Simple Algebra and Special Relativity

Consider just two quantities, x' , the distance an object has traveled, and I , the distance a light flash has traveled during the same time t at speed c . We will assume that they both started out at x=0. Let's play with these.

Let $x'^2 + I^2 = H'^2$; $I^2 = H'^2 - x'^2$; $I^2/t^2 = H'^2/t^2 - x'^2/t^2$

Let $x'>0$; $I>0$. Therefore, $H'>I$

NM

Let $c=I/t$; $c'=H'/t$

Therefore,

$I=ct$; $\mathbf{H'=c't}$

Because $H'>I$,

$\mathbf{c' > c}$

NM $\mathbf{I^2 = (c't)^2 - x'^2}$

Let $V=x'/t$

$x'=(x'/t)t=Vt=(V/c)ct=(V/c)I$

SRT

$\mathbf{H' > [ct = I]}$

Let $\mathbf{t'= H'/c}$

$H'^2 = (ct')^2$

SRT $\mathbf{I^2 = (ct')^2 - x'^2}$

Let $\gamma=(H'/I)=(ct'/ct)$ [see below]

Let $v=(x'/t')$

$x'=(ct'/ct)(x'/ct')ct$
$=\gamma(v/c)ct=\gamma vt$

$t'=(ct'/ct)t=\gamma t$

$x'=Vt=\gamma vt = \gamma(v/c)ct= \gamma(v/c)I$
$V=\gamma v$

$$\gamma^2 = \mathbf{(ct')^2/I^2} = \mathbf{(H'/I)^2} = H'^2/(H'^2-x'^2)=1/1-(x'/H')^2$$
$$= 1/1-(x'/ct')^2 = \mathbf{1/1-(v/c)^2}$$
$$\gamma = [1/(1-(v/c)^2)]^{1/2} = (H'/I) = (ct')/I$$

The γx and $\gamma(v/c^2)$x of the full SRT transformation equations are readily derivable from the Relativistic Interval equation.