T18

R$ 1,00 < moeda R$0,26/moeda
nota R$0,17/nota

R$ 1.000,00

Nº de moedas $\frac{R\$1.000,00}{R\$0,26/moeda} = \frac{1000}{0,26}$ moedas 3846

Nº de notas $\frac{R\$1.000,00}{R\$0,17/nota} = \frac{1000}{0,17}$ notas 5882

T14

III $k \in \mathbb{Z}_+^*$ 2^k

$4 = 2^2 = 1 \cdot 2^2 + 0 \cdot 2^1 + 0 \cdot 2^0$

$8 = 2^3 = 1 \cdot 2^3 + 0 \cdot 2^2 + 0 \cdot 2^1 + 0 \cdot 2^0$

$8 = [1000]_2$

$\vdots$

$2^k = 1 \cdot 2^k + 0 \cdot 2^{k-1} + 0 \cdot 2^{k-2} + \dots + 0 \cdot 2^1 + 0 \cdot 2^0$

—11—

$3 = 1 \cdot 2 + 1 \cdot 2^0$ $\quad 3 = [11]_2$

$5 = 1 \cdot 2^2 + 0 \cdot 2 + 1 \cdot 2^0$ $\quad 5 = [101]_2$

8 | 2
0 4 | 2
0 2 | 2
0 1

16 | 2
0 8 | 2
0 4 | 2
0 2 | 2
0 1

$2^k \mid 2$
$0 \quad 2^{k-1} \mid 2$
$0 \quad 2^{k-2}$

etc

5 | 2
1 2 | 2
0 1

T19

Nº pacotes	Nº cadernos por pacote	Sobra
X	12	11
Y	20	19
Z	18	17

$X, Y, Z \in \mathbb{N}$

$n = 12 \cdot X + 11$

$n = 20 \cdot Y + 19$

$n = 18 \cdot Z + 17$

$n < 1200$

$$\begin{cases} n - 11 = 12 \cdot X \\ n - 19 = 20 \cdot Y \\ n - 17 = 18 \cdot Z \end{cases} \Rightarrow \text{mmc}(12, 20, 18) = 180$$

$$\begin{cases} n - 11 = 180k \quad k \in \mathbb{Z} \\ n - 19 = 180h \quad h \in \mathbb{Z} \\ n - 17 = 180l \quad l \in \mathbb{Z} \end{cases} \begin{array}{l} \longrightarrow n = 180k + 11 \\ \longrightarrow n = 180h + 19 \\ \longrightarrow n = 180l + 17 \end{array}$$

$n \in \{179, 359, \ldots, 1079\}$

$n + 1 = 12X + 12 = 12 \cdot (X + 1)$

$n + 1 = 20Y + 20 = 20 \cdot (Y + 1)$

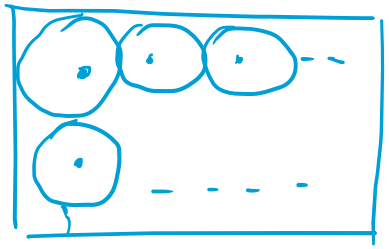
$n + 1 = 18Z + 18 = 18 \cdot (Z + 1)$

$\text{mmc}(12, 20, 18) = 180$

$n + 1 = 180 \cdot q, \; q \in \mathbb{N}^*$

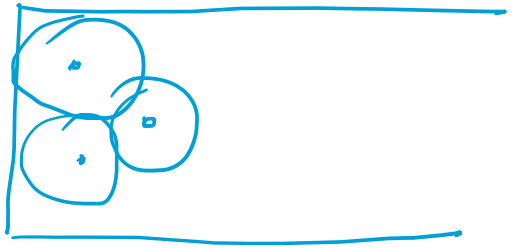
$n = 180q - 1, \; q \in \mathbb{N}^*$

T21

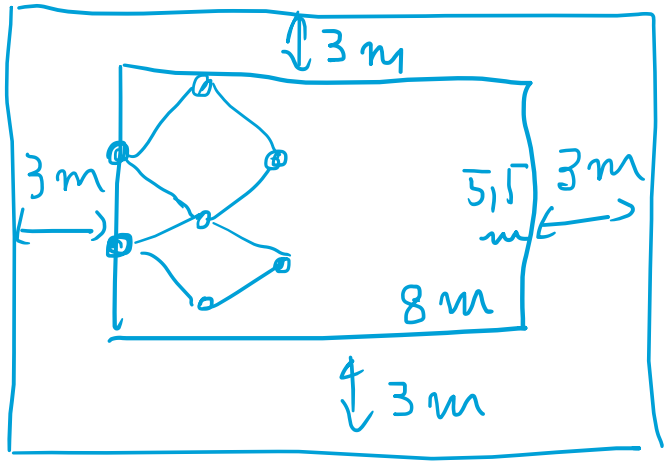


115 cm

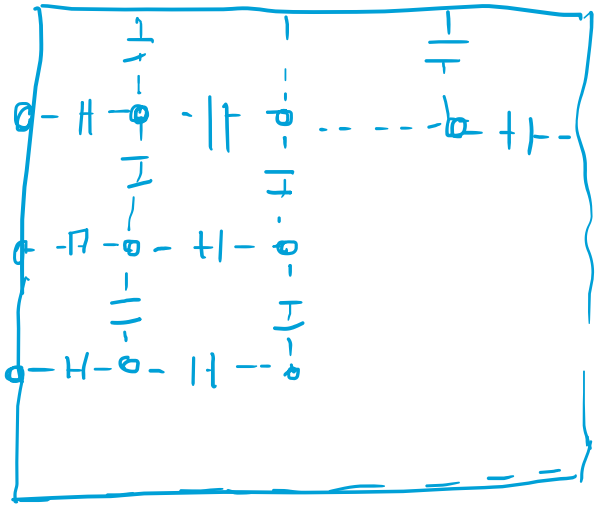
11,5 m



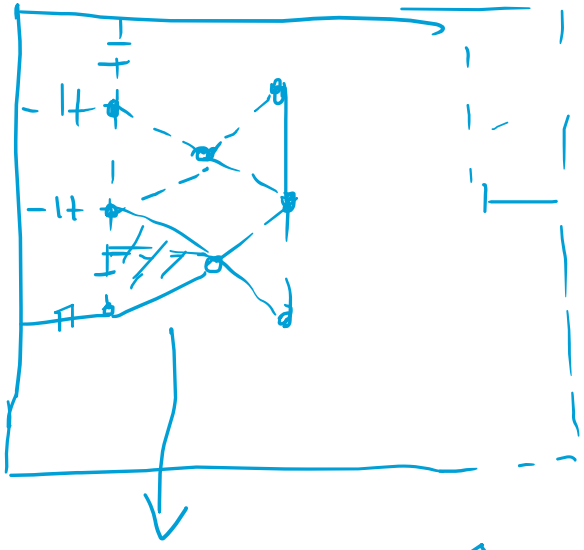
14 m = 140 cm



14 m



14 | 3
2 | 4



" triângulo equilátero "

C2 $N = 77XY$ X alg e Y alg

$N \mid 91$
$D \quad 7$

$\Rightarrow N = 91q$, $q \in \mathbb{N}$

$7700 \mid 91$
$56 \quad 84$

$7700 = 91 \cdot 84 + 56$

$7700 + 35 = 91 \cdot 84 + 56 + 35$ (91)

$7735 = 91 \cdot 85$ e

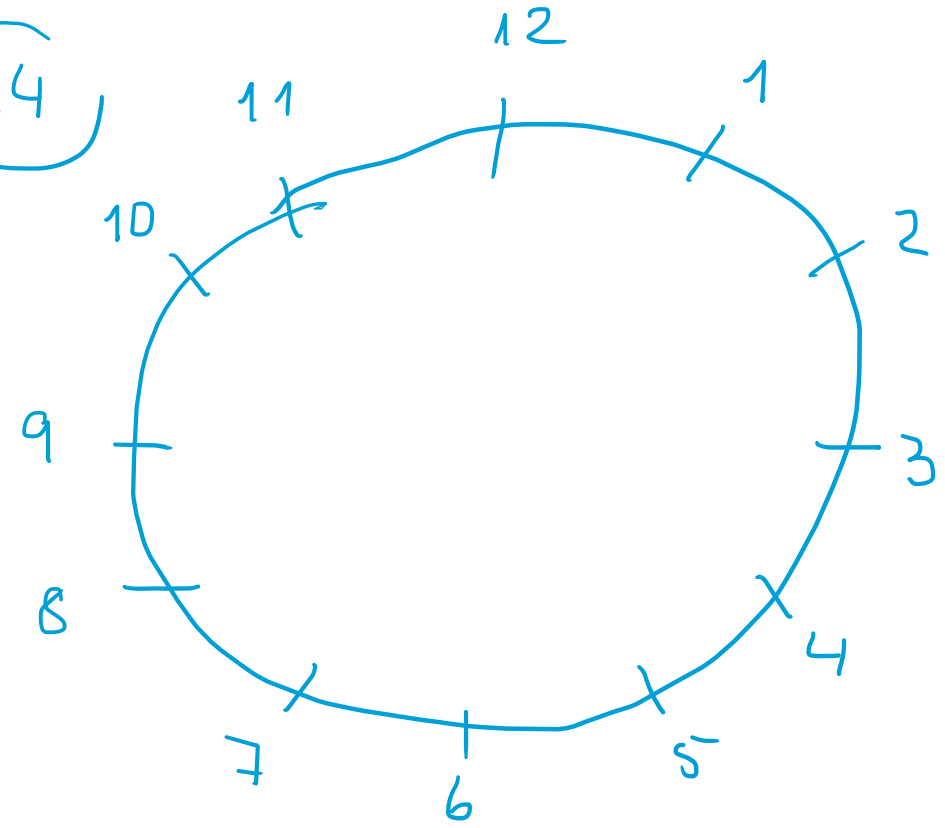
$91 \cdot 84 = 7644$

$91 \cdot 85 = 7735$

$91 \cdot 86 = 7826$

$X = 3$ e $Y = 5$

C4



nº não primo → 1 pulo ↷

nº primo → 2 pulos ↷

2014º pulo

↓

2013 pulos

12 → 1 → 2 → 4 → 5 → 7 → (9) → 10 → 11 → 1 → 2 → 4

8 pulos

2013 | 8

(5)

(5) $a, b \in \mathbb{Z}^*_+$

Pensando

$a \mid 8$ $\quad$ $b \mid 8$

$7 \quad q$ $\quad$ $5 \quad k$

$q \in \mathbb{N}$ $\quad$ $k \in \mathbb{N}$

$ab \mid 8$

$r \quad Q$

$0 \leq r < 8$

$ab = 8Q + r$

divisor, quociente, resto

$a = 8q + 7, \ q \in \mathbb{N}$

$b = 8k + 5, \ k \in \mathbb{N}$

$ab = (8q+7).(8k+5)$

$ab = 64qk + 40q + 56k + 35$

$ab = \underbrace{64qk + 40q + 56k + 32}_{\text{múltiplos de 8}} + 3$

$ab = \underbrace{8}_{\text{divisor}} . \underbrace{(8qk + 5q + 7k + 4)}_{\text{quociente}} + \underbrace{3}_{\text{resto}}$

Resp: 3