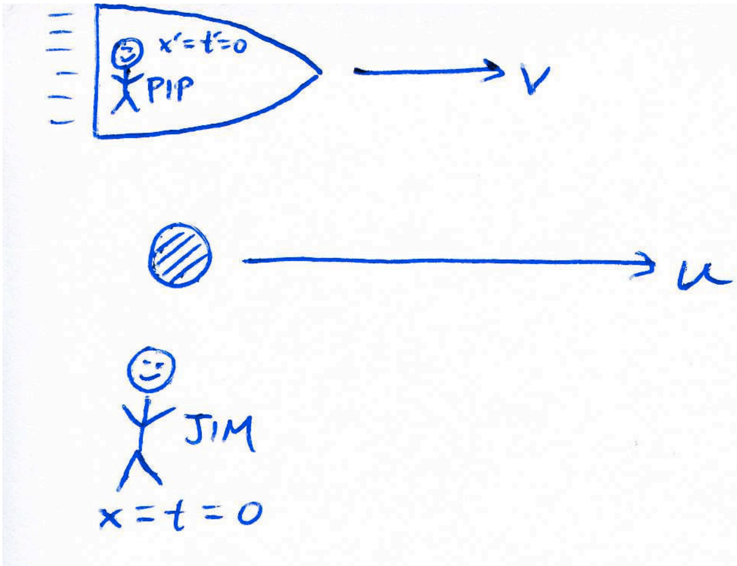
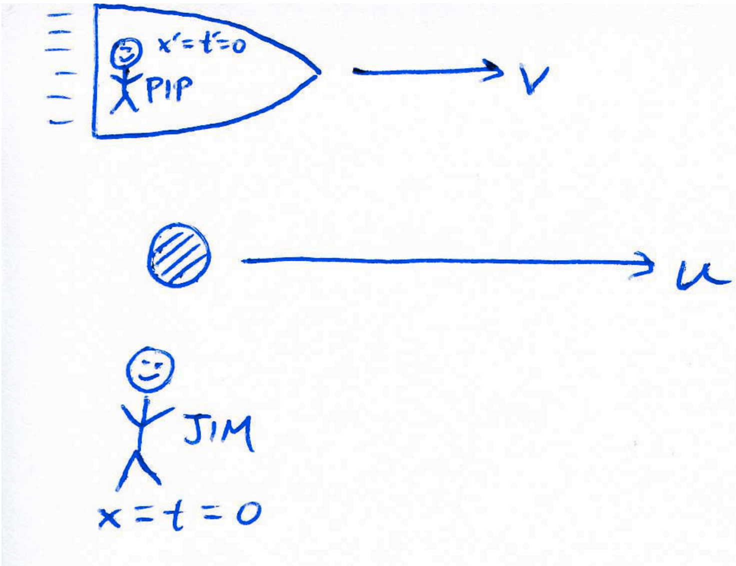


At time t=T in Jim's frame, the ball hits a wasp. What is the location of this event in Pip's frame?

A) $x' = \gamma\,(uT - uT) = 0$
B) $x' = \gamma\,(uT - vT)$
C) $x' = \gamma\,(uT - (u\text{-}v)T)$
D) $x' = \gamma[uT - T(u\text{-}v)\,/(c^2 - uv)]$
E) None of the above.

Extra: what is the time of the event in Pip's frame? What is the velocity of the ball in Pip's frame?



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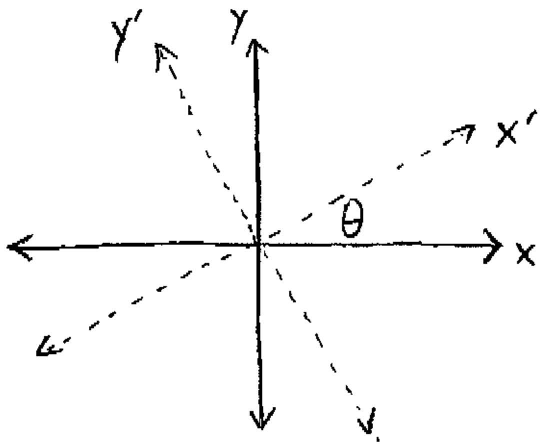
S: Jim's frame S': Pip's frame
velocity of S' relative to S: v
event: ball hitting wasp
coords in Jim's frame: (t = T, x = uT)
coords in Pip's frame:
$x' = \gamma\,(x - vt) = \gamma\,(uT - vT)$

Extra:
$t' = \gamma\,(t - vx/c^2) = \gamma\,(T - uvT/c^2)$
Velocity of ball:
$\Delta x'/\Delta t' = (u\text{-}v)/(1 - uv/c^2)$



What is the transformation relating the two coordinate systems?

A) $x' = (\cos\theta)x + (\sin\theta)y$
$y' = (\cos\theta)y + (\sin\theta)x$

B) $x' = (\cos\theta)x - \sin\theta\, y$
$y' = (\cos\theta)y + \sin\theta\, x$

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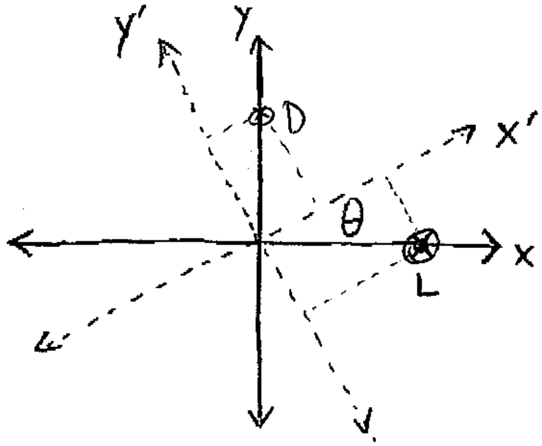

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D) $x' = \cos\theta\, x + \sin\theta\, y$
$y' = \cos\theta\, y - \sin\theta\, x$

e.g. event at $y=0$, $x=L$
should be at
$x' = L\cos\theta$
$y' = -L\sin\theta$
$\therefore$ C or D

event at $x=0$, $y=D$
should be at
$x' = \sin\theta$
$y' = \cos\theta$

$\therefore$ answer: D