

$$\gcd(a_i, x) = 1 \quad x=2 \rightarrow 3$$

$n - c$

$$\begin{pmatrix} 1 \\ 2 \end{pmatrix} \quad 2 \quad \begin{pmatrix} 3 \\ 2 \end{pmatrix} \quad 4 \quad 2$$

$$\begin{array}{cccccc} \checkmark & \checkmark & \checkmark & \cancel{\checkmark} & & \\ 2 & 3 & 4 & 6 & 7 & 5 \end{array}$$

$$2 \quad 3 \quad 2 \quad 2,3 \quad 7$$

$$c(2) = 7 \quad c(3) = 5 \quad c(6) = 2$$

$$x=12 \rightarrow 2,3$$

$$\gcd \left(\begin{array}{c} 1 \\ 1 \end{array} \right)$$

$$n(A \cup B \cup C) = n(\overline{A}) + n(\overline{B}) + n(\overline{C})$$

$\begin{matrix} 3 \\ 2-1 \end{matrix}$

$$- n(A \cap B) - n(A \cap C) + n(\overline{A \cap B \cap C})$$

2, 3, 7

$$+ c(2)$$

$$- c(2 \cdot 3)$$

$$+ c(3)$$

$$- c(2 \cdot 3)$$

$$+ c(7)$$

$$- c(3 \cdot 7)$$

Sieve ✓

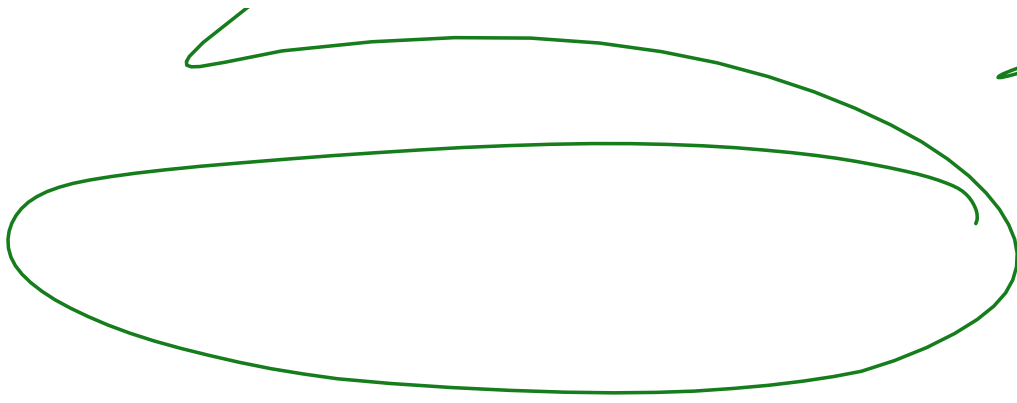
factorize ✓

IEP X

Observation + analysis X

u.

[Handwritten scribbles and lines]



$$(12)^2 = 144$$

$\rightarrow (2^2 \times 3)$

Modular Arithmetic

0~

$$(a \pm b) \% M = ((a \% M) \pm (b \% M)) \% M$$
$$(a * b) \% M = ((a \% M) * (b \% M)) \% M$$

~~149.~~ $a - b < 0$ (2)

$$(4+7k) \% 7 = 4$$

$$(4 \% 7) + (7k \% 7)$$

Diagram illustrating the simplification of the modular arithmetic expression:

The expression $(4+7k) \% 7 = 4$ is shown. Below it, a box contains the expression $(7k \% 7)$, which is crossed out with multiple diagonal lines. To the left of the box is the expression $(4 \% 7)$. To the right of the box, there are two downward arrows, each labeled with the number 7, indicating the modulus operation.

$$(a/b) \% M = (a \times$$

$$= (a$$

$$= (a \%$$

$$b^{M-2}$$

$$b^{-1} \% \textcircled{M} \longrightarrow \text{Mod}$$

$$b < M \quad \text{ged}$$

M ~~not~~ prime

Fermat's Theorem

$$\boxed{a^{p-1} \% 1}$$

$$2^2 \cdot 3^3 \cdot 5^5 \cdot 7^7 \cdot 11^{11}$$

$$2^4 \% 5$$

$$b^{p-1} \%$$

\cap annuence

0 1 ,

completing

$$b^{p-1} \equiv 1 \pmod{p}$$

$$\cdot b^{p-1} \equiv 1 \pmod{p}$$

$$\Rightarrow b^{-1} \cdot b^{p-1} \equiv 1 \pmod{p}$$

$$\Rightarrow b^{p-2} \equiv b^{-1} \pmod{p}$$

~~10~~

