



$$i = 2a - 7 \dots \dots \dots 1p$$

$$2a - 7 + 3 = 4 \cdot (2a - 7 - a)$$

$$2a - 7 + 3 = 4a - 28 \Rightarrow 28 - 7 + 3 = 4a - 2a \dots \dots 1p$$

$$24 = 2a \Rightarrow a = 24 : 2 = 12$$

$$i = 2 \cdot 12 - 7 = 17 \dots \dots \dots 1p$$

2.  $(a + 2b) : c = x \text{ rest } m, \quad m < c$

$$(b + 2c) : a = x \text{ rest } n, \quad n < a$$

$$(c + 2a) : b = x \text{ rest } p, \quad p < b \dots \dots \dots 1p$$

$$a + 2b = x \cdot c + m$$

$$b + 2c = x \cdot a + n$$

$$c + 2a = x \cdot b + p \dots \dots \dots 1p$$

$$3a + 3b + 3c = x \cdot a + x \cdot b + x \cdot c + m + n + p$$

$$m + n + p = 3(a + b + c) - x(a + b + c)$$

$$m + n + p = (a + b + c)(3 - x) \dots \dots \dots 1p$$

$$m + n + p < a + b + c \Rightarrow x = 3 \text{ si } m = n = p = 0 \dots \dots 1p$$

deci  $a + 2b = 3c \quad | :3$

$$b + 2c = 3a$$

$$c + 2a = 3b \dots \dots \dots 1p$$

$$3a + 6b = 9c \Rightarrow b + 2c + 6b = 9c \Rightarrow 7b = 7c$$

$$\Rightarrow b = c \dots \dots \dots 1p$$

$$a + 2b = 3b \Rightarrow a = b \text{ deci } a = b = c \dots \dots \dots 1p$$

3. a) pentru  $n=2022$ ,  $t$  conține 2022 termeni.

$2022 \div 3$  deci putem grupa termenii câte 3 fără a rămâne nici unul în afara grupelor ..... 1p

$$t = 11(1+11+11^2) + 11^4(1+11+11^2) + \dots + 11^{2020}(1+11+11^2)$$

$$t = 133 \cdot (11 + 11^4 + \dots + 11^{2020}) \dots \dots \dots 1p$$

$$t = 19 \cdot 3 \cdot (11 + 11^4 + \dots + 11^{2020}) = 19 \cdot k \Rightarrow t : 19 \dots \dots 1p$$

b)  $N = 11 + 10 \cdot 11 + 10 \cdot 11^2 + 10 \cdot 11^3 + \dots + 10 \cdot 11^n =$

$$= 11^2 + 10 \cdot 11^2 + 10 \cdot 11^3 + \dots + 10 \cdot 11^n = 11^{n+1} \dots \dots 1p$$

Cazul I: dacă  $n = nr. par \Rightarrow n = 2k$

$$N = 11^{2k+1} = 11^{2k} \cdot 11 = 11^{2k} (1+1+3^2) = (11^k)^2 + (11^k)^2 + (11^k \cdot 3)^2 \dots \dots 1p$$

Cazul II dacă  $n = nr. impar \Rightarrow n = 2k+1$

$$N = 11^{2k+2} = 11^{2k} \cdot 121$$

$$121 = 9^2 + 6^2 + 2^2 \dots \dots \dots 1p$$

$$N = 11^{2k} (9^2 + 6^2 + 2^2) = (11^k \cdot 9)^2 + (11^k \cdot 6)^2 + (11^k \cdot 2)^2 \dots \dots 1p$$