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

$100\,(x^2 + 9) = 650\,x \quad \rightarrow \quad x^2 - 6{,}5\,x + 9 = 0$

$(x - 2) \cdot (x - 4{,}5) = 0$

$x = 2 \quad \text{v} \quad x = 4{,}5$

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.