

Two Dimensional Motion, with gravity.....

NOTES, fill in the blanks as we go over in class (Tue, Nov 29, 2005)

Due Thur Dec 1, Read Section 3-3, do Practice 3D pg 102, Sec Review pg 105 1-5. (plus 6,7 for Honors).

Due Fri Dec 2. Projectile 2 Practice Problems

Due Fri Dec 2, Projectile Lab1 Procedures (see pg 120,121 for ideas)

Due Mon Dec 5 Review questions Chapter 3

Tue Dec 6th Test (Relative Motion, Relativity, Vectors, Projectiles)

Thur Dec 8th, Projectile Labpt1 due (indiv)

PLEASE ANSWER:

Why do we use vectors at right angles to represent projectile motion?

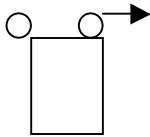
If I roll something off the table (without air resistance), what force is acting on it?

In what direction?

What will its final horizontal velocity be?

TODAY:

Independence of horizontal and vertical motion



We separate motion in two dimensions into x and y components.... Horizontal (x) usually has no force, thus no acceleration. Vertical (y) has the acceleration due to gravity.

Projectile motion: 2 dimensions, only force is that of gravity (no air resistance), makes a parabola..

What property is the same between the two???

Steps for solving projectile problems:

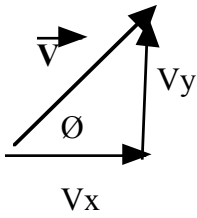
- 1) Draw a picture!!
- 2) Write down the info given as x and y parts. (Change vector velocity to x and y components if needed)
- 3) Determine what needs to be solved.
- 4) Find the time in one direction and use it in the other direction.
- 5) Solve.

OTHER NOTES:

Strobe diagrams:

Path of motion:

PROJECTILE FORMULAS:



Pythagorean: $V^2 = V_x^2 + V_y^2$
 $V_x = V \cos(\theta)$
 $V_y = V \sin(\theta)$
 $\theta = \tan^{-1}(V_y/V_x)$

X _____

$A_x = 0$ so
 $V_{ix} = V_{fx} = V_{avgx}$

$D_x = V_x T$

$V_x = V \cos(\theta)$

Y _____

$A_y = -9.8 \text{ m/s}^2$
 $V_{iy} = V \sin(\theta)$

$h = D_y = V_{iy}T + \frac{1}{2} A_y T^2$
 $V_{fy} = V_{iy} + A_y T$
 $V_{fy}^2 = V_{iy}^2 + 2 A_y D_y$

If launched horizontally, $V_{iy} = 0$.



If launched at an angle so it hits the ground, at top $V_y = 0$, at ground $D_y = 0$.

