Trigonometria.

1ª Avaliação – Nº 3

Q1: $118° 57' 18''$ em segundos: $1° = 3600''$ $1' = 60''$

$118° = 118 \cdot 1° = 118 \cdot 3600'' = 424800''$

$57' = 57 \cdot 1' = 57 \cdot 60'' = 3420''$

$118° 57' 18'' = 424800'' + 3420'' + 18'' = 428.238''$

Q2: $59° 55' 49''$ em grau $1' = \frac{1°}{60}$ $1'' = \frac{1°}{3600}$

$49'' = 49 \cdot 1'' = 49 \cdot \frac{1°}{3600} \approx 0{,}0136°$

$55' = 55 \cdot 1' = 55 \cdot \frac{1°}{60} \approx 0{,}9167$

$59° 55' 49'' = 59° + 0{,}0136° + 0{,}9167° \approx 59{,}9303°$

Q3: Ângulos Adjacentes:

$E'\hat{O}'A'$ e $A'\hat{O}'B'$; $E'\hat{O}'A'$ e $A'\hat{O}'C'$; $A'\hat{O}'E'$ e $A'\hat{O}'D'$;
$E'\hat{O}'B'$ e $B'\hat{O}'C'$; $E'\hat{O}'B'$ e $B'\hat{O}'D'$; $E'\hat{O}'C'$ e $C'\hat{O}'D'$;
$A'\hat{O}'B'$ e $B'\hat{O}'C'$; $A'\hat{O}'B'$ e $B'\hat{O}'D'$; $B'\hat{O}'C'$ e $C'\hat{O}'D'$;

$1' = \frac{1°}{60}$

Q4: um ângulo: x

O dobro do seu suplemento: $2 \cdot (180° - x) = 360° - 2x$

a metade do seu complemento: $\frac{90° - x}{2} = 45° - \frac{x}{2}$

$(360° - 2x) - (45° - \frac{x}{2}) = 238° 36'$

$36' = 36 \cdot 1' = 36 \cdot \frac{1°}{60} = 0{,}6°$

$238° 36' = 238{,}6°$

$-2x + \frac{x}{2} = 238{,}6° - 360° + 45°$

$\frac{-4x + x}{2} = -76{,}4°$

$-3x = -76{,}4° \cdot 2$

$x = \frac{-152{,}8°}{-3}$

$x \approx 50{,}93°$

O ângulo mede, aproximadamente, 50,93°.

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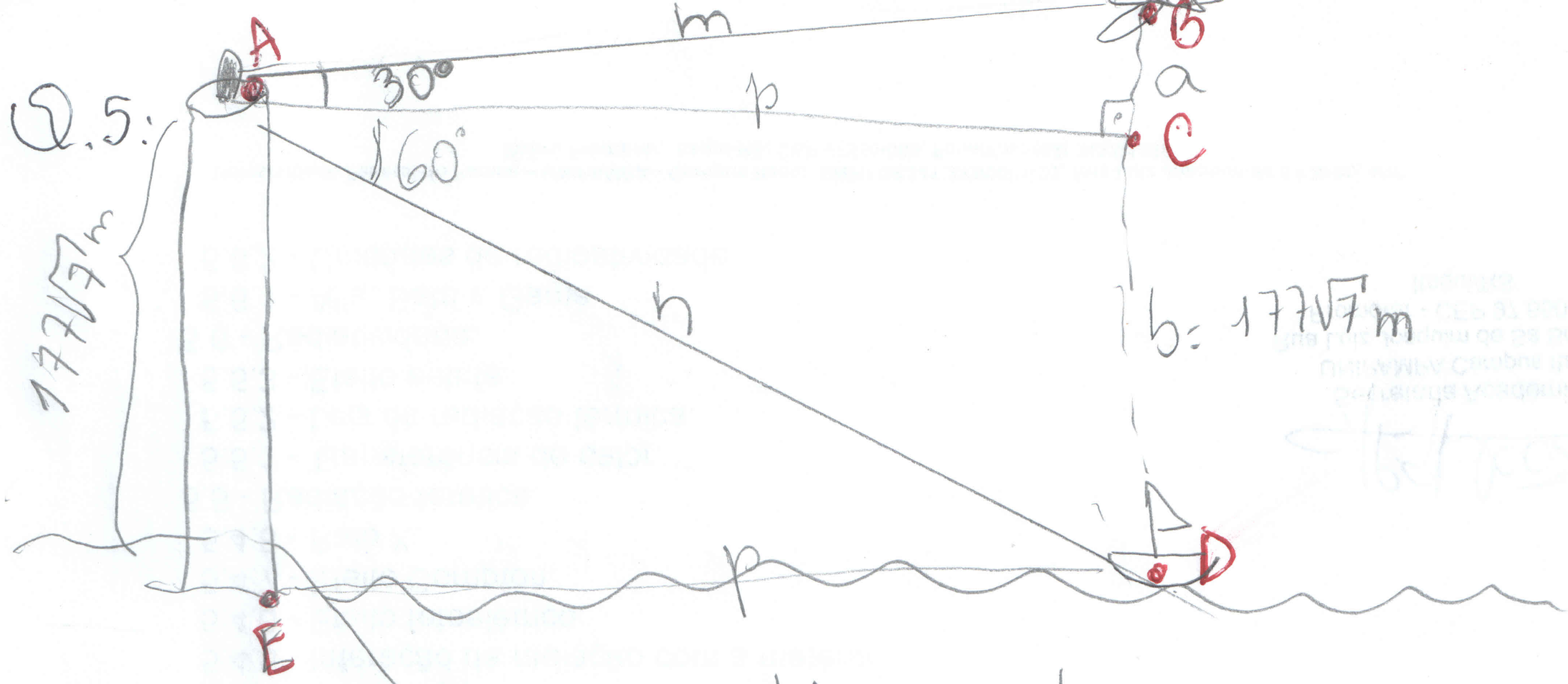
$x \approx 50{,}93°$

O ângulo mede, aproximadamente, 50,93°.

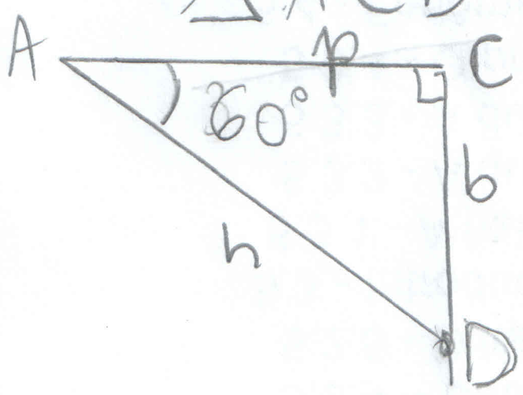
Q.5:



a) $p = ?$

b) $c = a + b$

ΔACD



$\overline{AD}$ é hipotenusa $\overline{CD}$ é cat. oposto de $\hat{A}$

$$\text{sen}\,\hat{A} = \frac{b}{h} \Rightarrow \text{sen}\,60° = \frac{177\sqrt{7}}{h} \Rightarrow \frac{\sqrt{3}}{2} = \frac{177\sqrt{7}}{h}$$

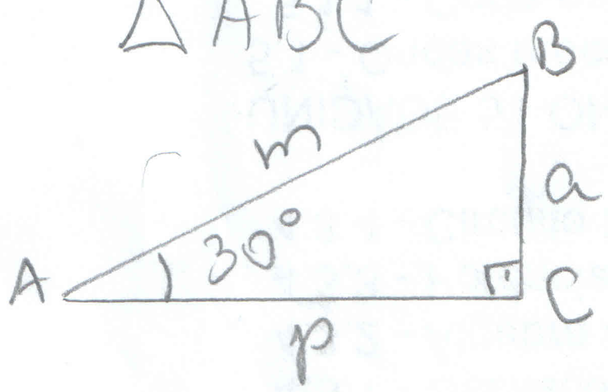
$$\Rightarrow h = \frac{177\sqrt{7}\cdot 2}{\sqrt{3}} \Rightarrow h = \frac{354\sqrt{7}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{354\sqrt{21}}{3 \div 3}$$

$$h = 118\sqrt{21} \text{ metros}$$

$$\cos\hat{A} = \frac{p}{h} \Rightarrow \cos 60° = \frac{p}{118\sqrt{21}} \Rightarrow \frac{1}{2} = \frac{p}{118\sqrt{21}} \Rightarrow p = \frac{118\sqrt{21}}{2}\,m$$

$$p = 59\sqrt{21}\,m$$

ΔABC



$$tg\,\hat{A} = \frac{a}{p} \Rightarrow tg\,30° = \frac{a}{59\sqrt{21}} \Rightarrow \frac{\sqrt{3}}{3} = \frac{a}{59\sqrt{21}}$$

$$\Rightarrow \frac{\sqrt{3}}{3} \cdot 59\sqrt{21} = a \Rightarrow a = \frac{59\sqrt{63}}{3}$$

$$a = \frac{59 \cdot 3\sqrt{7}}{3} = 59\sqrt{7}\,m$$

a) A distância do farol até o navio é $p = 59\sqrt{21}$ m.

b) A distância entre o navio e o avião é:

$$c = 59\sqrt{7} + 177\sqrt{7}$$

$$c = 236\sqrt{7}\,m$$

$$\text{sen}\,\hat{A} = \frac{a}{m} \Rightarrow \text{sen}\,30° = \frac{59\sqrt{7}}{m} \Rightarrow \frac{1}{2} = \frac{59\sqrt{7}}{m}$$

$$\Rightarrow m = 59\sqrt{7} \cdot 2$$

$$m = 118\sqrt{7}\,m$$

Q.6: Dados os triângulos: ΔABC; ΔEDF; ΔGHI

ΔABC e ΔGHI são congruentes ($\Delta ABC \equiv \Delta GHI$),

pois: $\overline{AB} \equiv \overline{IH}$; $\overline{BC} \equiv \overline{GH}$ e $\overline{AC} \equiv \overline{GI}$;

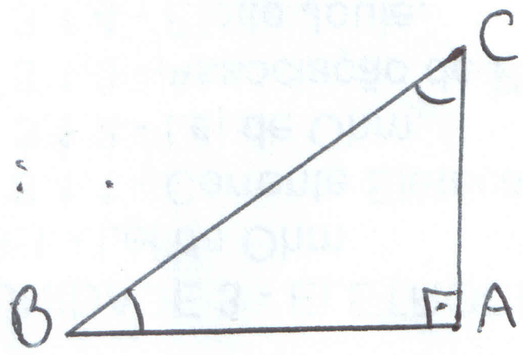
$\hat{A} \equiv \hat{I} = 90°$, $\hat{B} \equiv \hat{H}$ e $\hat{C} \equiv \hat{G}$

ΔABC e ΔDEF são semelhantes ($\Delta ABC \sim \Delta DEF$), pois:

$\hat{A} \equiv \hat{E}$; $\hat{B} \equiv \hat{F}$ e $\hat{C} \equiv \hat{D}$; $\dfrac{\overline{EF}}{\overline{AB}} = \dfrac{\overline{FD}}{\overline{BC}} = \dfrac{\overline{ED}}{\overline{AC}}$

Se $\Delta ABC \equiv \Delta GHI \Rightarrow \Delta GHI \sim \Delta DEF$.

Q.7:



$\hat{B} + \hat{C} = 90°$

$tg\,\hat{C} = 18,8784 \Rightarrow tg\,\hat{C} = cot\,\hat{B}$

$\Rightarrow cotg\,\hat{B} = 18,8784$

$cotg\,\hat{B} = \dfrac{cos\,\hat{B}}{sen\,\hat{B}} \Rightarrow 18,8784 = \dfrac{cos\,\hat{B}}{sen\,\hat{B}} \Rightarrow cos\,\hat{B} = 18,8784 \cdot sen\,\hat{B}$

$\Downarrow$

$cos\,\hat{B} \approx 18,8784 \cdot 0,0529$

$cos\,\hat{B} \approx 0,99867$

$sen^2\hat{B} + cos^2\hat{B} = 1$

$sen^2\hat{B} + (18,8784\,sen\,\hat{B})^2 = 1$

$sen^2\hat{B} + 356,394\,sen^2\hat{B} \approx 1$

$357,394\,sen^2\hat{B} \approx 1$

$sen^2\hat{B} \approx \dfrac{1}{357,394}$

$sen\,\hat{B} \approx \sqrt{0,0028}$

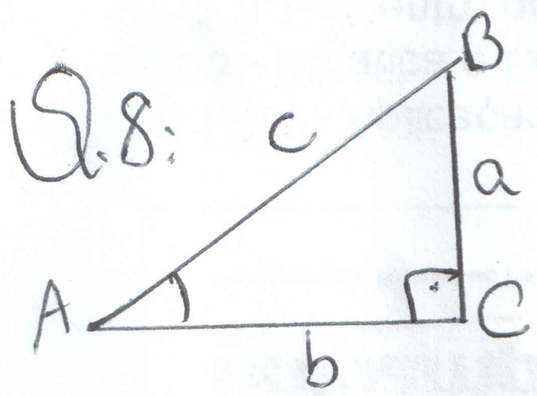
$sen\,\hat{B} \approx 0,0529$

$tg\,\hat{B} = \dfrac{sen\,\hat{B}}{cos\,\hat{B}}$

$tg\,\hat{B} = \dfrac{0,0529}{0,99867}$

$tg\,\hat{B} \approx 0,05297$

Q.8:



$\overline{BC} = 6\,cm = a$

$tg\,\hat{A} = \dfrac{\sqrt{10}}{4} \Rightarrow tg\,\hat{A} = \dfrac{c.o.}{c.adj.} \Rightarrow tg\,\hat{A} = \dfrac{a}{b}$

$\Rightarrow \dfrac{\sqrt{10}}{4} = \dfrac{a}{b} \Rightarrow b = \dfrac{4 \cdot 6}{\sqrt{10}} \Rightarrow b = \dfrac{24}{\sqrt{10}} \cdot \dfrac{\sqrt{10}}{\sqrt{10}}$

$b\sqrt{10} = 4a$

$b = \dfrac{24\sqrt{10}}{10 \div 2} \Rightarrow b = \dfrac{12\sqrt{10}}{5}$

$$b = \frac{24\sqrt{10}^{\div 2}}{10 \div 2} \Rightarrow b = \frac{12\sqrt{10}}{5} \text{ cm}$$

Teorema de Pitágoras

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

$$c^2 = 6^2 + \left(\frac{12\sqrt{10}}{5}\right)^2$$

$$c^2 = 36 + \frac{144 \cdot 10^{\div 5}}{25_{\div 5}}$$

$$c^2 = 36 + \frac{144 \cdot 2}{5}$$

$$c^2 = 36 + \frac{288}{5}$$

$$c^2 = \frac{180 + 288}{5}$$

$$c = \sqrt{\frac{468}{5}}$$

$$c \approx 9{,}67 \text{ cm}$$