$$x = a_1 + a_2 + a_3 \cdots a_k$$

$$a_1 \cdot a_2 \cdot a_3 \cdot a_4 \cdots a_k$$

$$a_k \geq 4$$

$$3(a_k - 3) = 3a_k - 3$$

$$= a_k + (\underbrace{2a_k - 3}_{>0})$$

$$> a_k$$

$$2(a_k - 2) = 2a_k - 4$$

$$= a_k + a_k - 4$$

$$\geq a_k$$

$\Rightarrow$ if $a_k \geq 4$, make it 2, 3

$\Rightarrow$ Thus: $\chi = 3 \cdot a + 2 \cdot b$

must be in this form

If $\chi \bmod 3 = 0 \Rightarrow \chi = 3 \cdot a$

$\Rightarrow p = 3^a$

If $x \bmod 3 = 1$

$\Rightarrow x = 3a + 1$ ← assume $a \geq 1$ ⇒ handle edge case

$= 3(a-1) + 4$

$\Rightarrow 3^{a-1} \cdot 2^2$

If $x \bmod 3 = 2$

$\Rightarrow x = 3a + 2$

$= 3a + 2 \cdot 1$

$\Rightarrow 3^a \cdot 2^1$