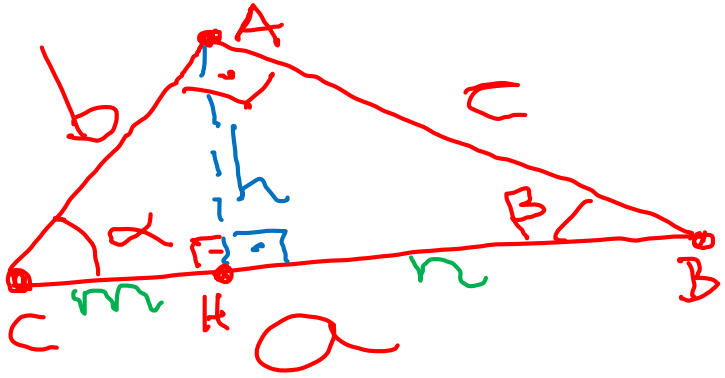
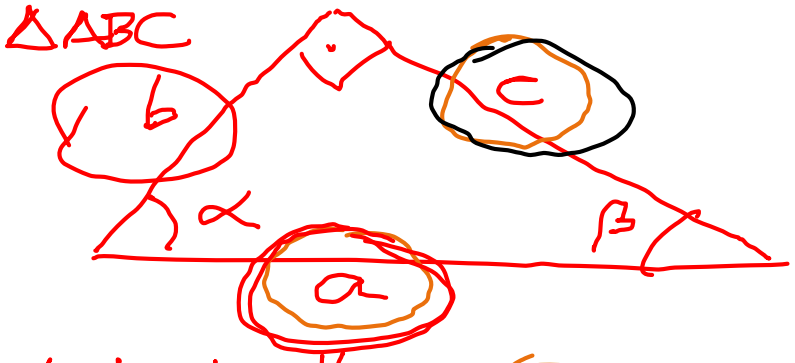
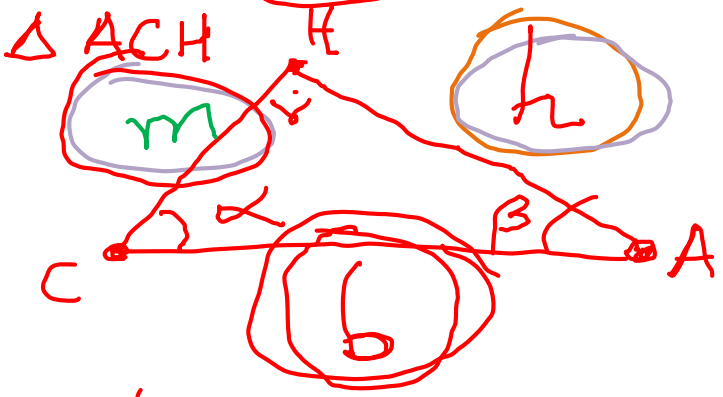
Semelhança de Triângulos Aplicado no Tria. Retângulo:

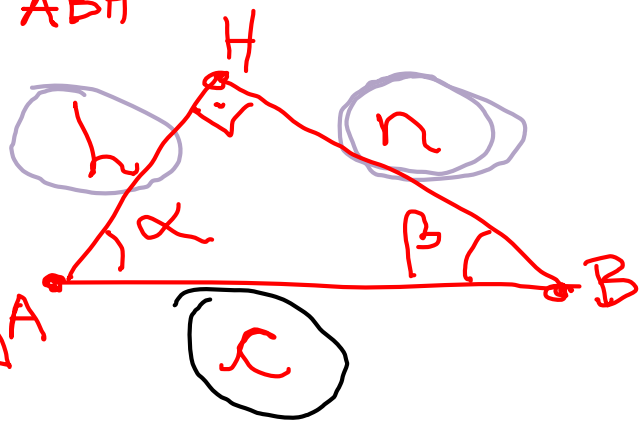




$$\frac{a}{b} = \frac{c}{h} \Rightarrow \boxed{ah = b \cdot c}$$



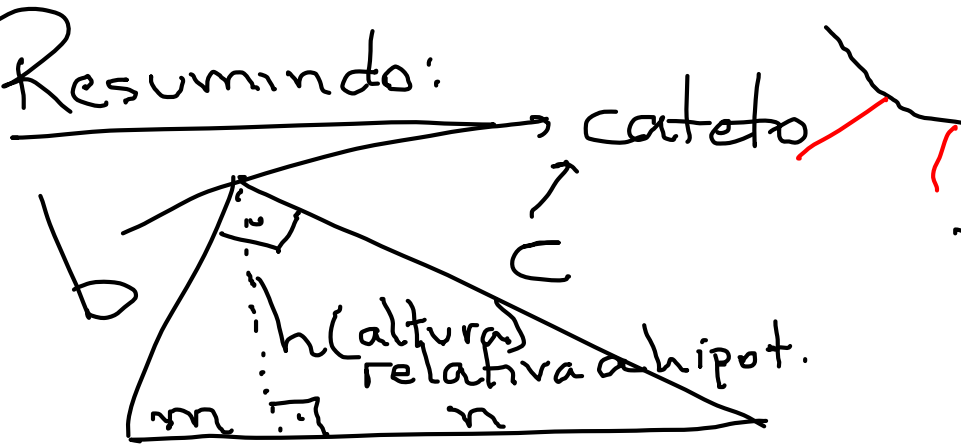
$$\frac{h}{m} = \frac{n}{h} \rightarrow \boxed{h^2 = m \cdot n}$$



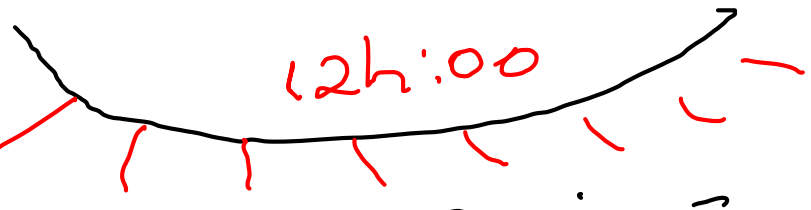
$$\frac{b}{m} = \frac{a}{b} \rightarrow \boxed{b^2 = a \cdot m}$$

$$\frac{a}{c} = \frac{c}{n} \rightarrow \boxed{c^2 = a \cdot n}$$

Resumindo:



a (hipotenusa)

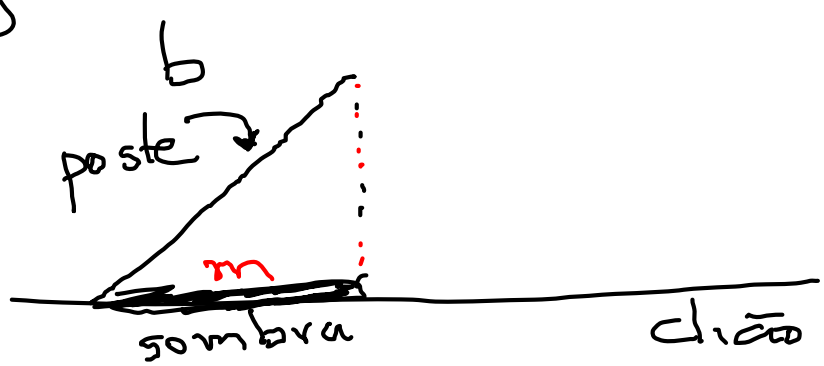


m, n → projeções dos catetos sobre a hipotenusa.

$$a \cdot h = b \cdot c$$

$$h^2 = m \cdot n$$

$$\begin{cases} b^2 = a \cdot m \\ c^2 = a \cdot n \end{cases}$$



$$a = m + n$$

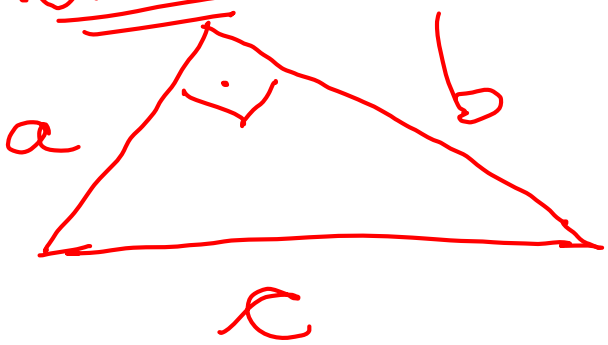
$$a = \frac{b^2}{a} + \frac{c^2}{a}$$

$$a = \frac{b^2 + c^2}{a}$$

$$a^2 = b^2 + c^2$$

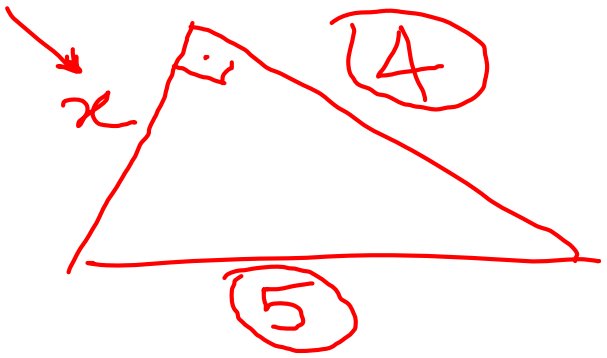
Teorema de Pitágoras

Obs.:



$$c^2 = a^2 + b^2$$

Exemplo:



$$a^2 = b^2 + c^2$$

$$5^2 = 4^2 + x^2$$

$$25 = 16 + x^2$$

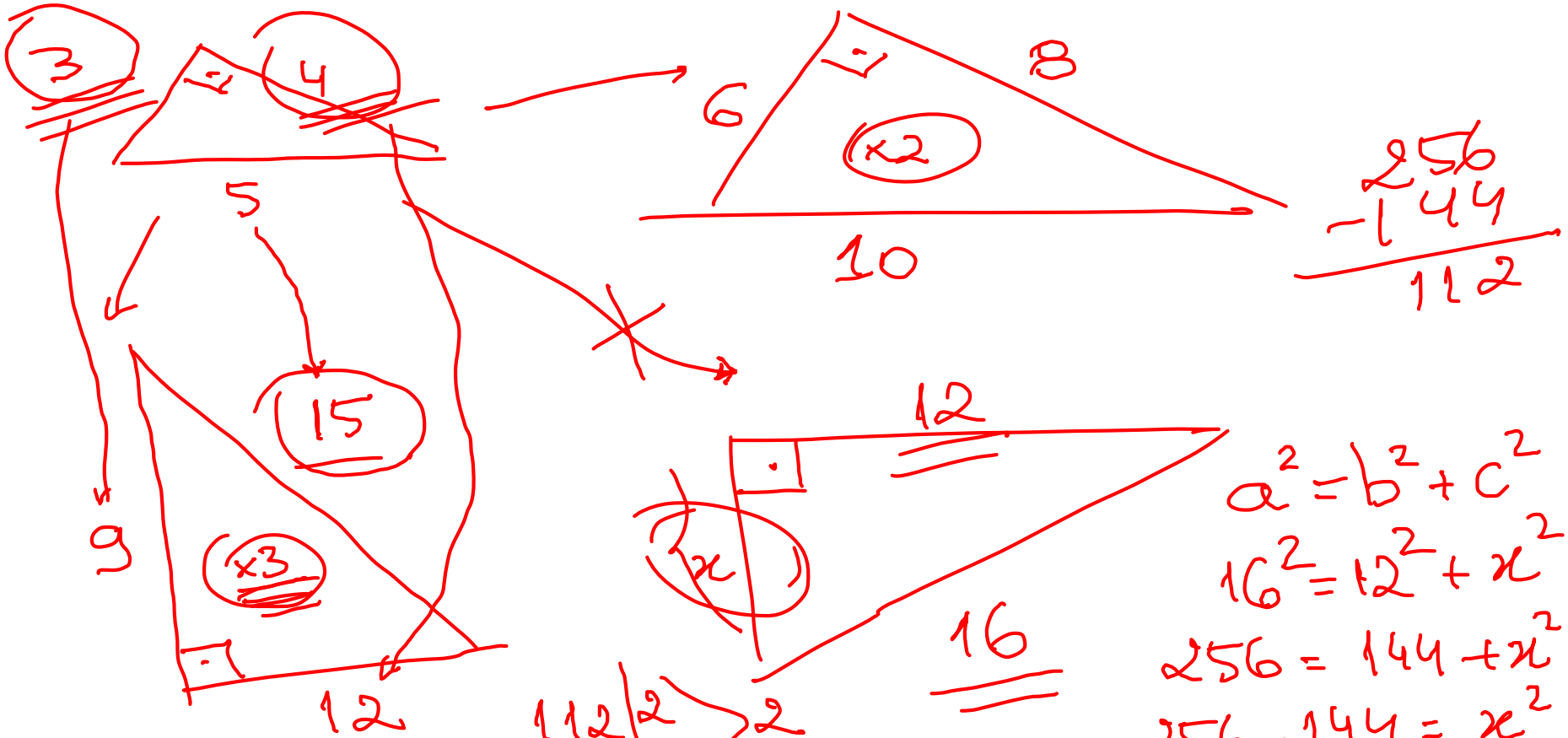
$$25 - 16 = x^2$$

$$x^2 = 9$$

$$\boxed{x = 3}$$

Obs.: 5, 4, 3

Triângulo Pitagórico



$$256 - 144 = 112$$

$$a^2 = b^2 + c^2$$

$$16^2 = 12^2 + x^2$$

$$256 = 144 + x^2$$

$$256 - 144 = x^2$$

$$112 = x^2$$

$$x = \sqrt{112}$$

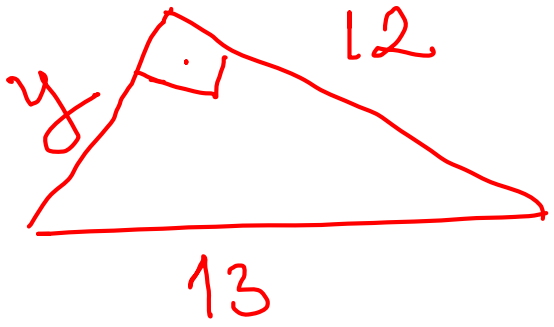
$$x = 4\sqrt{7}$$

112	2
56	2
28	2
14	2
7	7
1	

$2 \cdot 2 \cdot 2 \cdot 2 \cdot 7$

Triângulos Pitagóricos: 3, 4, 5

5, 12, 13



$a^2 = b^2 + c^2$

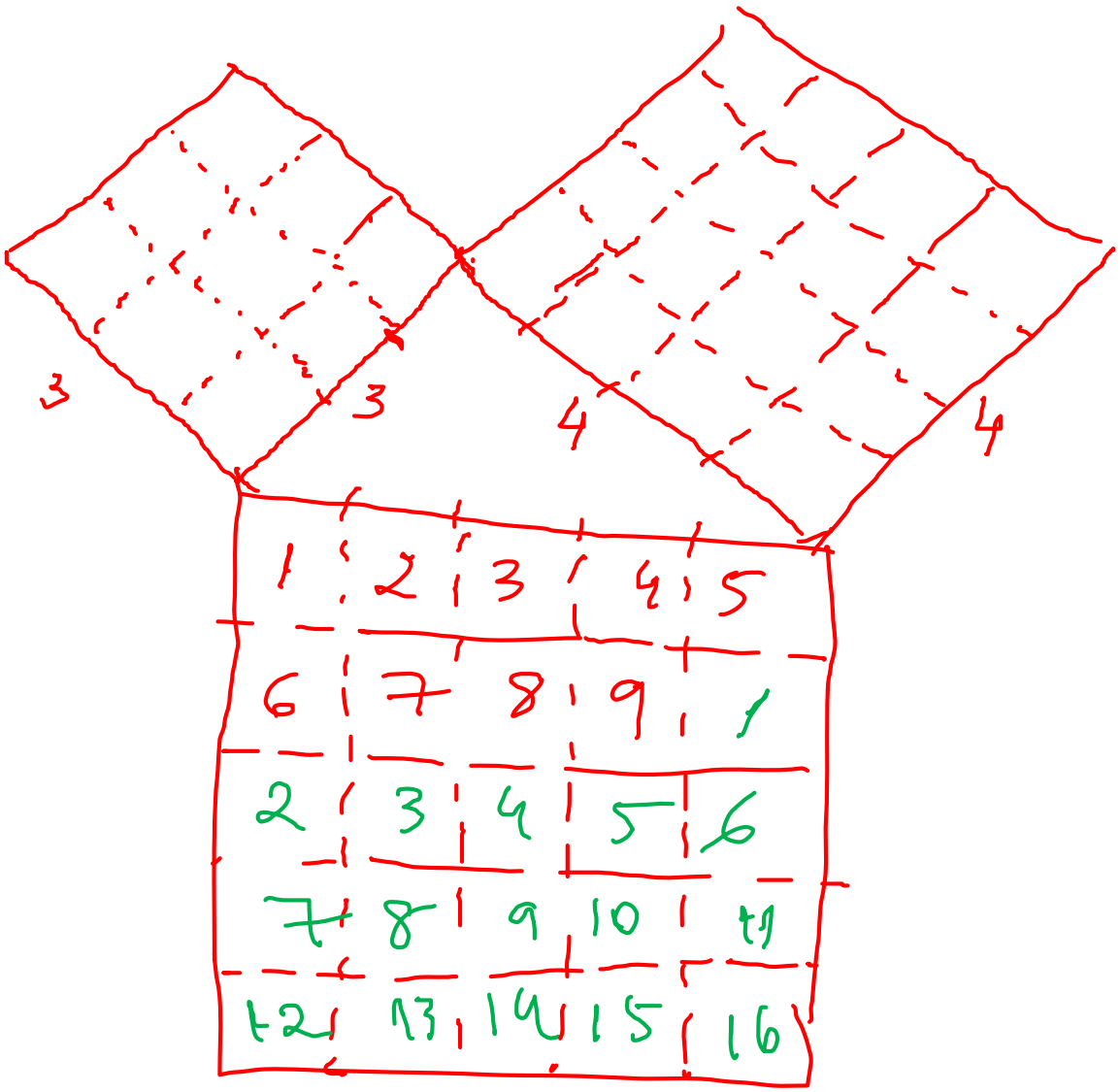
$13^2 = 12^2 + y^2$

$169 = 144 + y^2$

$25 = y^2$

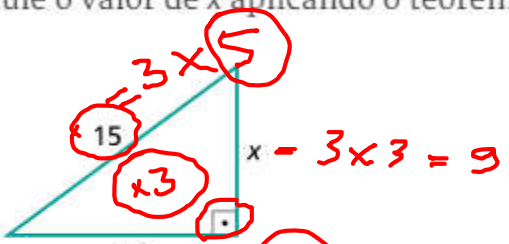
$y = \sqrt{25}$

$y = 5$


3
3
4
4
1 2 3 4 5
6 7 8 9 1
2 3 4 5 6
7 8 9 10 11
12 13 14 15 16

4 Calcule o valor de x aplicando o teorema de Pitágoras.

a)

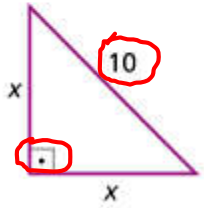


3x5

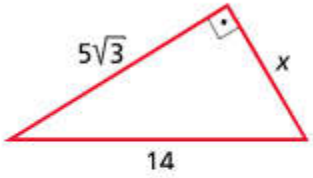
x = 3x3 = 9

12 = 3x4

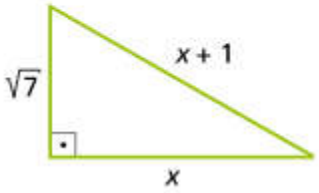
b)



c)



d)



A) $15^2 = 12^2 + x^2$

$x = 9$

B) $a^2 = b^2 + c^2$

$10^2 = x^2 + x^2$

$100 = 2x^2$

$\frac{100}{2} = x^2$

$50 = x^2 \rightarrow x = \sqrt{50} = 5\sqrt{2}$

50 | 2
25 | 5
5 | 5
1

5

$(x+1)^2 = x^2 + (\sqrt{7})^2$

$x^2 + 2x + 1 = x^2 + 7$

$2x = 6$

$x = 3$

196
−75
121

c) $14^2 = (5\sqrt{3})^2 + x^2$

$196 = 25 \cdot 3 + x^2$

$196 - 75 = x^2$

$121 = x^2$

$x = \sqrt{121}$

$x = 11$

$x^2 \cdot x^2 = x^4$

$x^2 + x^2 = 2x^2$