Two Dimensional Motion, with gravity…..

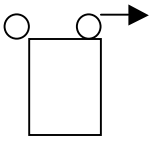
NOTES, fill in the blanks as we go over in class (Tue, Nov 29, 2005)
Due Thur Dec 1, Read Section 3-3, do Practice 3D pg 102, Sec Review pg 105 1-5. (plus 6,7 for Honors).
Due Fri Dec 2. Projectile 2 Practice Problems
Due Fri Dec 2, Projectile Lab1 Procedures (see pg 120,121 for ideas)
Due Mon Dec 5 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..

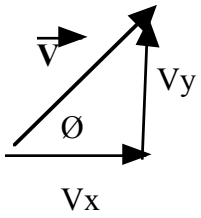
What property is the same between the two???

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: $\mathbf{V}^2 = Vx^2 + Vy^2$

$Vx = \mathbf{V} \cos(Ø)$

$Vy = \mathbf{V} \sin(Ø)$

$Ø = \tan^{-1}(Vy/Vx)$

X

$Ax = 0$ so

$Vix = Vfx = Vavgx$

$Dx = Vx\ T$

$Vx = \mathbf{V} \cos(Ø)$

Y

$Ay = -9.8\ m/s^2$

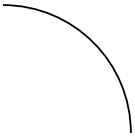
$Viy = \mathbf{V} \sin(Ø)$

$h = Dy = ViyT + ½\ Ay\ T^2$

$Vfy = Viy + Ay\ T$

$Vfy^2 = Viy^2 + 2\ Ay\ Dy$

If launched horizontally, $Viy = 0$.



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