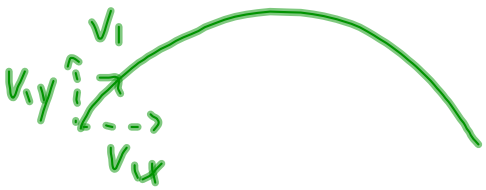
A juggler is doing his thing and decides to add a little variety. He continue to toss the balls along the same path but doubles his speed imparted to t ball as it leaves his hand. If he is to continue to catch the balls at the sam level as release, how will his hand separation compare to the original widt Justify your answer.



If you double V_1, what happens to d_x?

If the speed at which he throws the ball doubles, both the horizontal and vertical components of his velocity will double. ($v_{1x} = v_1\cos\theta$ and $v_{1y} = v_1 \sin\theta$.

Since the hand separation is given by d_x and $d_x = v_xt$, we need to determine the impact on time. Time is given by

$$t = \frac{v_2 - v_1}{a}$$

So, if the vertical component of velocity doubles then so will the time.

Since $d_x \alpha v_xt$
$d_x \alpha (2)(2)$
$d_x \alpha 4$

Therefore, if he doubles his velocity, he must increase his hand must be 4 times further apart.

L : 7m/s