

Podiumverlichting

1. $x^2 + 3^2 = r^2$

$$V = c \cdot \frac{1}{r} \cdot \sin \alpha = 650 \cdot \frac{1}{r} \cdot \frac{x}{r} = \frac{650 x}{r^2} = \frac{650 x}{x^2 + 9}$$

2. $\frac{650 x}{x^2 + 9} \geq 100$

$$\begin{aligned} 100(x^2 + 9) &= 650 x && \rightarrow & x^2 - 6,5 x + 9 = 0 \\ & && & (x - 2) \cdot (x - 4,5) = 0 \\ & && & x = 2 \quad \vee \quad x = 4,5 \end{aligned}$$

Dus $2 \leq h \leq 4,5$

3. $\frac{dV}{dx} = \frac{650 \cdot (9 + x^2) - 2x \cdot 650x}{(9 + x^2)^2}$

$$\frac{dV}{dx} = 0 \quad \rightarrow \quad 650 x^2 = 5850 \quad \rightarrow \quad x^2 = 9$$

V is maximaal als de hoogte van de balk $\sqrt{9} = 3$ meter is.