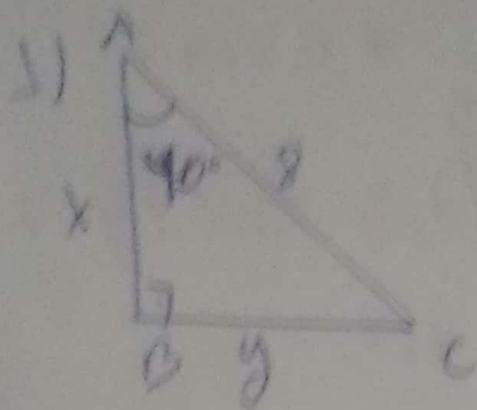


2.5.14



$$\sin 40^\circ \approx 0,643$$

$$\cos 40^\circ \approx 0,766$$

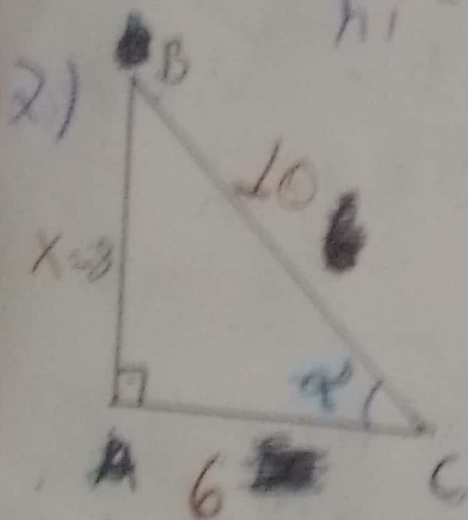
$$y = 5,144$$

$$x = 6,128$$

$$6,13$$

$$\sin 40^\circ = \frac{CO}{HI} = \frac{y}{8} \Rightarrow y = 8 \times 0,643 = 5,144$$

$$\cos 40^\circ = \frac{CA}{HI} = \frac{x}{8} \Rightarrow x = 8 \times 0,766 = 6,128$$



$$\cos \alpha = \frac{CA}{h}$$

$$\frac{3}{5} = \frac{10}{h} = \frac{3}{5} \cdot 10 = 6$$

$$8 + 10 + 6$$

$$P = 24$$

Perimetro

$$h^2 = 6^2 + 8^2$$

$$16^2 = 6^2 + x^2$$

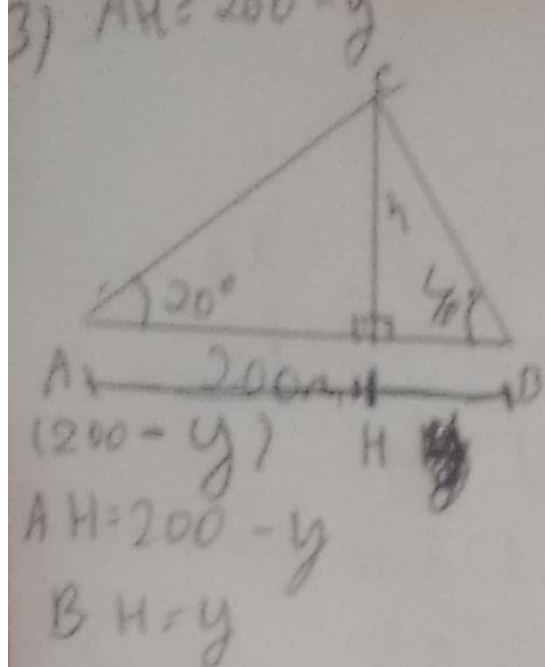
$$100 = 36 + x^2$$

$$100 - 36 = x^2$$

$$64 = x^2$$

$$x = \sqrt{64}$$

$$x = 8$$



Ângulo de  $20^\circ$

$$\operatorname{tg} 20^\circ = \frac{h}{200 - y} \Rightarrow 0,364 =$$

$$\frac{h}{200 - y} \Rightarrow 72,8 - 0,364y = h$$

Ângulo de  $40^\circ$

$$\operatorname{tg} 40^\circ = \frac{h}{y} \Rightarrow 0,839 = \frac{h}{y} \Rightarrow 0,839y = h$$

Cálculo de  $y$

$$0,839y = 72,8 - 0,364y$$

$$1,203y = 72,8$$

$$y = 60,515$$

Cálculo de  $h$

$$h = 72,8 - 0,364 \cdot 60,515$$

$$72,8 - 22,02746$$

$$h \approx 50,77 \text{ m}$$

Triângulo ABD

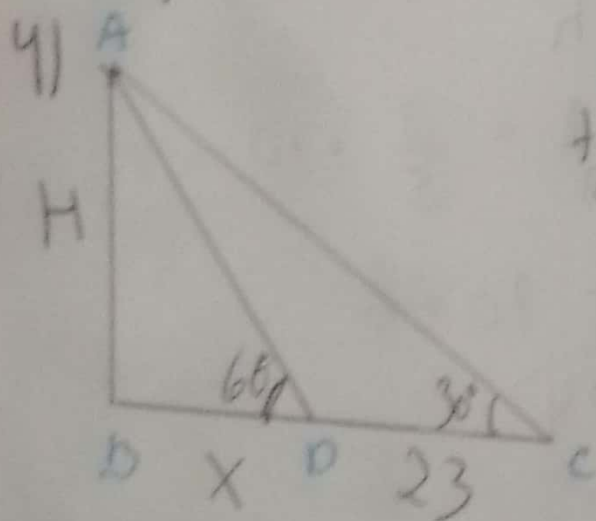
$$\operatorname{tg} 60^\circ = \frac{H}{x}$$

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

$$x\sqrt{3} = H$$

Solução

$$H = \frac{23\sqrt{3}}{2} \text{ m}$$



Triângulo ABC

$$\operatorname{tg} 30^\circ = \frac{H}{(23 + x)}$$

$$\frac{\sqrt{3}}{3} = \frac{H}{(23 + x)}$$

$$\sqrt{3} \cdot (23 + x) = 3 \cdot H$$

$$23\sqrt{3} + x\sqrt{3} = 3H$$

$$23\sqrt{3} + H = 3H$$

$$23\sqrt{3} = 3H - H$$

$$2H = 23\sqrt{3}$$

$$CO = 3$$

$$CA = \sqrt{7}$$

tg

$$\text{tg } x = \frac{-3\sqrt{7}}{7}$$

x é um arco do 2º quadrante. Seu tangente é negativo.

6)

$$\sin(x) = \frac{3}{2}$$

$$\cos(x) = -\frac{\sqrt{3}}{2}$$

$$\cotg(x) = \frac{1}{\text{tg}(x)} = \frac{1}{\frac{\sin(x)}{\cos(x)}} = \frac{\cos(x)}{\sin(x)}$$

$$-\frac{\frac{\sqrt{3}}{2}}{\frac{3}{2}} = -\frac{\sqrt{3}}{2} \cdot \frac{2}{3} = -\frac{\sqrt{3}}{3} \quad \boxed{-\frac{\sqrt{3}}{3}}$$

7)

$$\text{tg } x = \frac{1}{2}$$

$$x = \frac{\pi}{2}$$

$$\cos(x) = \frac{1}{2}$$

$$\sec = \frac{1}{\cos(x)} = \frac{1}{\frac{1}{2}} = 2$$

$\boxed{-2}$  tangente do 2º quadrante

8)

$$\csc x = \frac{1}{\sin(x)}$$

$$\sin(x) = \frac{\sqrt{6}}{3}$$

$$\sin(x) = \frac{2}{\sqrt{6}}$$

$$\sin(x) = \frac{2\sqrt{6}}{6}$$

9) Se das relações fundamentais

$$\sin^2 x + \cos^2 x = 1$$

$$\cos^2 x = 1 - \sin^2 x$$

Cosseno

$$\cos^2 x = 1 - \left(\frac{3}{5}\right)^2$$

$$\cos^2 x = 1 - \frac{9}{25}$$

$$\cos^2 x = \frac{16}{25}$$

$$\cos x = \sqrt{\frac{16}{25}} = \frac{4}{5}$$

seno

$$\sin x = \frac{\text{cateto oposto}}{\text{hipotenusa}}$$

$$\sin x = \frac{3}{5} = \frac{3}{5}$$

10

$$\cos x = \frac{1}{2} \Rightarrow x = 60^\circ$$

$$y = \frac{\cotg 60^\circ - 1}{\text{sen } 60^\circ - \tg 60^\circ} = \frac{\frac{1}{\tg 60^\circ} - 1}{\text{sen } 60^\circ - \tg 60^\circ} = \frac{\frac{1}{\sqrt{3}} - 1}{\frac{\sqrt{3}}{2} - \sqrt{3}}$$

$$y = \frac{\frac{1}{\sqrt{3}-1}}{\frac{-\sqrt{3}}{2}} = \frac{1}{\sqrt{3}+2} \quad y = \frac{3}{\sqrt{3}} \quad (4\sqrt{3})$$

11)

$$2 + \tan^2 x + \sec^2 x$$

$$2 (\sec x / \cos x)^2 + 1 / (\cos^2 x)$$

$$2 \left( \frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}} \right)^2 + \frac{1}{\left( \frac{\sqrt{3}}{2} \right)^2}$$

$$2 \left( \frac{\frac{1}{4}}{\frac{3}{4}} \right) + \frac{1}{\frac{3}{4}}$$

$$2 \left( \frac{1}{3} \right) + \frac{4}{3}$$

$$\frac{2}{3} + \frac{4}{3} = \frac{6}{3} = 2$$



2)

$$\cos(x) + (0 \cdot \cos(x) + \sin(x) \cdot 1) = (1 \cdot \cos(x) - \sin(x) \cdot 0) = \sin(x) = -2\sin(x)$$

$$13) \frac{\sin(4\pi - x) \tan(\frac{\pi}{2} + x) \sec(\pi - x)}{\cos(5\pi - x) \tan(\pi + x) \cot(x)}$$

$$\frac{\frac{1}{\cos(x)} \cdot \left(-\frac{\cos(x)}{\sin(x)}\right) \cdot x(1)}{\frac{1}{\sin(x)} \cdot \cot(x)}$$

$$\frac{1}{\sin(x)} \cdot \cot(x)$$

$$\frac{1}{\sin(x)}$$

$$\frac{1}{\sin(x)} \cdot \cot(x) = \frac{1}{\cot(x)}$$