

①

$$a) \operatorname{sen} 240^\circ = -\operatorname{sen} 60^\circ = -\frac{\sqrt{3}}{2}$$

$$b) \operatorname{cos} 210^\circ = -\operatorname{cos} 60^\circ = -\frac{1}{2}$$

$$c) \operatorname{cos} 480^\circ = \operatorname{cos} 120^\circ = -\operatorname{cos} 60^\circ = -\frac{1}{2}$$

$$\downarrow$$

$$480^\circ = 360^\circ + 120^\circ$$

$$d) \operatorname{sen} 70^\circ = \operatorname{cos} 20^\circ = 0,93$$

②

$$\operatorname{sen} d = -\frac{4}{5}, \quad \text{Diagram: a circle with a point in the third quadrant, a right triangle with hypotenuse 5, vertical side 4, and horizontal side 3.} \quad \rightarrow \quad \operatorname{cosec} d = -\frac{5}{4}$$

$$\operatorname{cos} d = \frac{3}{5} \quad \rightarrow \quad \operatorname{sec} d = \frac{5}{3}$$

$$\operatorname{tg} d = \frac{-\frac{4}{5}}{\frac{3}{5}} = -\frac{4}{3} \quad \rightarrow \quad \operatorname{cotg} d = -\frac{3}{4}$$

③

$$\frac{\operatorname{sen} x \operatorname{cos} x}{\operatorname{cos}^2 x - \operatorname{sen}^2 x} = \frac{\operatorname{tg} x}{1 - \operatorname{tg}^2 x}$$

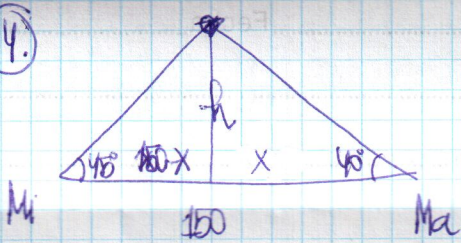
$$\operatorname{sen} x \operatorname{cos} x (1 - \operatorname{tg}^2 x) = \operatorname{tg} x (\operatorname{cos}^2 x - \operatorname{sen}^2 x)$$

$$\operatorname{sen} x \operatorname{cos} x - \operatorname{sen} x \operatorname{cos} x \cdot \operatorname{tg}^2 x = \operatorname{tg} x \operatorname{cos}^2 x - \operatorname{tg} x \operatorname{sen}^2 x$$

$$\operatorname{sen} x \cdot \operatorname{cos} x - \operatorname{sen} x \cdot \operatorname{cos} x \cdot \frac{\operatorname{sen}^2 x}{\operatorname{cos}^2 x} = \frac{\operatorname{sen} x}{\operatorname{cos} x} \operatorname{cos}^2 x - \frac{\operatorname{sen} x}{\operatorname{cos} x} \operatorname{sen}^2 x$$

$$\cancel{\operatorname{sen} x \operatorname{cos} x} - \frac{\cancel{\operatorname{sen}^3 x}}{\operatorname{cos} x} = \cancel{\operatorname{sen} x \operatorname{cos} x} - \frac{\cancel{\operatorname{sen}^3 x}}{\operatorname{cos} x} \quad \rightarrow \quad 0 = 0 \quad \checkmark$$

4.



$$\operatorname{tg} 45^\circ = \frac{h}{150x} = 1 \rightarrow h = 150x$$

$$\operatorname{tg} 40^\circ = \frac{h}{x} = 0,83 \rightarrow h = 0,83x$$

$$150x = 0,83x$$

$$x = \frac{150}{1,83} = 81,97 \text{ m}$$

$$h = 81,97 \text{ m}$$

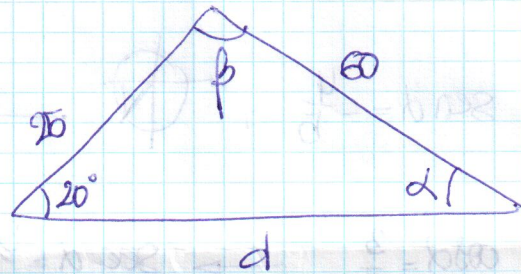
5

$$\frac{60}{\sin 20^\circ} = \frac{25}{\sin \alpha}$$

$$\sin \alpha = \frac{25 \sin 20^\circ}{60} = \frac{25 \cdot 0,34}{60} =$$

$$\sin \alpha = 0,14 \rightarrow \alpha = 8,19^\circ$$

$$\beta = 180 - 20 - 8,19 = 151,81^\circ$$



Opción A:

$$d^2 = 25^2 + 60^2 - 2 \cdot 25 \cdot 60 \cos 151,81 = 625 + 3600 + 2640 = 1585 \text{ m}$$

$$d = 82,94 \text{ m}$$

Opción B:

$$\frac{60}{\sin 20^\circ} = \frac{d}{\sin 151,81} \rightarrow d = \frac{60 \cdot \sin 151,81}{\sin 20^\circ} = \frac{60 \cdot 0,47}{0,34} = 82,94 \text{ m}$$

$$\textcircled{6} \begin{cases} 2^x + 3^y = 7 \\ 2^{x+1} - 3^{y+1} = -1 \end{cases} \quad \begin{matrix} t = 2^x \\ v = 3^y \end{matrix}$$

$$\begin{cases} t + v = 7 \\ 2t - 3v = -1 \end{cases} \rightarrow \begin{cases} -2t - 2v = -14 \\ 2t - 3v = -1 \end{cases}$$

$$\hline -5v = -15$$

$$v = \frac{15}{5} = 3 \rightarrow \boxed{y=1}$$

$$t = 7 - v = 7 - 3 = 4 \rightarrow \boxed{x=2}$$

⑦

(+2, 3, -1)

⑧

$$-\frac{x^2 - 5x + 6}{x^2 - 1} \geq 0 \Rightarrow -\frac{(x-3)(x-2)}{(x-1)(x+1)} \geq 0$$

	-1	1	2	3	
(x-3)	-	-	-	-	+
(x-2)	-	-	-	+	+
(x-1)	-	-	+	+	+
(x+1)	-	+	+	+	+
Prod	-	⊕	-	⊕	-

Sol:  $(-1, 1) \cup [2, 3]$

9.

$x = \text{madre}$

$y = \text{hija}$

$$\begin{cases} x = 2y \\ (x+5)(y+5) = 1.767 \end{cases}$$

$$(2y+5)(y+5) = 1.767$$

$$2y^2 + 5y + 10y + 25 = 1.767$$

$$2y^2 + 15y - 1742 = 0$$

$$y = \frac{-15 \pm \sqrt{225 + 4 \cdot 2 \cdot 1742}}{4} = \frac{-15 \pm 119}{4} = \underline{\underline{26}}$$

$$\underline{\underline{x = 2y = 52}}$$