Lista 3

Q.1: $\text{sen}\,35° = 0{,}57358$; $\text{sen}\,36° = 0{,}58779$; $\cos 45° = 0{,}70711$ e $\cos 46° = 0{,}69466$

$36° - 35° = 1° \Rightarrow \text{sen}\,36° - \text{sen}\,35° = 0{,}58779 - 0{,}57358 = \text{sen}\,1° \approx 0{,}01421$

a) $\text{sen}\,35°30'$?

$30' = 0{,}5°$

$\text{sen}\,35°30' = \text{sen}\,35° + \text{sen}\,0{,}5° \approx 0{,}57358 + 0{,}00873 \approx 0{,}58231$

b) $20' = 20 \cdot 1' = 20 \cdot \frac{1°}{60} = \frac{20°}{60} = 0{,}33\ldots \approx 0{,}33°$

$\cos 45°20' = \cos 45° + \cos 0{,}33° \approx 0{,}70711 + 0{,}99998 \approx 1{,}71709$

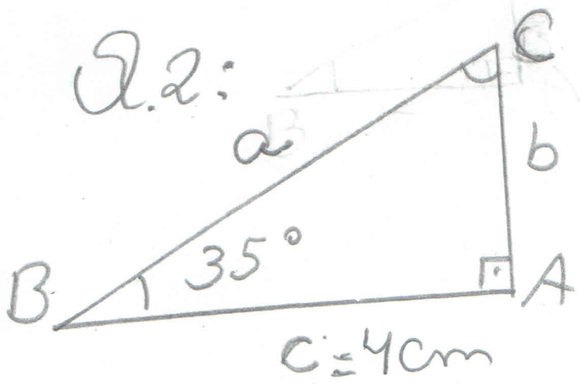
c) $50' = 50 \cdot 1' = 50 \cdot \frac{1°}{60} = \frac{50°}{60} \approx 0{,}83°$

$\cos 45°50' = \cos 45° + \cos 0{,}83° \approx 0{,}70711 + 0{,}99990 \approx 1{,}70701$

d) $48' = 48 \cdot 1' = 48 \cdot \frac{1°}{60} = \frac{48°}{60} = 0{,}8°$

$\text{sen}\,35°48' = \text{sen}\,35° + \text{sen}\,0{,}8° \approx 0{,}57358 + 0{,}01396 \approx 0{,}58754$

Q.2:



$\cos 35° = \frac{c.adj.}{hip.} \Rightarrow$

$0{,}8192 = \frac{4}{a}$

$\times \quad \div$

$a = \frac{4}{0{,}8192} \Rightarrow a \approx 4{,}88$

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

$(4{,}88)^2 = b^2 + 4^2$

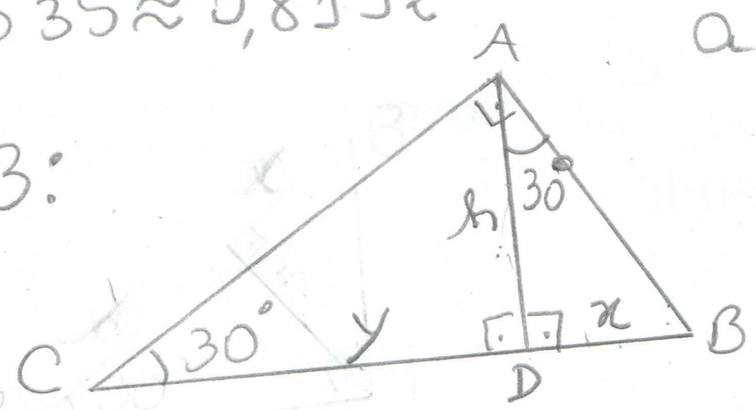
$23{,}8144 - 16 = b^2$

$b = \sqrt{7{,}8144}$

$b \approx 2{,}8$

$\cos 35° \approx 0{,}8192$

Q.3:



$\overline{BC}$ = hipotenusa $= a = x + y$

x = projeção de $\overline{AB}$ sobre $\overline{BC}$

y = projeção de $\overline{AC}$ sobre $\overline{BC}$

ΔCAD

$tg\,30° = \frac{h}{y} \Rightarrow \frac{\sqrt{3}}{3} = \frac{h}{y} \Rightarrow h = \frac{y\sqrt{3}}{3}$

ΔADB

$tg\,30° = \frac{x}{h} \Rightarrow \frac{\sqrt{3}}{3} = \frac{x}{h} \Rightarrow h = \frac{3x}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$

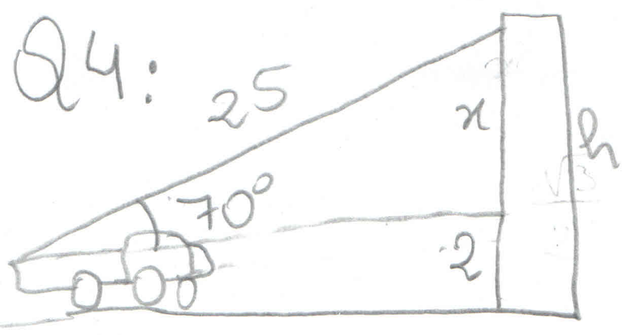
$h = \frac{3x\sqrt{3}}{3}$

$h = x\sqrt{3}$

$h = h$

$\frac{y\sqrt{3}}{3} = \frac{x\sqrt{3}}{1} \Rightarrow \frac{\sqrt{3}}{3\sqrt{3}} = \frac{x}{y} \Rightarrow \frac{x}{y} = \frac{1}{3}$

Q4:



$\text{sen}\,70° = \frac{x}{25}$

$\text{sen}\,70° \approx 0{,}9397$

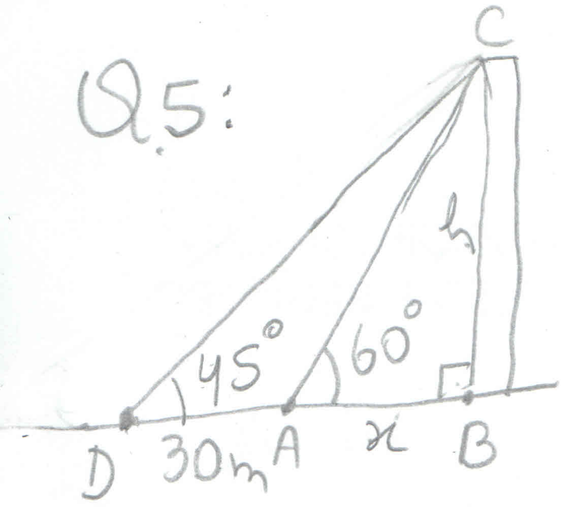
$0{,}9397 = \frac{x}{25} \Rightarrow x = 25 \cdot 0{,}9397$

$x \approx 25{,}49\,m$

$h = x + 2$

$h = 27{,}49\,m$

Q.5:



$tg\,60° = \frac{h}{x}$ e $tg\,45° = \frac{h}{30+x}$

$\sqrt{3} = \frac{h}{x}$ $\quad$ $1 = \frac{h}{30+x}$

$x = \frac{h}{\sqrt{3}}$ $\quad$ $h = 30 + x$

$x = h - 30$

$x = x$

$\frac{h}{\sqrt{3}} = h - 30$

$h = \sqrt{3}.(h-30)$

$h = \sqrt{3}h - 30\sqrt{3}$

$h - \sqrt{3}h = -30\sqrt{3}$

$h.(1-\sqrt{3}) = -30\sqrt{3}$

$h = \frac{-30\sqrt{3}}{1-\sqrt{3}}$

$h = \frac{30\sqrt{3}}{\sqrt{3}-1}$ m

Q.6: $tg\,60° = \frac{x}{160} \Rightarrow \sqrt{3} = \frac{x}{160} \Rightarrow x = 160\sqrt{3}$ m

Q.7: $m(C\hat{B}A) = 60°$ porque $\hat{A} = 90°$ e
$m(B\hat{C}A) = 30°$

ΔCBD é isósceles pois $B\hat{C}D \equiv C\hat{B}D \Rightarrow \overline{CD} \equiv \overline{DB} = 80$ cm

ΔABD, a hipotenusa é $\overline{DB} = 80$ cm e $m(A\hat{B}D) = 30°$

$sen(A\hat{B}D) = \frac{\overline{DA}}{\overline{DB}} \Rightarrow sen\,30° = \frac{z}{80} \Rightarrow \frac{1}{2} = \frac{z}{80} \Rightarrow z = \frac{80}{2} \Rightarrow z = 40$ cm

Q.8: a) $\overline{AD} = \overline{DC}$

Dado o ΔCAB, reto em B, e $\hat{C} = 30°$, temos que $\hat{C} + \hat{A} = 90° \Rightarrow \hat{A} = 60°$.
Como ΔDAB, reto em B, tem $\hat{D} = 60°$ e $\hat{D} + D\hat{A}B = 90°$, temos que $D\hat{A}B = 30°$.
Se $D\hat{A}B = 30°$ e $\hat{A} = D\hat{A}B + D\hat{A}C \Rightarrow D\hat{A}C = 30°$, Assim $\hat{C} \equiv D\hat{A}C = 30°$
logo o ΔDAC é isósceles e $\overline{AD} = \overline{DC}$ $\square$

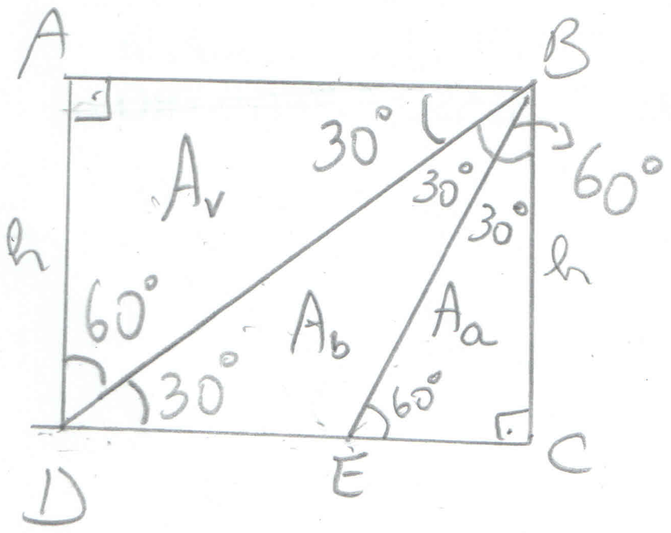
b) $\overline{CD} = 2.\overline{DB}$

Tomando ΔCAB, temos que $\overline{CB} = \overline{CD} + \overline{DB}$ e $\overline{AD} = DC$.
No ΔDAB, reto em B, $\overline{DA}$ é hipotenusa e $\overline{DB}$ é adjacente ao ângulo de 60°. Assim:

$\cos 60° = \frac{\overline{DB}}{DA} \Rightarrow \frac{1}{2} = \frac{\overline{DB}}{\overline{DA}} \Rightarrow \overline{DA} = 2.\overline{DB}$. Como $\overline{AD} = \overline{DC}$, então
$\overline{DC} = 2.\overline{DB}$ $\square$

Q.9: 8 colunas e 28 fileiras $\Rightarrow A = 8 \times 28$ Área cerâmica = A_c (3)

$A = 224\ m^2$



$\Delta ABD = \frac{1}{2}$ Área de uma cerâmica

$\Delta ABD = \frac{1}{2} A_c \Rightarrow A_v = \frac{1}{2} A_c$

$\Delta DBC \Rightarrow \hat{B} = 60°;\ \hat{D} = 30°;\ \hat{C} = 90°;$

$\Delta DBE \Rightarrow$ é isósceles: $D\hat{B}E \equiv B\hat{D}E = 30° \Rightarrow \overline{DE} \equiv \overline{EB}$ e $\overline{DE} = 2 \cdot \overline{EC}$

Como a cerâmica foi dividida em três partes (3:1), temos:

Área azul = A_a; Área verde = A_v; Área branca = A_b

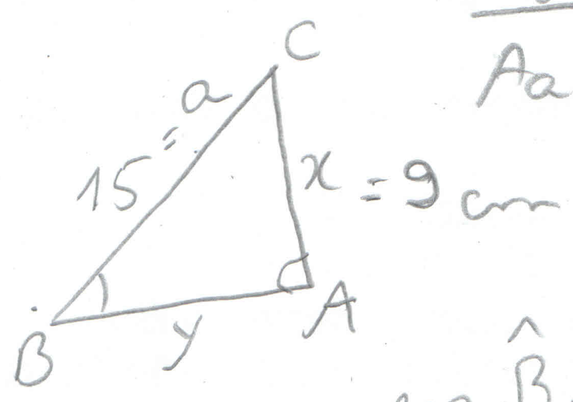
$A_a = \frac{\overline{EC} \cdot h}{2}$ $\quad A_b = \frac{h \cdot \overline{DE}}{2}$ (h é a altura do vértice B em relação a $\overline{DE}$)

$A_v = \frac{h \cdot \overline{AB}}{2}$

$$\frac{A_v}{A_a} = \frac{\frac{h \cdot \overline{AB}}{2}}{\frac{\overline{EC} \cdot h}{2}} = \frac{h \cdot \overline{AB}}{2} \cdot \frac{2}{h \cdot \overline{EC}} = \frac{\overline{AB}}{\overline{EC}}$$

$$\frac{A_b}{A_a} = \frac{\frac{h \cdot \overline{DE}}{2}}{\frac{h \cdot \overline{EC}}{2}} = \frac{h \cdot \overline{DE}}{2} \cdot \frac{2}{h \cdot \overline{EC}} = \frac{\overline{DE}}{\overline{EC}}$$

Q.10:

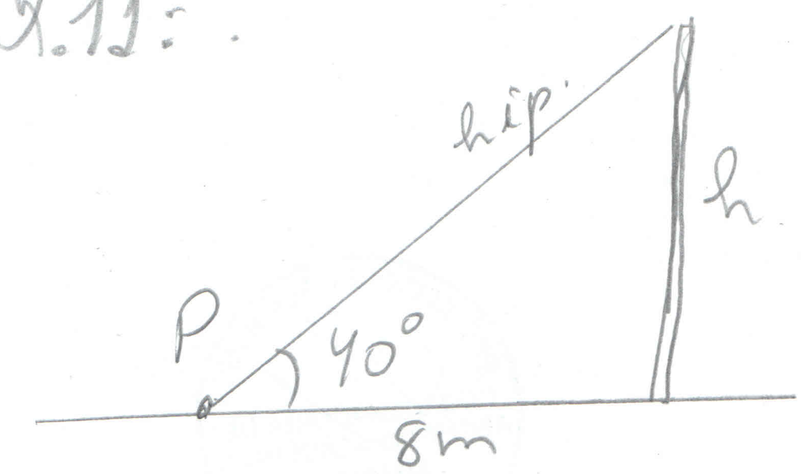


$\operatorname{sen} \hat{B} = \frac{3}{5} \Rightarrow \operatorname{sen} \hat{B} = \frac{x}{15} \Rightarrow \frac{3}{5} = \frac{x}{15} \Rightarrow x = \frac{3 \cdot 15}{5} = 3 \cdot 3 = 9$ $\quad (\div 5)$

$a^2 = x^2 + y^2 \Rightarrow 15^2 = 9^2 + y^2$

$225 = 81 + y^2 \Rightarrow y^2 = 225 - 81 \Rightarrow y = \sqrt{144} \Rightarrow y = 12$ cm

Q.11:



$\operatorname{sen} 40° = 0{,}76 \Rightarrow \operatorname{sen} 40° = \frac{c.o}{hip.}$

$tg\ 40° = 0{,}83$

$tg\ 40° = \frac{c.o}{c.a}$

$0{,}83 = \frac{h}{8} \Rightarrow h = 8 \cdot 0{,}83 = h = 6{,}64m$

6,64m