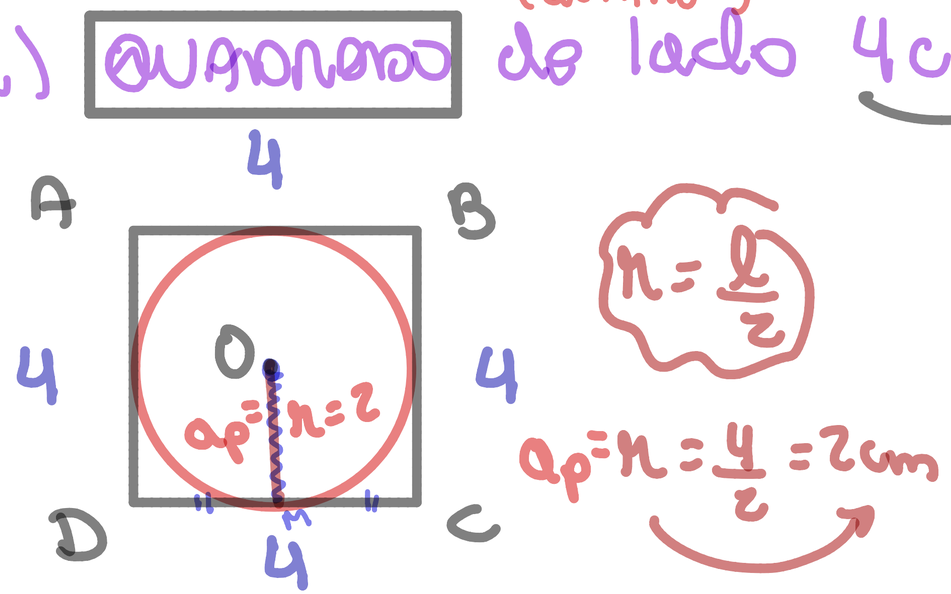
OBS: Polígonos Regulares (inscrição e circunscrição)

(CAIEM CAINDO!!!)

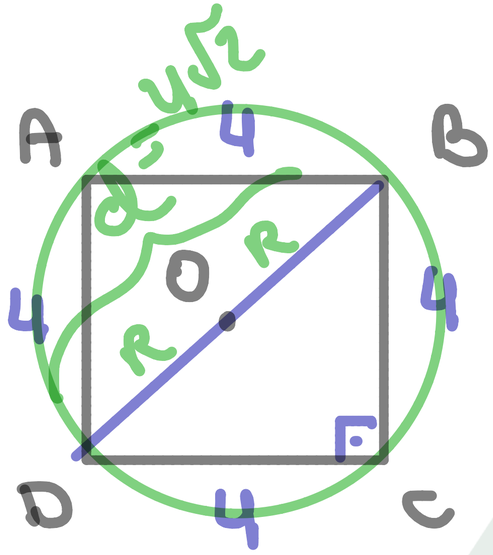
Exemplo 11 Determine a medida dos raios dos círculos INSCRITO ("dentro") e CIRCUNSCRITO ("fora") a um:

a) quadrado de lado 4cm.



$r = \frac{l}{2}$

$ap = r = \frac{4}{2} = 2cm$



$d = l\sqrt{2}$ (diagonal)

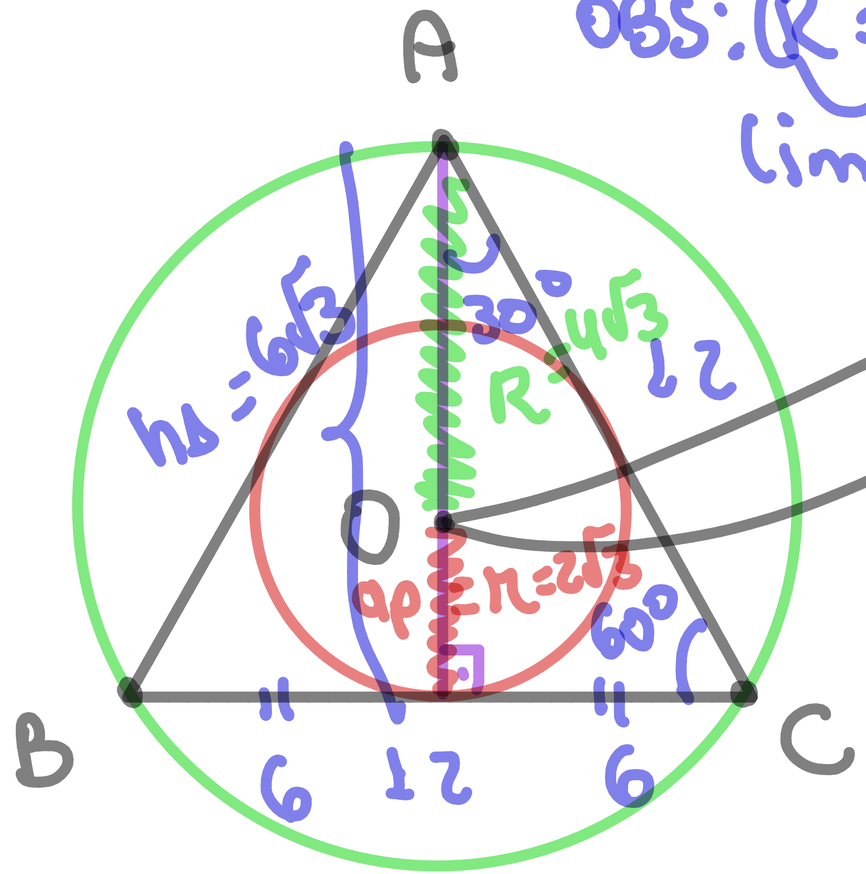
$2R = l\sqrt{2}$

$R = \frac{l\sqrt{2}}{2}$

$R = \frac{4\sqrt{2}}{2} = 2\sqrt{2}cm$

OBS.: APÓTEMA ⇒ é a DISTÂNCIA do centro do polígono regular ao ponto médio de um dos lados.

b) $\triangle$ equilátero de aresta igual a 12cm.



OBS: $R = 2r$ (importante!)

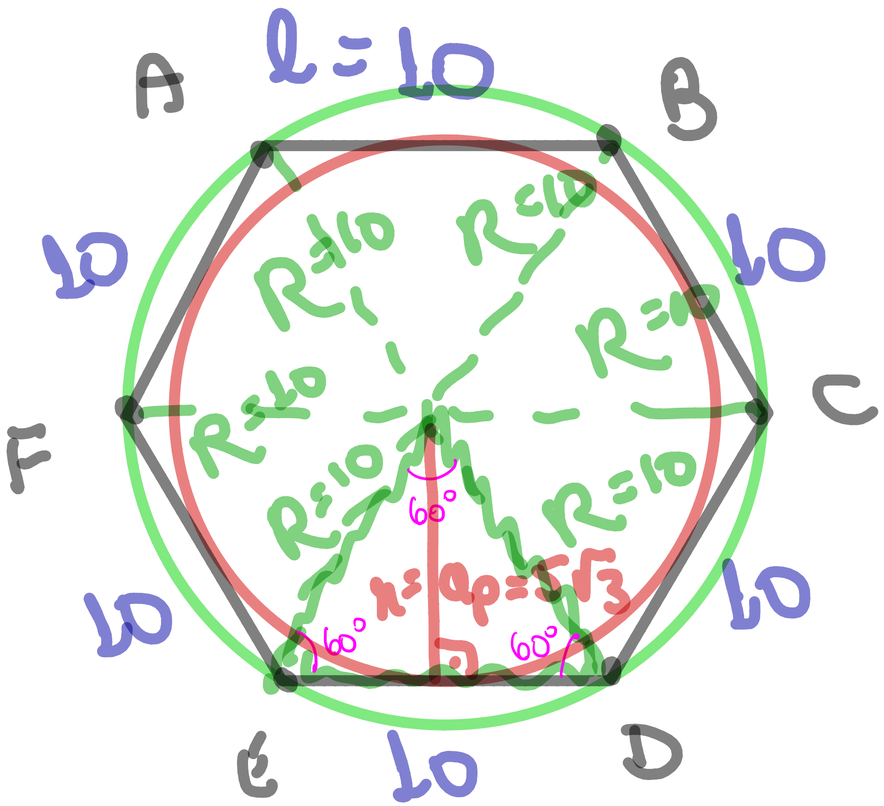
Como "O" é o Baricentro do $\triangle ABC$ temos:

$$ap = r = \frac{1}{3} h_\Delta = \frac{1}{3} \cdot 6\sqrt{3} = 2\sqrt{3}\,cm$$

$$R = \frac{2}{3} h_\Delta = \frac{2}{\cancel{3}_1} \cdot \frac{\cancel{6}^2\sqrt{3}}{} = 4\sqrt{3}\,cm$$

ou $h_\Delta = \frac{\ell\sqrt{3}}{2} = \frac{12\sqrt{3}}{2} = 6\sqrt{3}\,cm$

c) Hexágono Regular de perímetro igual a 60cm.



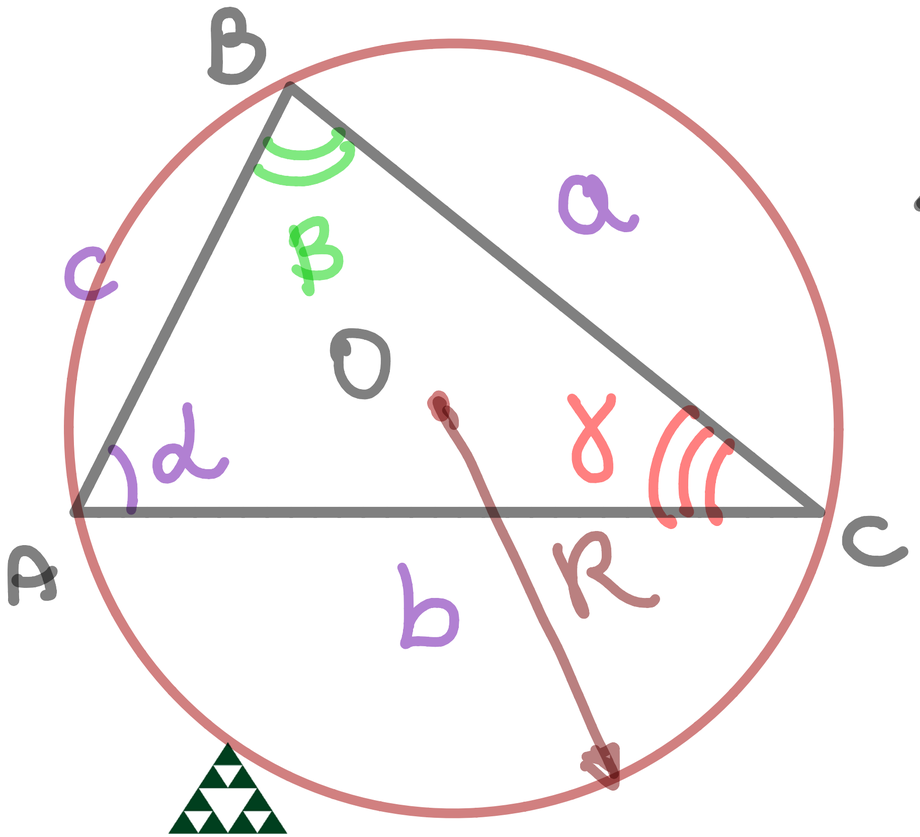
$$R = l_{hex.\ reg.} = 10cm$$

$$apótema = h_{\Delta} = \frac{l\sqrt{3}}{2}$$

$$ap = apótema = \frac{10\sqrt{3}}{2} = 5\sqrt{3}cm$$

Relações métricas no Δ qualquer

(+específico)



Lei dos cossenos

$$a^2 = b^2 + c^2 - 2bc\cos\alpha$$

$$b^2 = a^2 + c^2 - 2ac\cos\beta$$

$$c^2 = a^2 + b^2 - 2ab\cos\gamma$$

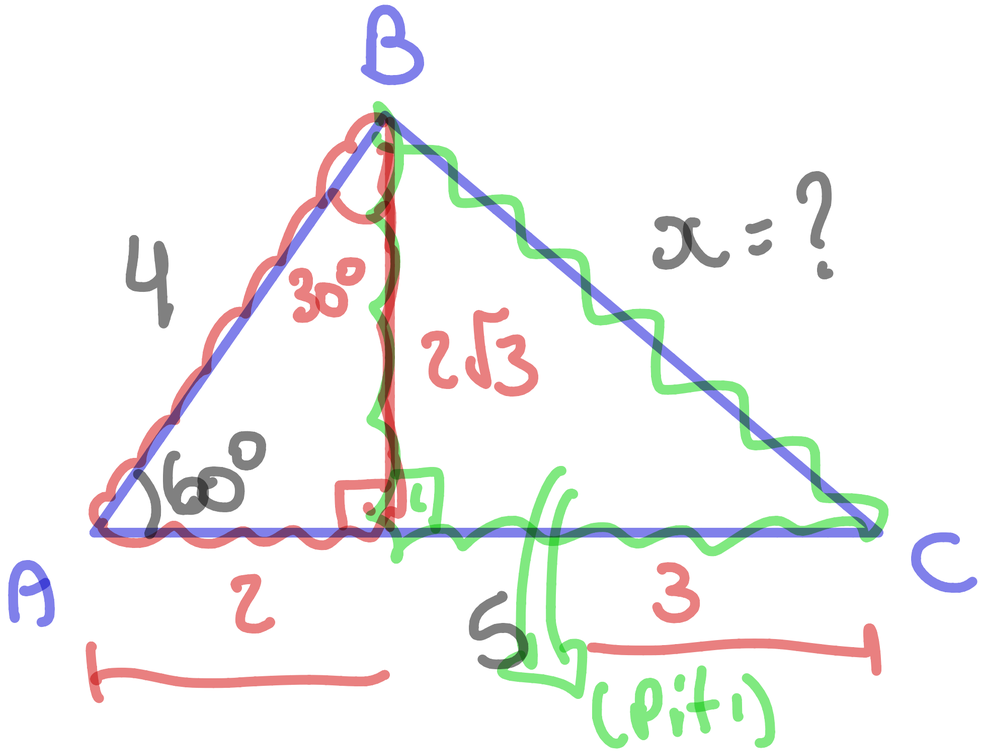
Lei dos senos

$$\frac{a}{\operatorname{sen}\alpha} = \frac{b}{\operatorname{sen}\beta} = \frac{c}{\operatorname{sen}\gamma} = 2R$$

MESTRES DA MATEMÁTICA

Exemplo 1 Determine o valor de x nos Δs abaixo:

a)



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

$x^2 = 12 + 9 \Rightarrow x^2 = 21$

$x = \sqrt{21}$ u.c.

Lei dos cossenos

$$a^2 = b^2 + c^2 - 2bc\cos\hat{A}$$

$x^2 = 4^2 + 5^2 - 2 \cdot 4 \cdot 5 \cdot \cos 60°$

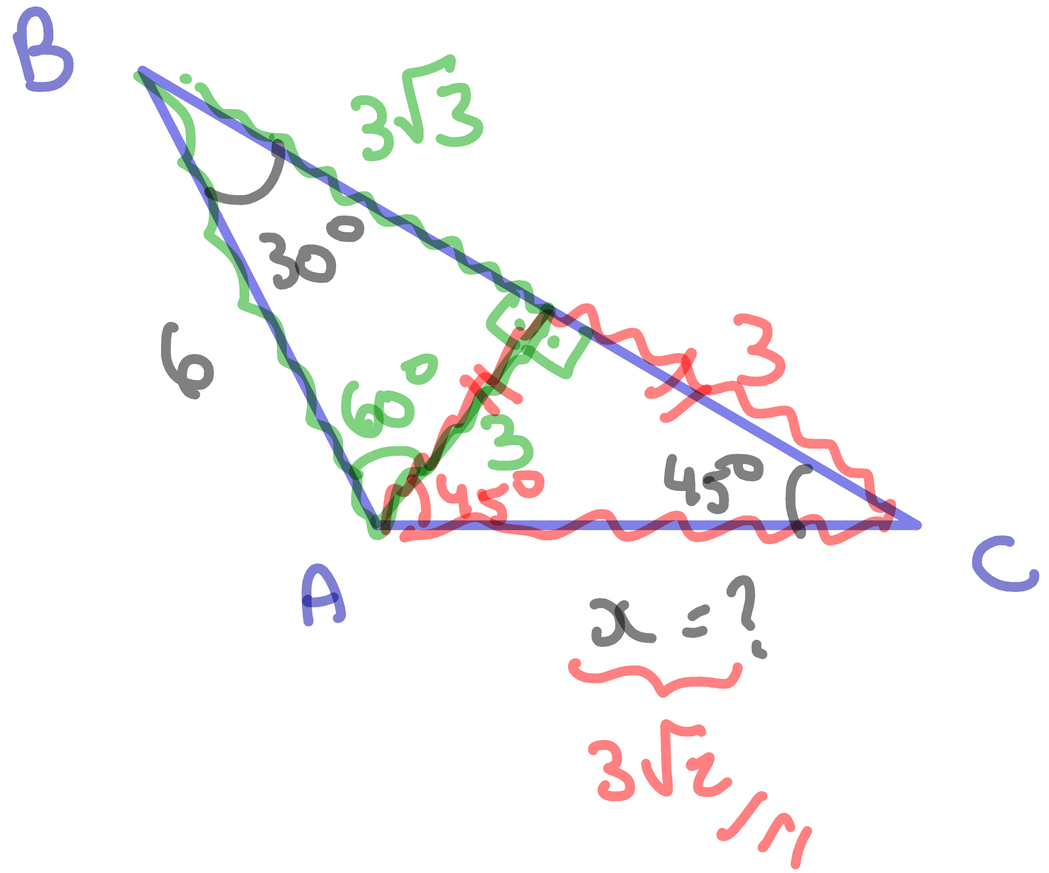
$x^2 = 16 + 25 - 40 \cdot \frac{1}{2}$

$x^2 = 41 - 20$

$x^2 = 21 \Rightarrow x = \sqrt{21}$

MESTRES DA MATEMÁTICA

b)



Lei dos senos

$$\frac{a}{\operatorname{sen}\hat{A}} = \frac{b}{\operatorname{sen}\hat{B}} = \frac{c}{\operatorname{sen}\hat{C}}$$

$$\frac{x}{\operatorname{sen}30^\circ} = \frac{6}{\operatorname{sen}45^\circ}$$

$$x \cdot \frac{\sqrt{2}}{2} = 6 \cdot \frac{1}{2}$$

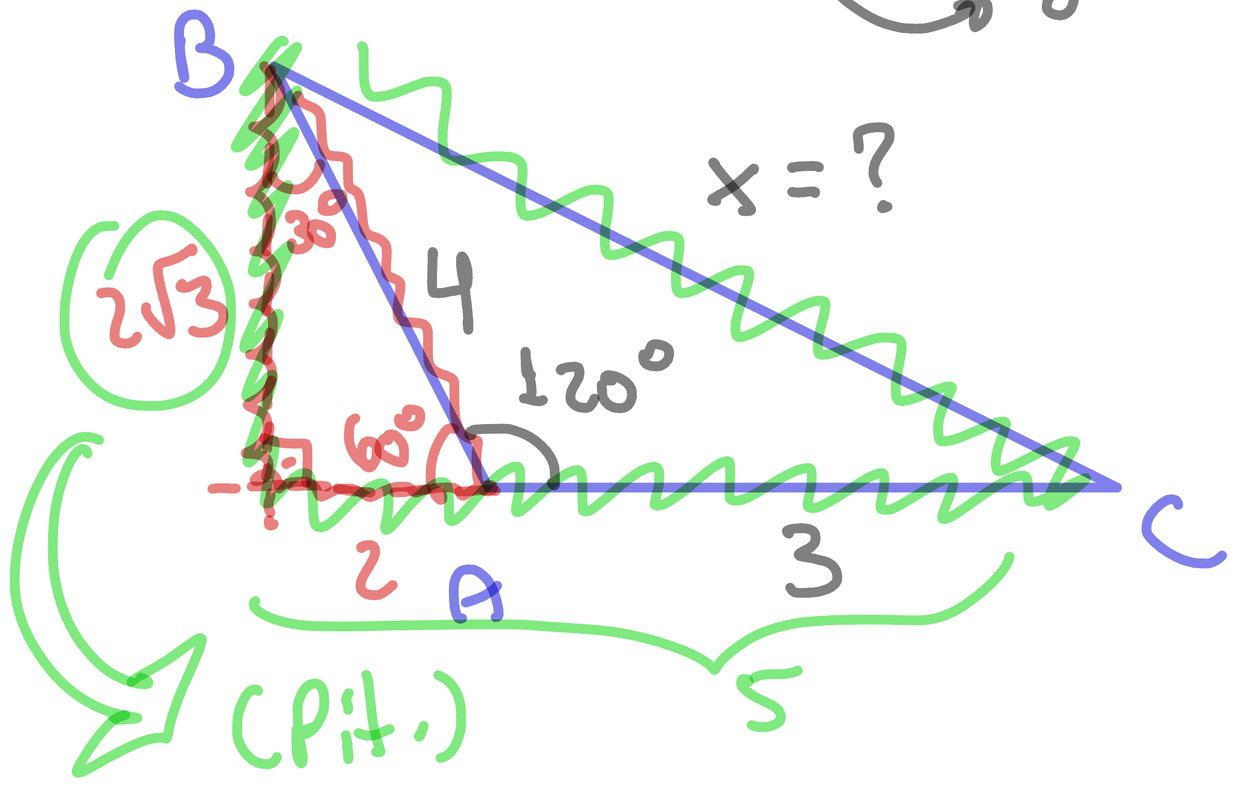
$$x\sqrt{2} = 6$$

$$x = \frac{6}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{6\sqrt{2}}{2} = 3\sqrt{2}\ //$$

$\cos 120° = -\cos 60°$

$= -\frac{1}{2}$

c)



(Lei dos cossenos)

$x^2 = 4^2 + 3^2 - 2 \cdot 4 \cdot 3 \cdot \cos 120°$

$x^2 = \underbrace{16 + 9}_{25} - 24 \cdot \left(-\frac{1}{2}\right)$

$x^2 = 25 + 12$

$x^2 = 37$

$x = \sqrt{37}$ //

(P.I.)

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

$x^2 = 12 + 25$

$x^2 = 37$

$x = \sqrt{37}$ //