

# PROJECTILE MOTION

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## Showmanship, and Conflict, as Darts Goes From Smoky Pubs to TV Spectacle

At times, a dart match can seem more like a rowdy frat party than a sporting event. Here, fans celebrate during the World Championship at the Alexandra Palace in London this month.



**INTRODUCTION:** Darts are thrown on average at 40 mph (59.61 ft./s.). Normally the dart boards are horizontally 7.77 ft. from the dart thrower.

**QUESTIONS:** (a) Set up the equation ( $x=v_x t$ ) for the horizontal motion of the dart projectile where we do not know the angle  $\theta$  to the horizontal and time ( $t$ ) of flight time to dart board?, (b) Set up the equation  $y = v_y t + \frac{1}{2} g t^2$  for the vertical motion of the dart projectile?  $Y = 0$  (c) With the two equations from (a) & (b) now find  $\theta$  &  $t$ ?

Note:  $\sin.(2\theta) = 2 \sin. \theta \cos.\theta$  . eq. 1 (d) Show equation 1 is valid if  $\theta = 37^\circ$  (e) Sketch darts low projectile path to dart board with at six points show both Horizontal & vertical components of velocity?

**ANSWERS:** (a)  $7.77 = 59.61 \cos. \theta t$ , (b)  $0 = 59.61 \sin. \theta t + \frac{1}{2} 32 t^2$ , (c)  $\theta = 0.7776^\circ$ ,  $t = 0.133$  s., (d)  $0.961 = 0.961$ , (e) Show a clear sketch.

LONDON — By conventional measures, dart players are not the telegenic type. They mutter to themselves onstage. They wear flamboyant polyester polos. They cradle their handful of **(((tiny spears and stare a lot at a fibrous board seven-feet, nine-and-a-quarter inches away)))**. But professional darts has catapulted itself from musty British pubs onto millions of television sets across Europe, an insurgency by a working-class sport that has turned the best of its mostly middle-aged players into stars. The premier darting event, the [William Hill World Championship](#), has grown into a three-week, \$3-million-purse affair, replete with cheerleaders and thunderous walk-on music, and the sport's promoters work tirelessly to ratchet up the show.



Michael van Gerwen, left, is considered by many to be the best player ever. Right, Lourence Ilagan