Find components first

7. A football is kicked off with a speed of 40. m/s at an angle of 45°. Determine: a) the time to the peak, b) the total time of flight, c) the total distance traveled, and d) the max. height reached.

$v_{0x} = v_0 \cos\theta = 40\frac{m}{s}\cos 45° = 28.3\frac{m}{s}$

$v_{0y} = v_0 \sin\theta = 40\frac{m}{s}\sin 45° = 28.3\frac{m}{s}$

a) t_{peak} $\quad v_f = v_0 + at$ (only vert...)

$0 = 28.3 - 9.8(t)$

$t_{peak} = 2.9$ seconds

b) $t_{tot} = 2 \cdot t_{pk} = 5.8$ seconds

c) $d_x = ? = v_x \cdot t = 28.3\frac{m}{s}(5.8s)$

$d_x = 82$ meters

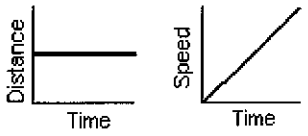
d) $v_f^2 = v_0^2 + 2ad$ (only vert...)

$0 = (28.3)^2 - 19.6(d)$ $\quad d = 41$ meters

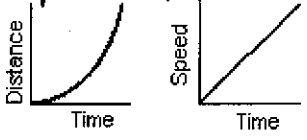
8. Which graphs below describe the vertical motion of a projectile launched horizontally? _____

speeds up

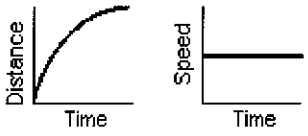
A.



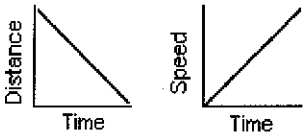
C.



B.



D.



9. Which graph best represents the horizontal motion of a projectile near the Earth's surface? ____

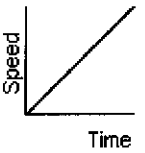
constant vel.

A.

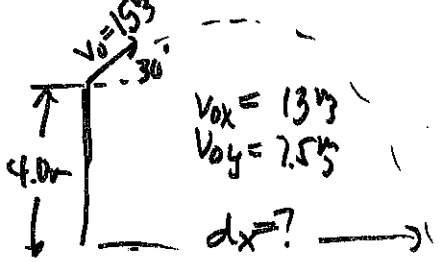
C.

B.

D.



BONUS: 10. Stunt Stickman (traveling 15 m/s) leaves from a 4.0 meter ramp at an angle of 30° flying through the air. Where will Stick land?



$d_x = v_x \cdot t$

$d_x = 13\frac{m}{s}(t)$

$d_x = 13\frac{m}{s}(2.93sec)$

$d_x = 38$ meters

$d_y = v_{0y}t + \frac{1}{2}at^2$

$-4m = 13t - 4.9t^2$

$4.9t^2 - 13t - 4 = 0$

use quadratic to find time

$t = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{13 \pm \sqrt{(13)^2 - 4(4.9)(-4)}}{2(4.9)}$

$t = \frac{13 \pm 15.7}{9.8}$ $\quad t = 2.93$ seconds (neg. rej.)