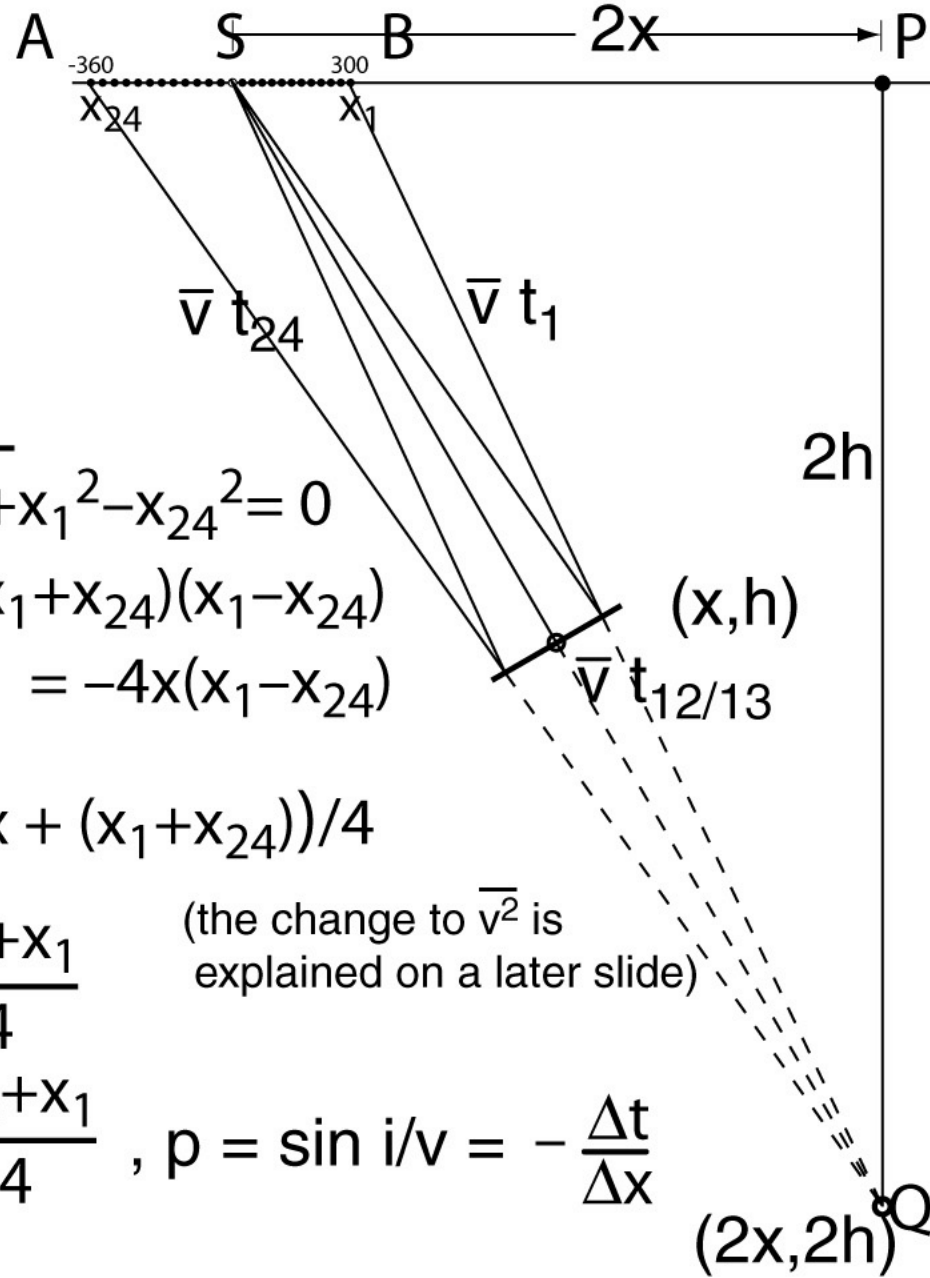


Thought experiment :

Rays arrive at the surface as if they would have come from the "virtual source", the reflection image of the real source in the reflector. Use Pythagoras to determine position of virtual source (and of reflection point).



$$s_1^2 - (2x - x_1)^2 = 4h^2$$

$$s_{24}^2 - (2x - x_{24})^2 = 4h^2$$

$$s_1^2 - s_{24}^2 + 4x(x_1 - x_{24}) + x_1^2 - x_{24}^2 = 0$$

$$v^2 (t_1 + t_{24})(t_1 - t_{24}) + (x_1 + x_{24})(x_1 - x_{24}) = -4x(x_1 - x_{24})$$

$$x = -(\bar{v}^2(t_1 + t_{24})\Delta t / \Delta x + (x_1 + x_{24})) / 4$$

$$\approx -\frac{\Delta t}{\Delta x} \frac{t_0}{2} \bar{v}^2 - \frac{x_{24} + x_1}{4}$$

(the change to \bar{v}^2 is explained on a later slide)

$$x = p \int_0^{t_0/2} v^2 dt - \frac{x_{24} + x_1}{4}, \quad p = \sin i/v = -\frac{\Delta t}{\Delta x}$$

