Mathematics:

Permutation → Combinatorics

→ GCD → Number theory

$\boxed{\text{Geometry}}$, Modular Arithmatics

Number theory:

15, 20, 37 → 10 based numbers.

0 1 2 3 4 5 6 7 8 9 10

2 based → on
→ off

$n = \boxed{5439}$

$= 5430 + 9$

$= 5400 + 30 + 9$

$5 \times 1000 + 4 \times 100 + 3 \times 10 + 9$

$\Rightarrow 5 \times 10^3 + 4 \times 10^2 + 3 \times 10^1 + 9 \times 10^0$

$$\rightarrow \boxed{\sum_{i=0}^{k-1} a_i \cdot 10^i}$$

[9, 3, 4, 5]

$a_0 10^0 + a_1 10^1 + a_2 10^2 + a_3 10^3$

$\Rightarrow 9 + 3 \times 10 + 4 \times 100 + 5 \times 1000$

$= 5439$

2-based number

$\boxed{1101} \rightarrow 13$

$\Rightarrow [1, 0, 1, 1]$

$$\sum_{i=0}^{k-1} a_i \cdot 2^i$$

$\Rightarrow 1 + 4 + 8 = 13$

$(13)_{10} = (1101)_2$

$n = 17$

$$\begin{array}{r|l l}
2 & 17 & \\ \hline
2 & 8 & - 1 \\
2 & 4 & - 0 \\
2 & 2 & - 0 \\
2 & 1 & - 0 \\
 & 0 & - 1
\end{array}$$

$(10001)_2 = (17)_{10}$

$\boxed{\text{decimal} \rightarrow \text{binary}}$

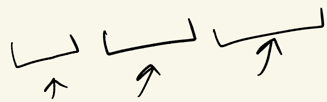
1. GCD, LCM

35, 21

cookies juices

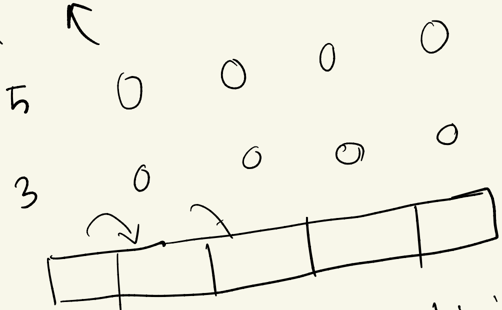
Students

take n students →



1 student

take 7 students,



5	5	5	5	5	5	5
3	3	3	3	3	3	3

$n \mid K \Rightarrow [K \% n == 0]$

↳ n divides K

→ 35 has to be divisible by K

→ 21 has to . . . . by K

$\boxed{K \mid 35,\ K \mid 21}$

↳ $\boxed{K}$ is a $\boxed{\text{common divisor}}$ of 35 and 21

Made with Goodnotes

GCD = Greatest common divisor

$48 = 4 \times 12$

$= 2\times 2 \times 3 \times 2 \times 2$

$= 2^4 \times 3^1 \rightarrow$ $\boxed{\text{prime factorization}}$

Theorem: Any natural number $\boxed{n > 1}$ can be written as a product of some prime numbers.

$24 = 2 \times 12 = 2\times 3\times 2^2 = 2^3 \times 3$

$= 2 \times 3 \times 4 =$

$= 2 \times 3 \times 4$

$n_1 = p_0^{a_0} \cdot p_1^{a_1} \cdot p_2^{a_2} \cdot \cdots\cdots p_k^{a_k}$

$n_2 = p_0^{b_0} \cdot p_1^{b_1} \cdot p_2^{b_2} \cdots\cdots p_k^{b_k}$

$(n_1, n_2) = \boxed{p_0^{\min\{a_0, b_0\}} \; p_1^{\min\{a_1, b_1\}} \cdots\cdots p_k^{\min\{a_k, b_k\}}} \rightarrow 1$

$15 = 3^1 \times 5^1 = 2^0 \cdot 3^1 \cdot 5^1$

$12 = 2^2 \cdot 3^1 = 2^2 \cdot 3^1 \cdot 5^0$

$(15, 12) = 3$

Gcd $\Rightarrow 2^0 \cdot 3^1 \, 5^0$

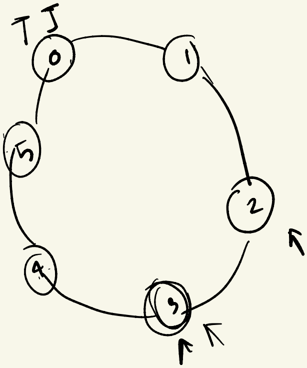
$= 3$

L.C.M = Least common multiple

$3, 5 \Rightarrow 15 \Rightarrow 3 | 15, \; 5 | 15$

Made with Goodnotes

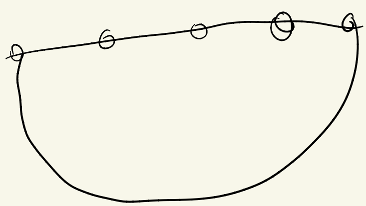
$\boxed{\text{Tom , Jenny}}$



$\boxed{K \text{ jumps}}$ $\boxed{4}$

$\boxed{2 , 3} \Rightarrow 6 \quad 12 \quad 18 , 24 \text{ ----}$

1	2, 3
2	4, 6
3	0, 3
4	2, 0
5	4, 3
6	0, 0



$\underline{14} , \underline{6}$

lcm: 42

$\underline{14} = 2 \times 7 = 2^1 \times 3^0 \times 7^1$

$6 = 2 \times 3 = 2^1 \times 3^1 \times 7^0$

$\boxed{\text{lcm}} : 2^1 \cdot 3^1 \cdot 7^1$

$n_1 = p_0^{a_0} \cdot p_1^{a_1} \text{ ------ } p_k^{a_k}$

$n_2 = p_0^{b_0} \cdot p_1^{b_1} \text{ ----- } p_k^{b_k}$

$\text{lcm} = p_0^{\max\{a_0, b_0\}} \quad p_1^{\max\{a_1, b_1\}} \text{ ------ } p_k^{\max\{a_k, b_k\}}$

a , b

$c = \min(a, b)$

$d = \max(a, b)$

$a \times b = c \times d$

$$\gcd = \underbrace{p_0^{\min\{a_0, b_0\}} \; p_1^{\min\{a_1, b_1\}}} \cdots\cdots p_k^{\min\{a_k, b_k\}}$$

$$\text{lcm} = p_0^{\max\{a_0, b_0\}} \; p_1^{\max\{a_1, b_1\}} \cdots\cdots p_k^{\max\{a_k, b_k\}}$$

$$\gcd \times \text{lcm} = \boxed{p_0^{(a_0+b_0)} \cdot p_1^{(a_1+b_1)} \cdots p_k^{(a_k+b_k)}}$$

$$= n_1 \times n_2$$

$$n_1 = p_0^{a_0} \; p_1^{a_1} \cdots\cdots p_k^{a_k}$$

$$n_2 = p_0^{b_0} \; p_1^{b_1} \cdots\cdots p_k^{b_k}$$

$$p_0^{a_0} \cdot p_0^{b_0} \cdot p_1^{a_1} \cdot p_1^{b_1} \cdots\cdots p_k^{a_k} \cdot p_k^{b_k}$$

$$= \underbrace{p_0^{a_0} \cdot p_1^{a_1} \cdots p_k^{a_k}}_{n_1} \cdot \underbrace{p_0^{b_0} \cdot p_1^{b_1} \cdots p_k^{b_k}}_{n_2}$$

$$\boxed{\gcd \cdot \boxed{\text{lcm}} = n_1 \times n_2} \rightarrow \text{cool}$$

$$\text{lcm} = \frac{n_1 \times n_2}{\gcd}$$

14, 6

gcd = 2 lcm = 42

14 × 6 = 84

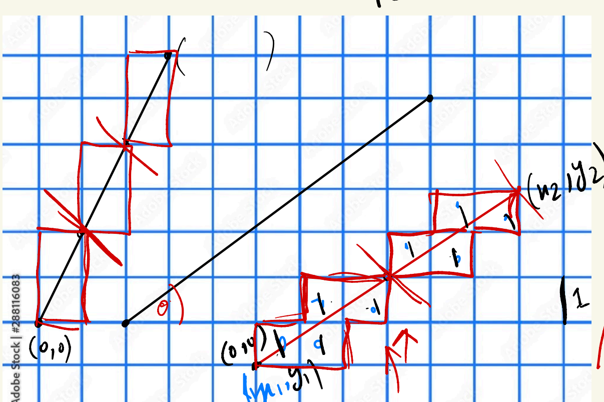
42 × 2 = 84

$\boxed{(1, 2) = 2}$ 3

(3, 6) = $\boxed{3}$

$\boxed{(1, 2)}$

(2, 4)



8 bong

6 + 4 = 10 − 2

(6, 4) = $\boxed{2}$

$\boxed{(3, 2)}$ = 4

5

|1

$(x_1 + y_1) - 1$

$$\gcd\left(\left(\frac{x_2}{\gcd} + \frac{y_2}{\gcd} - 1 \right) \gcd \right.$$