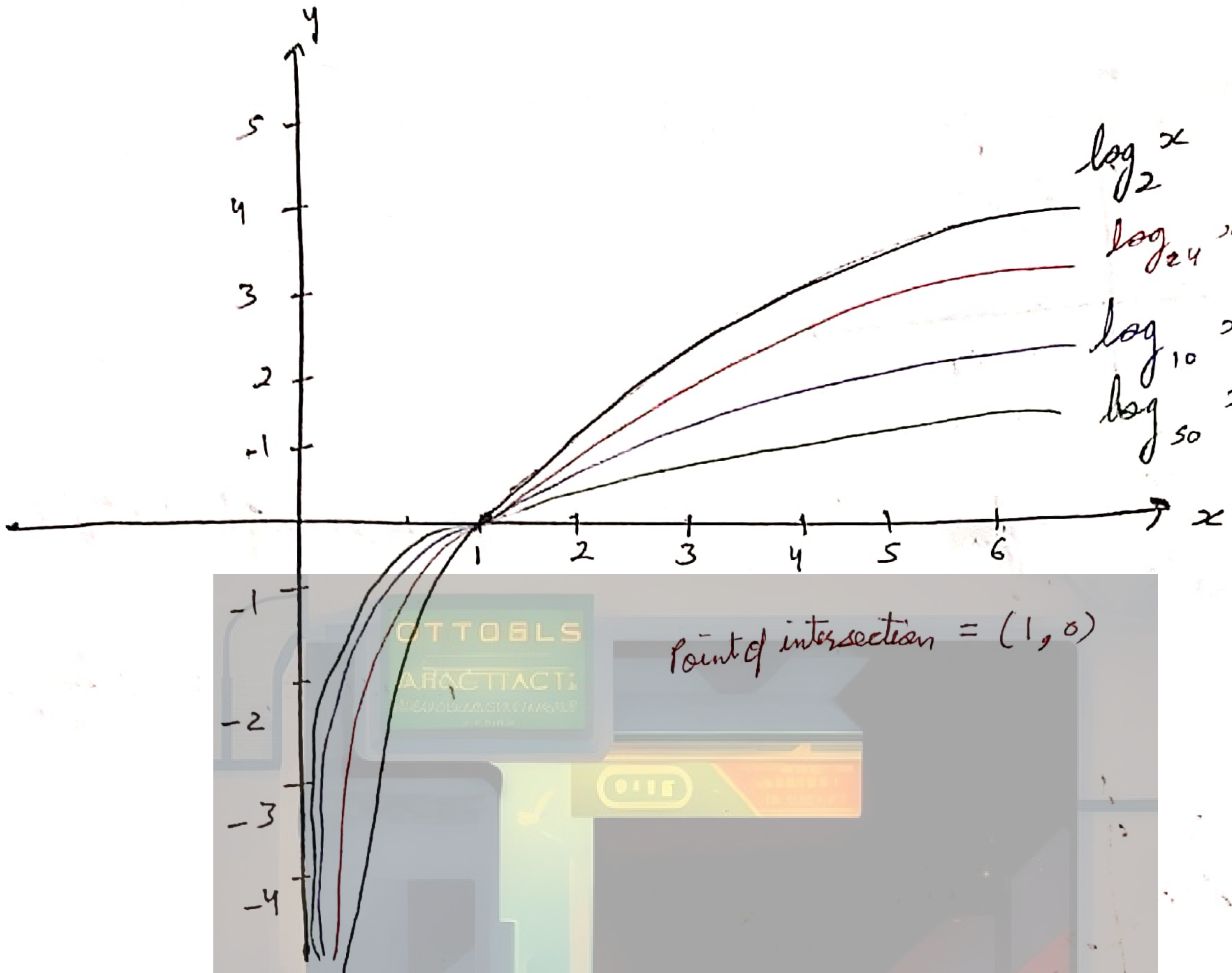
$a = 10$ $\quad x = 10, y = 1$, $\quad x = 100, y = 2$, $\quad x = 10^3, y = 3$, $\quad x = 10^4, y = 4$

$a > 0 \quad x < 0$

$a = 2$ $\quad x = 1/2, y = -1$ $\quad 1/4, -2$ $\quad 1/8, -3$

$a = 4$ $\quad x = 1/4, y = -1$ $\quad 1/16, -2$ $\quad 1/64, -3$

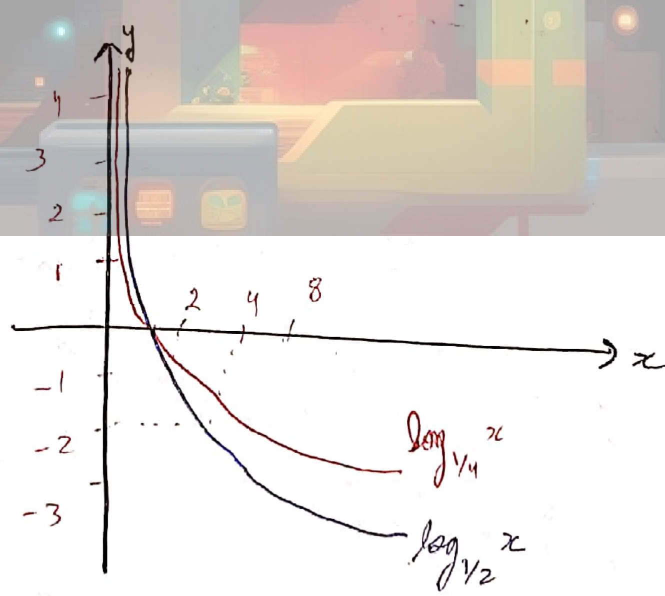
$a = 10$ $\quad x = 1/10, y = -1$ $\quad 1/100, -2$ $\quad 1/1000, -3$



I draw graph $y = \log_{1/2} x$ $\quad y = \log_{1/4} x$

$y =$	1	2	3	4
$x =$	$1/2$	$1/4$	$1/8$	$1/16$

$0 < a < 1$



Conclusions

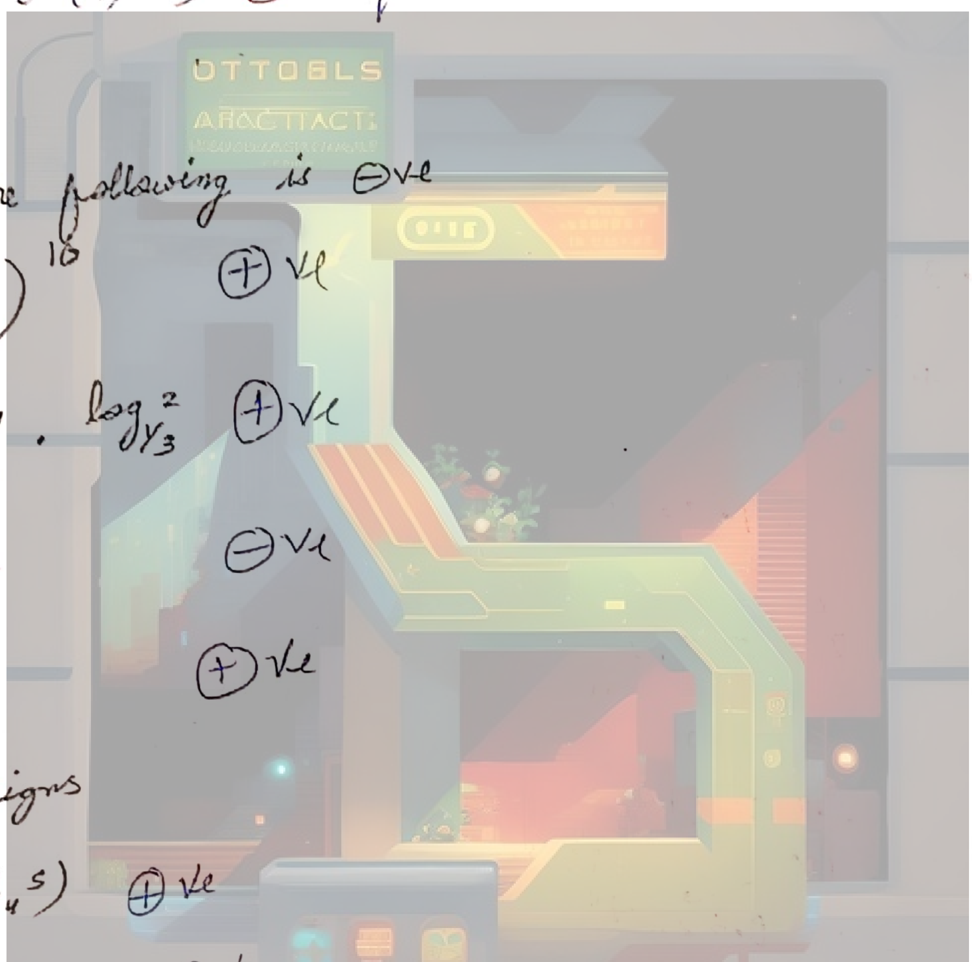
→ Value of log can be ⊕ve or can be ⊖ve or zero.

→ Graph of log lies in I^{st} & IV^{th} quadrant.

⇒ when Base 'a' and number 'x' lies on either side of 1. (1 ke aaju baju) then value of log will be ⊖ve. when base 'a' and number 'x' lies on the same side of one then the value of log will be ⊕ve.

$0 <$ Base < 1	Base > 1
$x \in (0, 1)$ ⊕ve	$x \in (1, \infty)$ ⊕ve
$x \in (1, \infty)$ ⊖ve	$x \in (0, 1)$ ⊖ve

for $\log_a x$



Q which of the following is ⊖ve

① $(\log_{1/5} 7)^{10}$ ⊕ve

② $\log_{1/5} 7 \cdot \log_{1/3} 2$ ⊕ve

③ $\log_3 1/2$ ⊖ve

④ $\log_2 8$ ⊕ve

Q. find signs

① $\log_9 (\log_4 5)$ ⊕ve

② $\log_5 (\log_4 22)$ ⊕ve

③ $\log_{\log_{11} 5} \left(\frac{3}{7}\right)$ ⊕ve

Characteristic & Mantissa

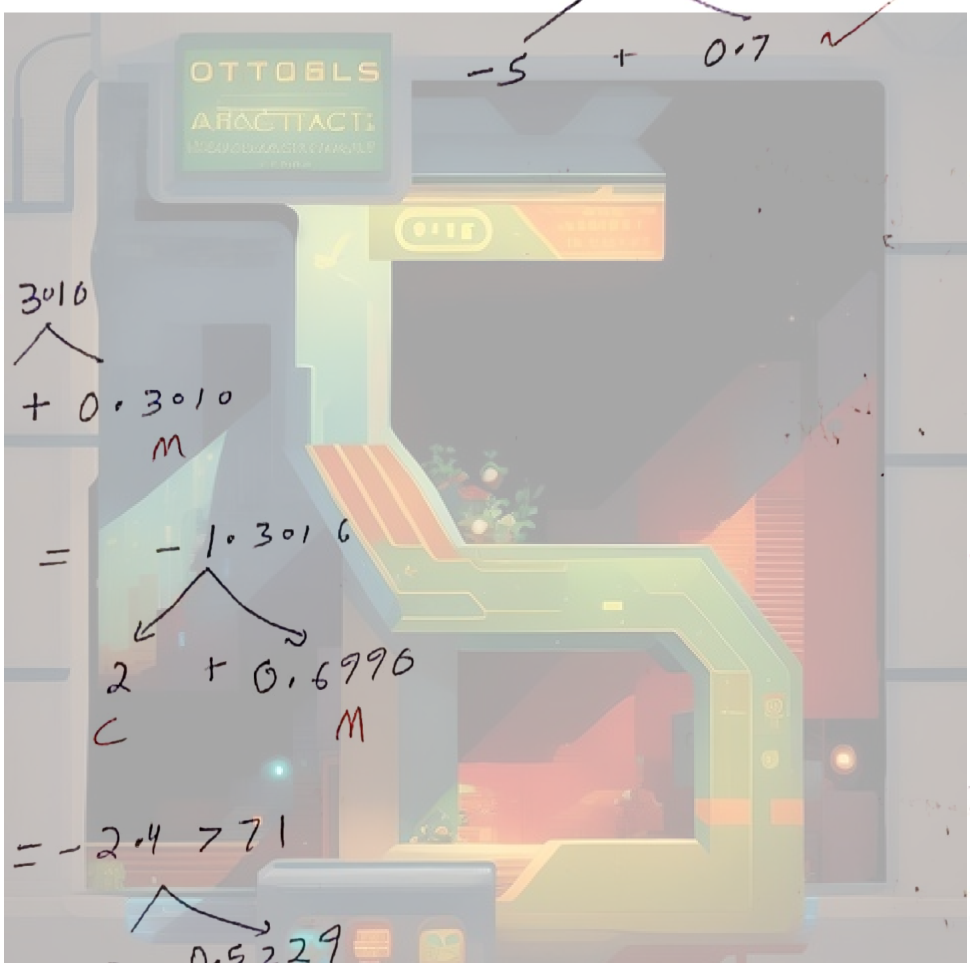
$\downarrow$ log to the integer part

$\longrightarrow$ fractional part $[0-1)$
can be zero

$$1.7 = 1 + 0.7$$

$$-4.3 = -4 + -0.3 \quad \times$$

$$-4.3 = -5 + 0.7 \quad \checkmark$$



$\log_{10} 20 = 1.3010 = \underset{C}{1} + \underset{M}{0.3010}$

$\log_{10} \frac{1}{20} = -1.3010 = \underset{C}{\bar{2}} + \underset{M}{0.6990}$

$\log_{10} \frac{1}{300} = -2.4771 = \underset{C}{-3} + \underset{M}{0.5229}$

Applications:-

$\rightarrow$ Finding the number of digits using common log (Base - 10)

$$\boxed{\text{No. of digits} = C + 1}$$

* $\log_{10} 2 = 0.3010$
* $\log_{10} 3 = 0.4771$

eg. (1) 10^2 $\quad \log_{10} 10^2 = 2$

$c = 2 \qquad m = 0$

no. of digits $= c+1$
$= 2+1$
$= 3$

(2) 10^3 $\quad \log_{10} 10^3 = 3$

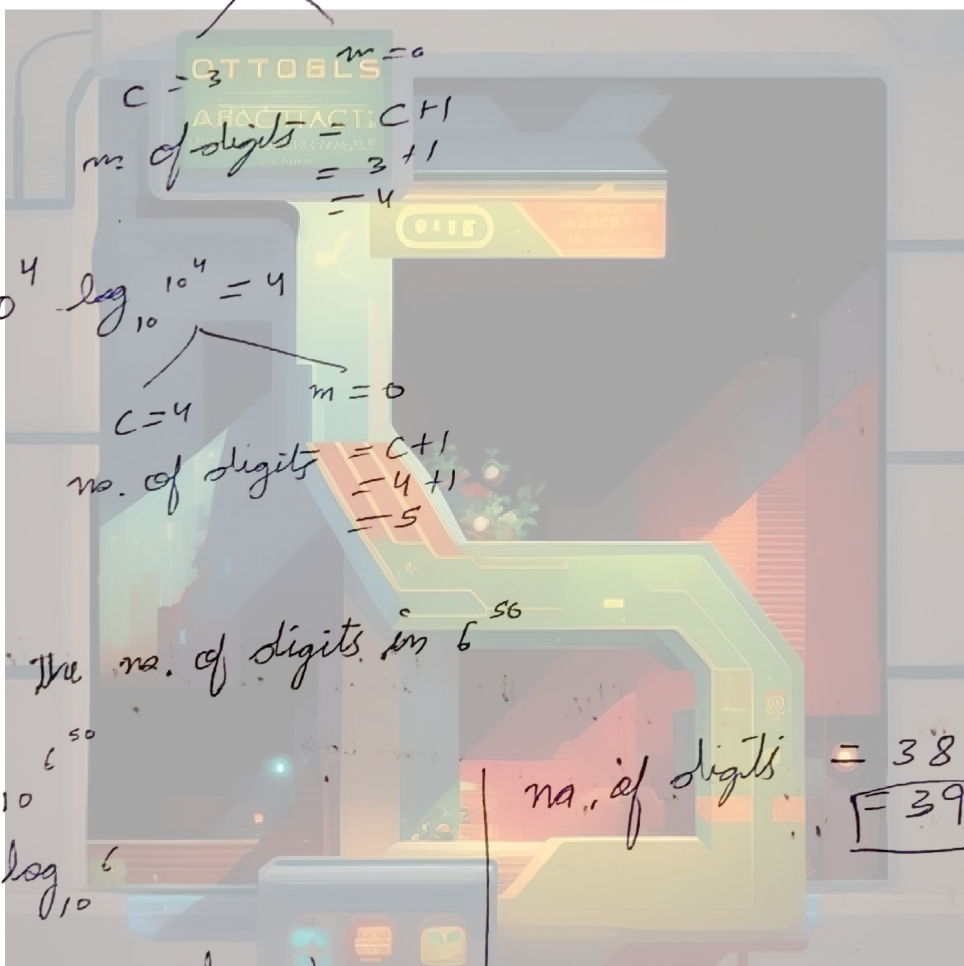
$c = 3 \qquad m = 0$

no. of digits $= c+1$
$= 3+1$
$= 4$

(3) 10^4 $\quad \log_{10} 10^4 = 4$

$c = 4 \qquad m = 0$

no. of digits $= c+1$
$= 4+1$
$= 5$



Q Find the no. of digits in 6^{50}

$\log_{10} 6^{50}$

$50 \log_{10} 6$

$50(\log_{10} 2 + \log_{10} 3)$

$50(0.3010 + 0.4771)$

$50(0.7781)$

38.905

$C = 38 \qquad M = 0.905$

no. of digits $= 38+1$
$\boxed{= 39}$

DYS 7

Q 2. 18^{20}

$\log_{10} 18^{20}$

$20 \log_{10} 18$

$20(\log_{10} 3 + \log_{10} 3 + \log_{10} 2)$

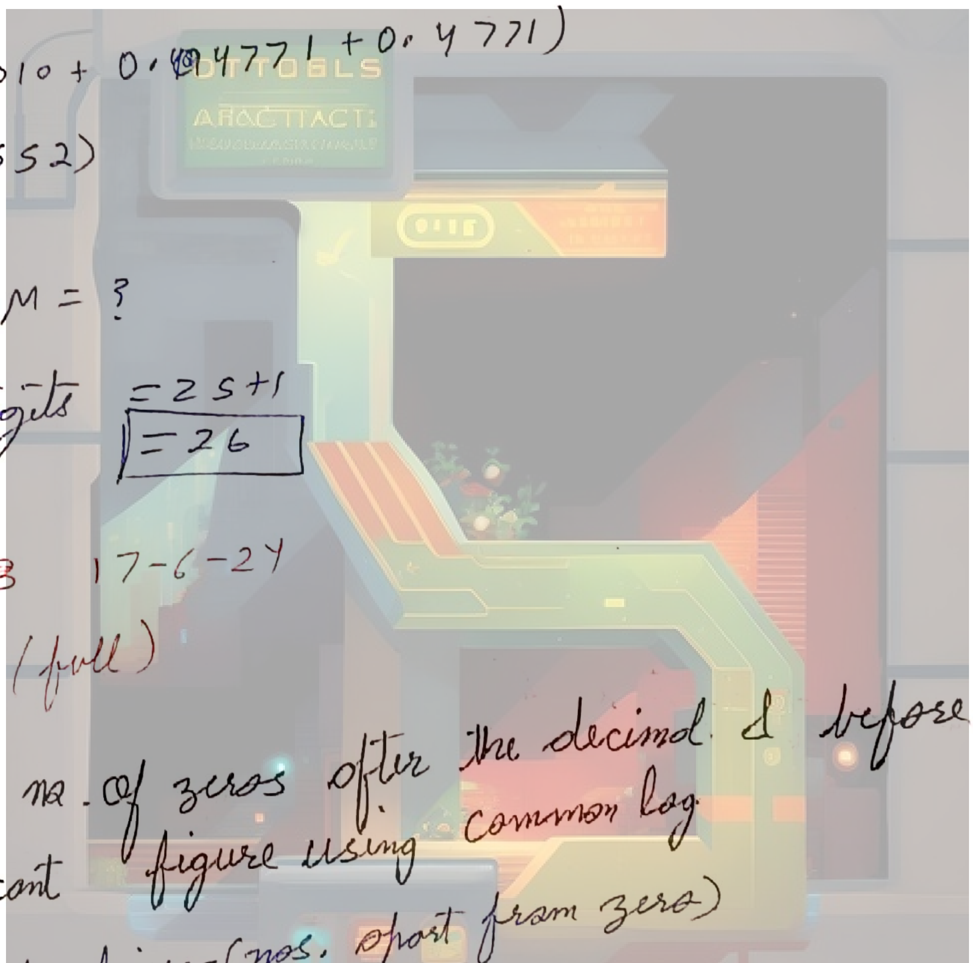
$20(0.3010 + 0.4771 + 0.4771)$

$20(1.2552)$

$C = 25 \quad M = ?$

no. of digits $= 25 + 1$

$\boxed{= 26}$



H.W. ~~Q-3~~ 17-6-24

Q-3 (full)

→ Finding no. of zeros after the decimal & before the significant figure using common log

Significant figure-(nos. apart from zero)

no. of zeros $= |c| - 1$

eg. 0.01

$\log_{10} 0.01 = -2$

$C = -2 \quad M = 0$

nos. of zeros $= 2 - 1$
$= 1$

0.0001

$\log_{10} 10^{-4} = -4$

$C = -4 \qquad M = 0$

nos. of zeros $= 4 - 1$

$= 3$

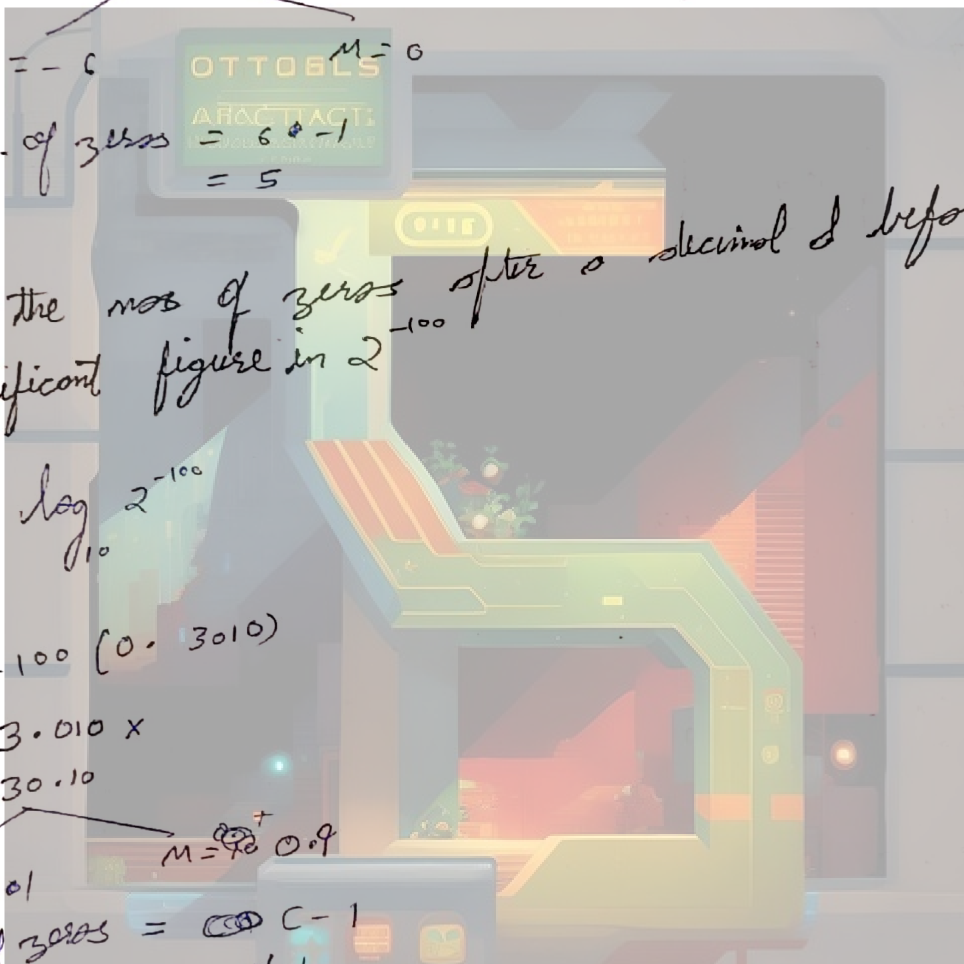
0.000001

$\log_{10} 10^{-6} = -6$

$C = -6 \qquad M = 0$

nos. of zeros $= 6 - 1$

$= 5$



Q Find the nos of zeros after a decimal & before a significant figure in 2^{-100}

$\log_{10} 2^{-100}$

$-100\,(0.3010)$

-3.010 ×

-30.10

$C = -31 \qquad M = 0.9$

no. of zeros $= C - 1$

$= 31 - 1$

$\boxed{= 30}$

DYS - 7

Q 2.

$\log_{10} 3^{-100}$

$-100\,(0.4771)$

-47.71

$C = -48$ $\quad m =$

$48 - 1$

$= \cancel{47}\ 47$

$\boxed{59}$

$\log_{10} 6^{15}$

$15\,(0.3010 + 0.4771)$

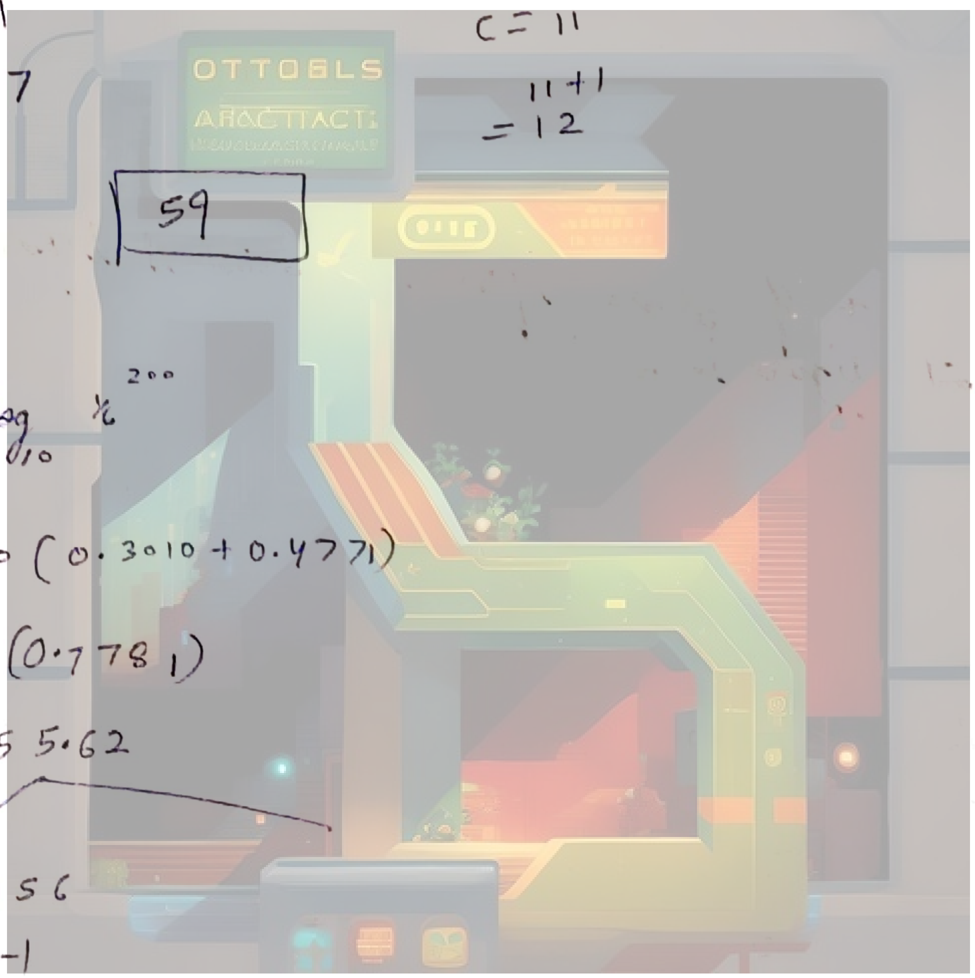
$15 \times (0.7781)$

11.6715

$C = 11$

$11 + 1$

$= 12$



Q 3.

$\log_{10} \frac{1}{6}^{200}$

$-200\,(0.3010 + 0.4771)$

$-200\,(0.7781)$

-155.62

$C = \cancel{-}\,-156$

$156 - 1$

$\boxed{155}$

Q Evaluate : $\log_{10}(0.06)^6$ find characteristic & Mantissa

$\cancel{6\,\log_{10} 6 + \log_{10} 10^{-2}}$

$\cancel{6\,[(0.7781)\ \oplus -2]}$

$\cancel{4.6686 - 12}$

$\cancel{7.6686}$ $\quad -8.6686$

$\boxed{\cancel{C = 2} \\ \cancel{M = 0.6686}}$

$C = -9$

$M = \cancel{0}0.3314$

(118)

$= \log_{10}\left(\frac{6}{100}\right)$

$6(\cancel{0}\, 0.7781 \; -2)$

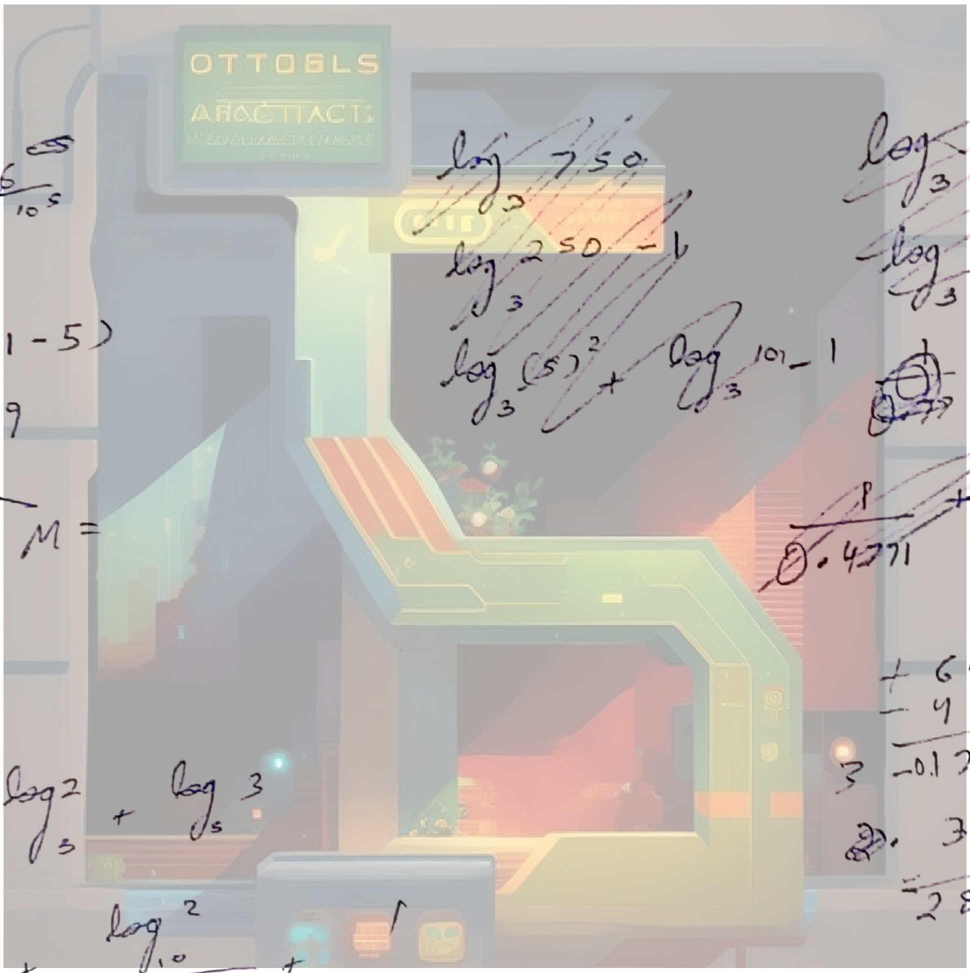
$\cancel{6 \times (-2)}$

$6(-1.2219) = -7.331$

$C = -8$ $\quad M = 0.668$

DYS-7

Q 5.



$\log_{10} \frac{6}{10^5}$

$(0.7781 - 5)$

-4.2219

$C = -5$ $\quad M =$

$\log_3 750$

$3\log_3 5 + \log_3 2 + \log_3 3$

$3\frac{\log_{10} 10/2}{\log_{10} 3} + \frac{\log_{10} 2}{\log_{10} 3} + 1$

$\frac{3(1-0.3010)}{0.04771} + \frac{0.3010}{0.4771} + 1$

$\frac{3 - 0.9030 + 0.3010 + 0.4771}{0.4771}$

$\frac{2.8751}{0.4771}$

$= 6 \ldots$

$\boxed{C = 6}$

$6+(-5)$

$\boxed{= 1}$

~~$\log_3 750$~~

~~$\log_3 250 - 1$~~

~~$\log_3 (5)^2 + \log_3 10 - 1$~~

~~$\log_3 750$~~

~~$\log_3 (10)^x + \log_3 75$~~

~~$\frac{1}{0.4771} + 3$~~

1.6020
$-.4771$
$3\ -0.1249$

3.0000
$.1249$
2.8751

2.8751

H.W. 18-6-24

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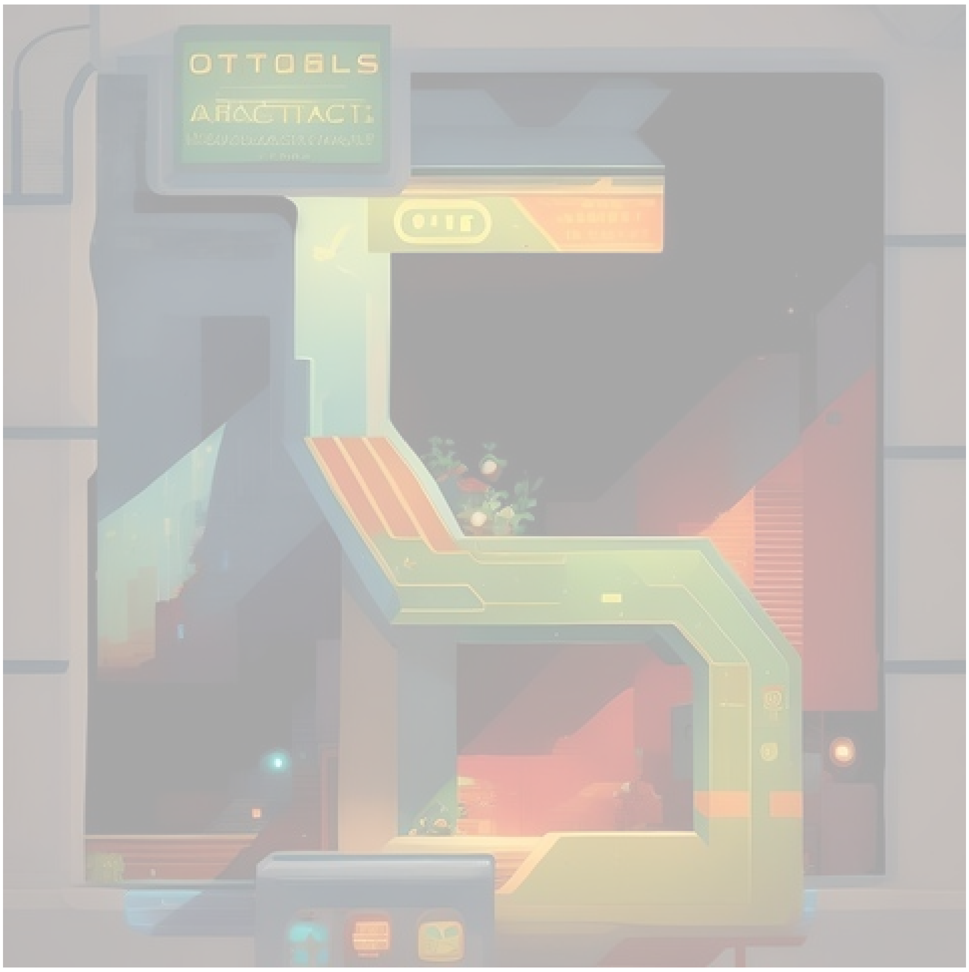
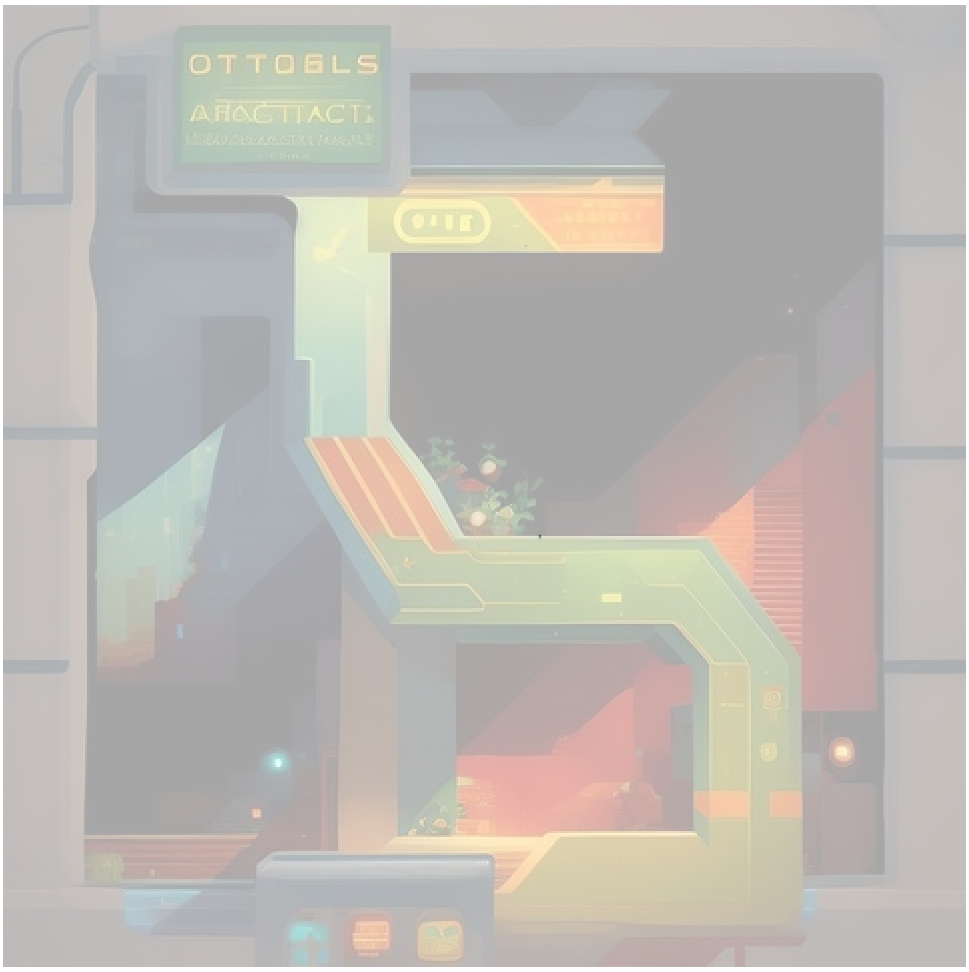
Q-7

Q-4 (Quadratic)

J-A

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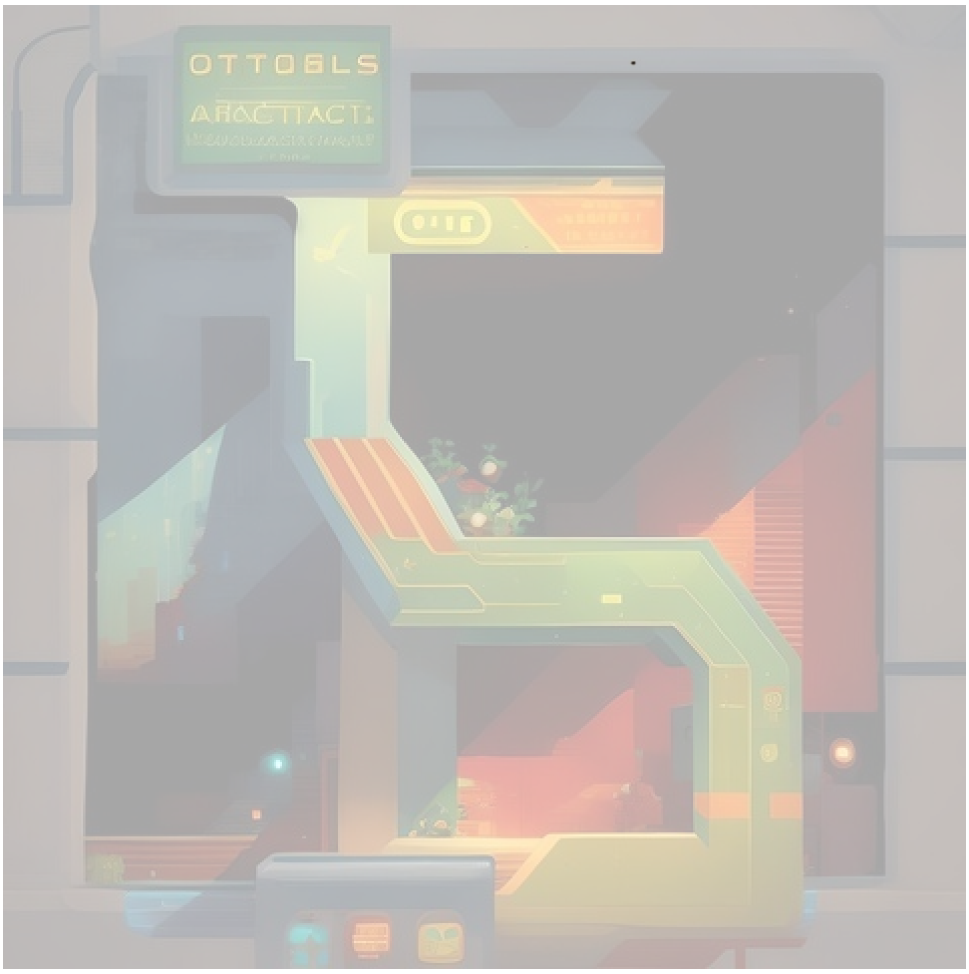

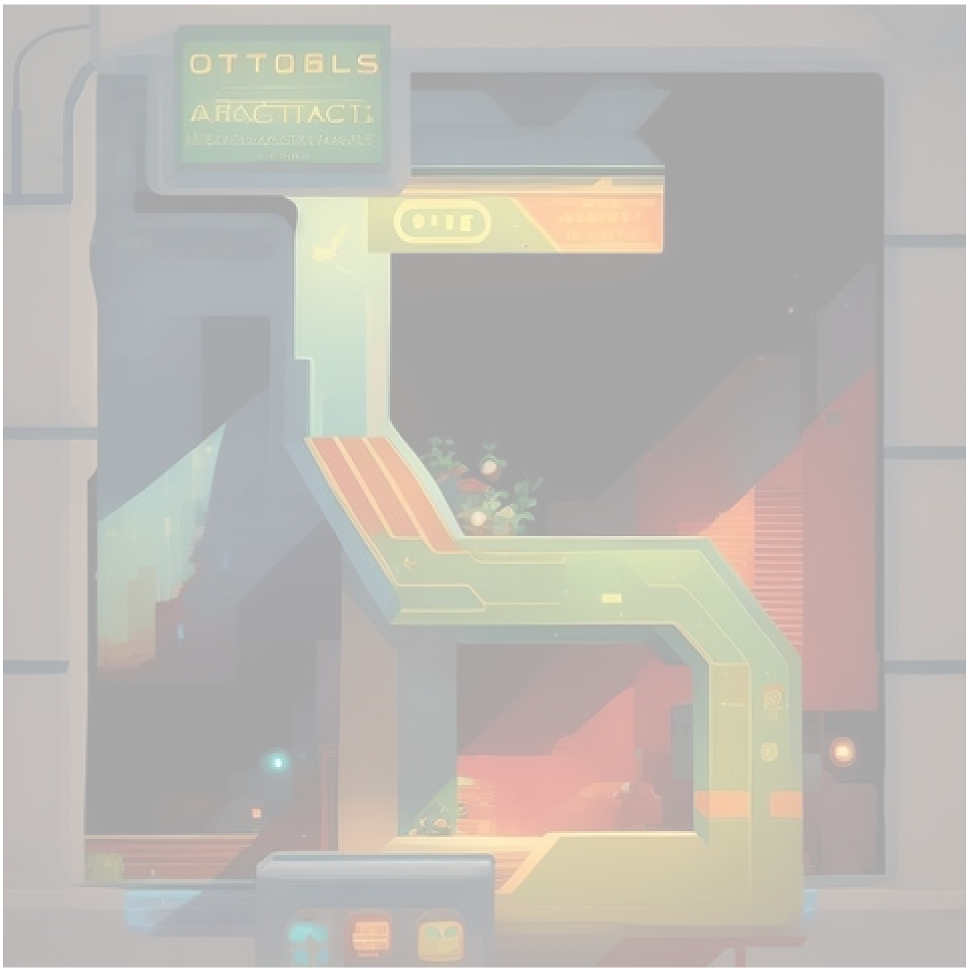
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