

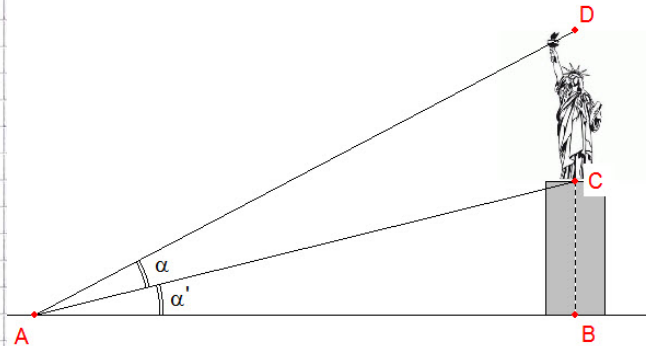
4) Données :

* hauteur piédestal : $a_1 = BC = 12,5 \text{ [m]}$

* hauteur statue : $a_2 = CD = 15,2 \text{ [m]}$

* $\angle \alpha = \angle CAD$ et $\alpha = \alpha'$
 $\angle \alpha' = \angle BAC$

* Calculer $x = AB$



Resolution :

* ds le triangle $\triangle ABC$,
 rectangle en B : $\tan(\alpha') = \frac{BC}{AB} = \frac{a_1}{x}$

* ds le triangle $\triangle ABD$,
 rectangle en B : $\tan(\alpha + \alpha') = \frac{BD}{AB} = \frac{a_1 + a_2}{x}$
 or $\alpha = \alpha'$: $= \tan(2\alpha') = \frac{2 \tan(\alpha')}{1 - \tan^2(\alpha')}$

$$\text{donc } \frac{a_1 + a_2}{x} = \frac{2 \cdot \frac{a_1}{x}}{1 - \left(\frac{a_1}{x}\right)^2} \Leftrightarrow \frac{a_1 + a_2}{x} = \frac{\frac{2a_1}{x}}{\frac{x^2 - a_1^2}{x^2}}$$

$$\Leftrightarrow \frac{a_1 + a_2}{x} = \frac{2a_1 x}{x^2 - a_1^2} \Leftrightarrow (a_1 + a_2)x^2 - (a_1 + a_2) \cdot a_1^2 = 2a_1 x^2$$

$$\Leftrightarrow (a_1 + a_2 - 2a_1)x^2 = (a_1 + a_2) \cdot a_1^2$$

$$\Leftrightarrow (a_2 - a_1)x^2 = (a_1 + a_2) \cdot a_1^2$$

$$\Leftrightarrow x^2 = \frac{a_1 + a_2}{a_2 - a_1} \cdot a_1^2 \Leftrightarrow x = \sqrt{\frac{a_1 + a_2}{a_2 - a_1}} \cdot a_1$$

- a.m. : $x = \sqrt{\frac{15,2 + 12,5}{15,2 - 12,5}} \cdot 12,5 \approx 40,04 \text{ [m]}$