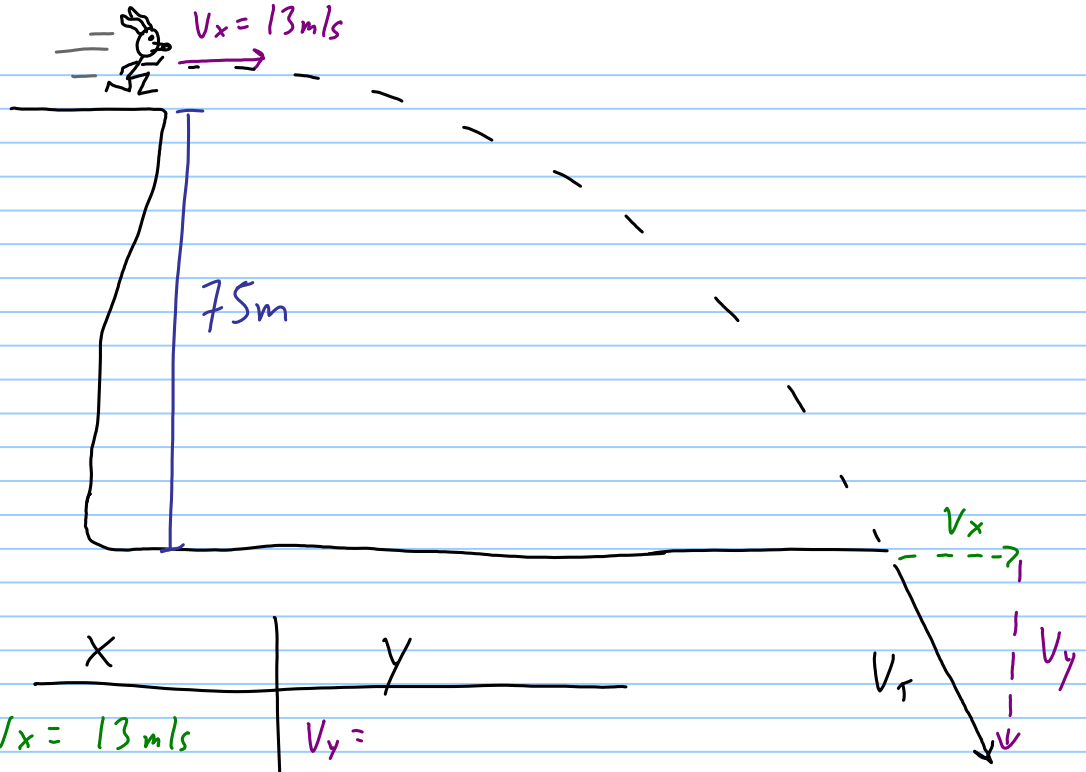
Wile E. Coyote is chasing the Road Runner when he takes a wrong turn and accidentally runs off of a 75 m high cliff. When he leaves the cliff he is running horizontally at 13 m/s.

a. How long does it take him to hit the ground below?

b. What is his **total** velocity upon impact?



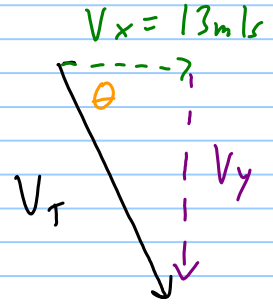
X	Y
$V_x = 13\,m/s$	$V_y =$
d_x	$V_{yo} = 0$
t	$a_y = -9.8\,m/s^2$
	$d_y = -75m$
	$t =$

a.) $d = v_0 t + \frac{1}{2}at^2$ ($v_0 = 0$)

$d = \frac{1}{2}at^2$ ✓

$t = \sqrt{\frac{2d}{a}} = \sqrt{\frac{2(-75)}{-9.8}} = 3.9123\,s$

$= \boxed{3.9\,s}$ ✓



$V_y = V_{yo} + at$

$= 0 + (-9.8)(3.9123)$

$= -38.34$ ✓

$V_T^2 = V_x^2 + V_y^2$

$V_T = \sqrt{V_x^2 + V_y^2}$

$= \sqrt{13^2 + (-38.34)^2}$

$= 40.48\,m/s$

$\tan\theta = \frac{38.34}{13}$

$\theta = \tan^{-1}\left(\frac{38.34}{13}\right)$

$= 71°$

$\boxed{\vec{V}_T = 40.\,m/s \;\; 71° \text{ below the horizontal}}$ ✓ ✓