# PROJECTILES

Unit 9 Dr. John P. Cise, Professor of Physics, Austin Com. College, Austin, Texas USA, jpcise@austincc.edu & New York Times , Sept. 1, 2019 by Willy Staley, Dedicated to Tony & Zeppelin Ryder Cardona

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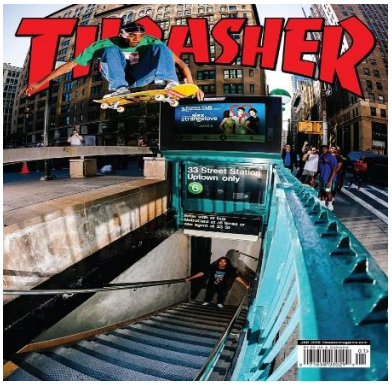
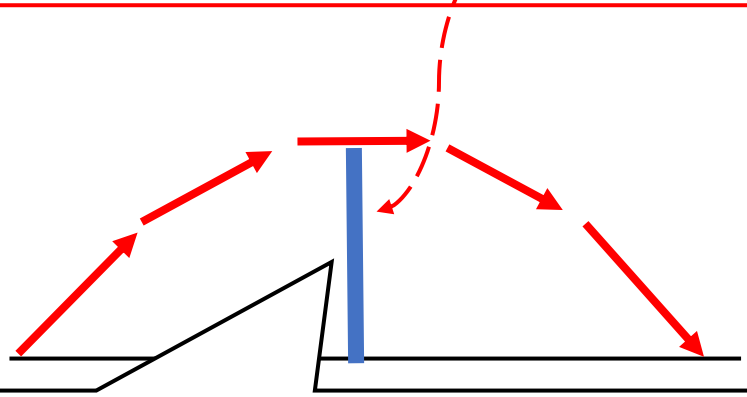
## Tyshawn Jones's jaw-dropping athleticism has made him a skateboarding icon. But is skateboarding big enough for someone like Tyshawn Jones?

**One of Tyshawn Jones's** favorite places to skate is the William F. Passannante Ballfield in Greenwich Village. Even by skateboarding's flexible standards, this park is barren: a flat expanse of asphalt with paint denoting a baseball diamond. There are no ledges sweaty with wax, no stairs to jump down, not even a measly curb; once you leave the painted infield, the ground becomes too chunky to really skate on. And yet it's still a destination in New York, known to locals as ''T.F. West'' — short for ''training facility,'' a convoluted inside joke about the fact that there's nothing to skate there. Except for the trash cans. You've probably used trash cans like these: green, metal, the ideal height for dropping garbage into (about midthigh). And provided they don't have too much in them, they make for handy ad hoc obstacles. Most skaters turn them on their sides, so they come up to just below the knee. Tyshawn Jones generally leaves them upright. Last year, **he filmed a short clip at T.F. West**, doing nothing but tricks over cans. He tends to clear them so effortlessly that you get the sense they're less an obstacle than a visual reference point, like the little man included for scale in a drawing of a skyscraper or a whale: Look at how high I can do *this*.

**The physics of what he's doing is apparent." Jones possesses an unholy combination of vertical leap, flexibility, strength, finesse and timing — which skaters call, somewhat reductively, "pop"** — that allows him to launch himself and his board over or onto seemingly whatever he wants, sometimes appearing to float for just a beat too long at the apex, as if briefly entering low orbit.



**Barrier Jones leaps over is 3 feet high. Jones leaps 3 feet in front of barrier and lands back on street 3 feet beyond barrier.**

**INTRODUCTION: With information given in lower left graphic of Jones leap over barrier(at left) goal is to find velocity(magnitude & direction….angle of leap needed to achieve his jump)**

**HINTS: g = 32 ft/s.., 60 mph = 88 ft./s.**

**QUESTIONS: (a) Find time to leap up 3' (just up)over barrier? (Note: Time t to leap up is equivalent to fall 3'),(b) Find total time to leap(jump) over barrier? (c) Write down both the initial unknown horizontal & vertical speed at launch off street? Let v = actual speed of leap.(d) Write down the two initial horizontal & vertical equations(with two unknowns v & Θ ) using kinematic equations 3 & 5 $x = v_H t$ , $y = v_{ov}t + 1/2gt^2$ ?, (e) Solve for v & Θ ? (Hint: $v^2 = v_0^2 + 2\,a\,x$ useful here). (f) Convert v in ft/s. to mph?, (g) Do answers look reasonable?**

**ANSWERS: (a) t = 0.433 s., (b) $t_{total}$ = .866 s (c) $v_H = v \cos.\Theta$, $v_{ov} = v \sin.\Theta$, (d) (e) v = 15.6 ft./s. , Θ =63.44$^0$ above horizontal. (f) v = ~ 10.61 mph,,(g) reasonable**