Class 13

Thursday, December 3, 2020 10:01 PM

1) Ugly Number III

$N \longrightarrow N^{th}$ ugly number

a, b, c

a = 2
b = 3
c = 5

ugly number $\rightarrow X \rightarrow$ $X \% a == 0$
$X \% b == 0$
$X \% c == 0$

X = 8

2, 3, 4, 5, 6, 8, 9, 10, 12, 14, 15, 16, 18, 20, 21, 22, 24, 25

$1 \le n, a, b, c \le 10^9$

$1 \le abc \le 10^{18}$

$1 \le X \le 2 \times 10^9$

a = 2
b = 3
c = 5

N = 11 (15)

Given(M)	L	R
50	1	100
25	1	50
13	1	25
19	14	25
16	14	19
15	14	16
14	14	15

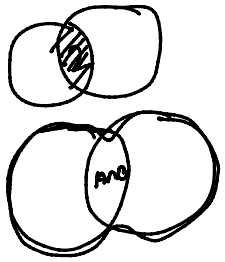
15 15 15

(1 ~ N) .... a এর গুণিতক

[1, N], a, b, c এর গুণিতক

N/a

$\frac{N}{a} + \frac{N}{b} + \frac{N}{c}$



$n(A) + n(B) - n(A \cap B)$

$$\frac{N}{a}+\frac{N}{b}+\frac{N}{c}-\frac{N}{lcm(a,b)}-\frac{N}{lcm(b,c)}-\frac{N}{lcm(a,c)}+\frac{N}{lcm(a,b,c)}$$

$$N(A\cup B)=N(A)+N(B)-N(A\cap B)$$

$$N(A\cup B\cup C)=N(A)+N(B)+N(C)-N(A\cap B)-N(B\cap C)-N(A\cap C)+N(A\cap B\cap C)$$

$$\frac{N}{2}+\frac{N}{4}-\frac{N}{4}$$

2, 4, 6, 8, 10, 12, 14, 16, 18, ...

3, 6, 9, 12, 15, 18

$$ab=gcd(a,b)\cdot lcm(a,b)$$

$$\frac{ab}{gcd(a,b)}=lcm(a,b)$$

$$\frac{13}{2}+\frac{13}{3}+\frac{13}{5}-\frac{13}{6}-\frac{13}{15}-\frac{13}{10}+\frac{13}{30}$$

$$6+4+2-2-0-0+0=9$$

$[1, 2e^9]$ $l=1$ $R=2e9$ $=2\times10^9$

while($L<R$)
{ $M=(L+R)/2$
if $f(M)<N$
$L=M+1$

else R=M

}

→ L;

a b c
5, 10, 15

5, 10, 15, 20, 25, 30, ...

≤25
≤26
≤27
≤28
≤29

v

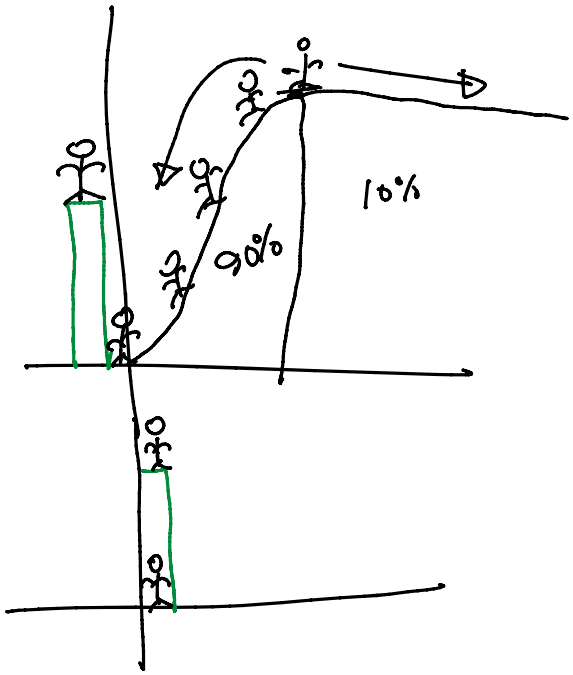
$lcm(a,b,c) = lcm(lcm(a,b), lcm(b,c))$

lcm(a,b) lcm(b,c)

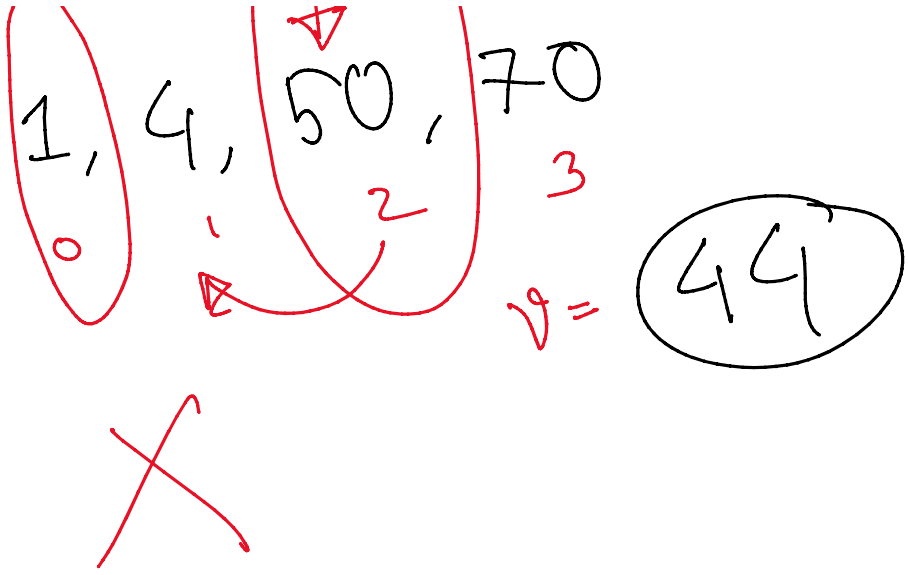
100

$\frac{20 \times 10}{5} = \frac{200}{5} = 40$

$4 \times 10 = 40$



lcm 70



lb - 1

X