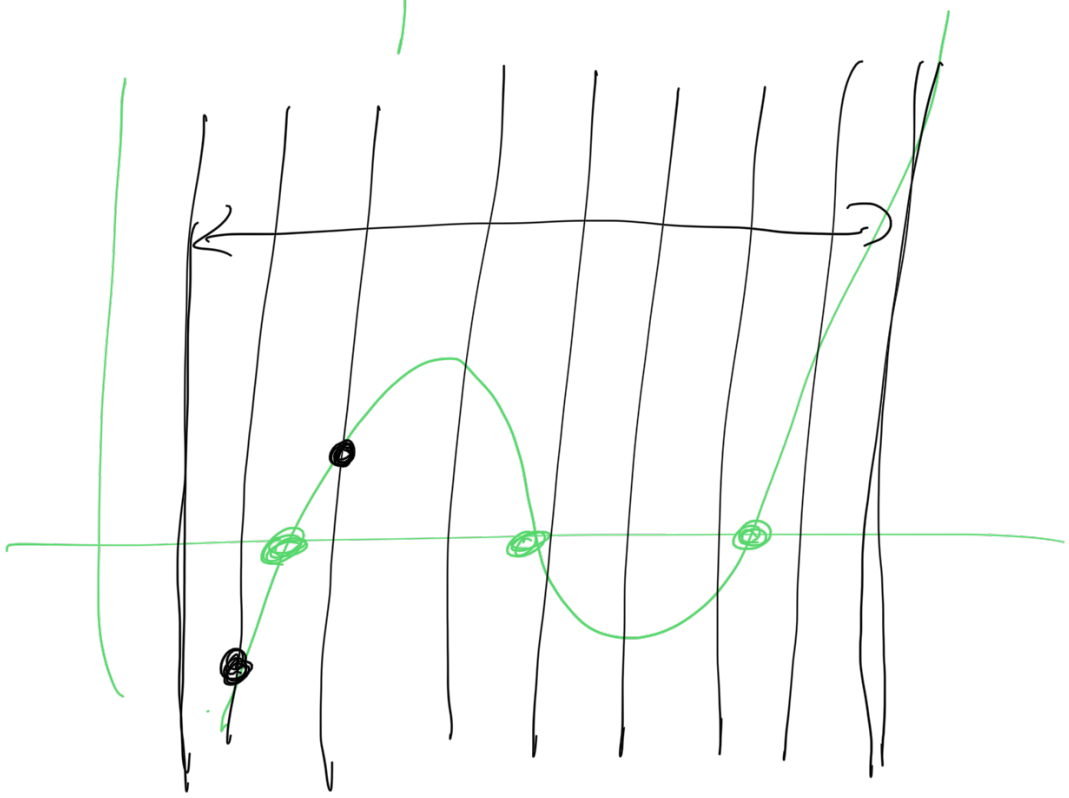
Physics 421 / PCSE 503

Lecture 4

Labour Day



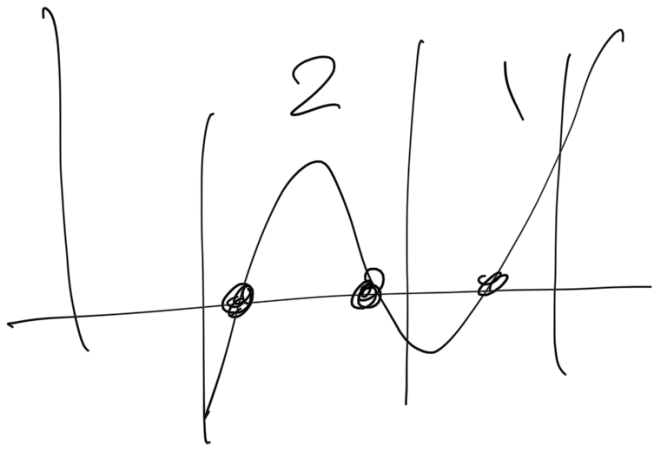
# of slices → (2) 500

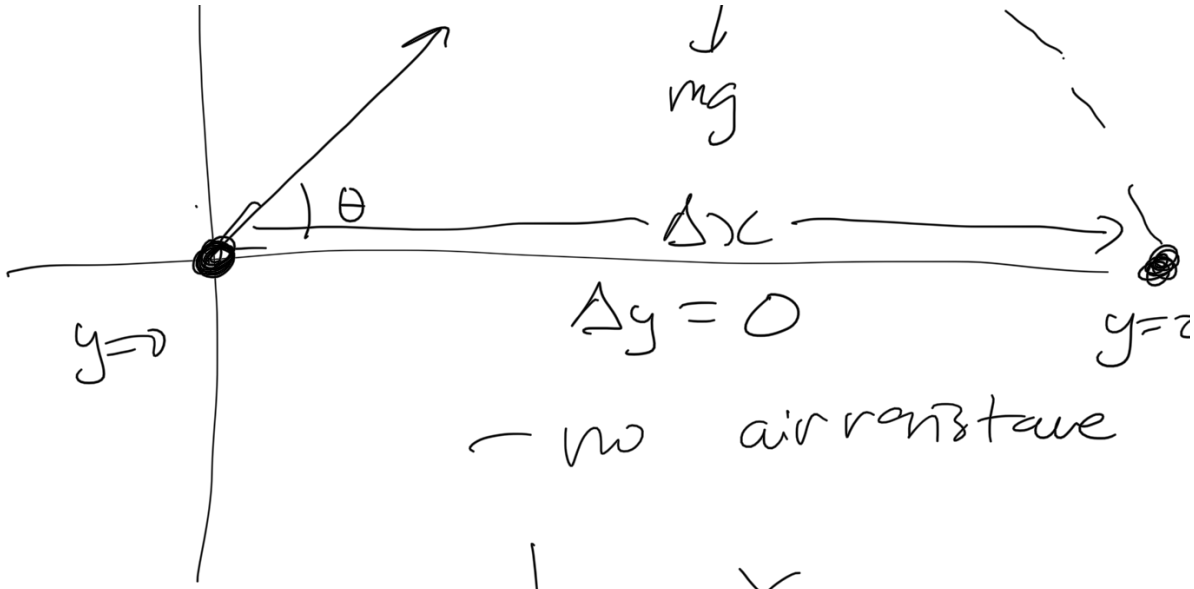
10000 1

$$\text{interval size} = \frac{\#\text{ pts}}{\#\text{ slices}}$$

$$= \frac{10000}{\#\text{ slices}}$$

3333 ↳ # slices = 3





– no air resistance

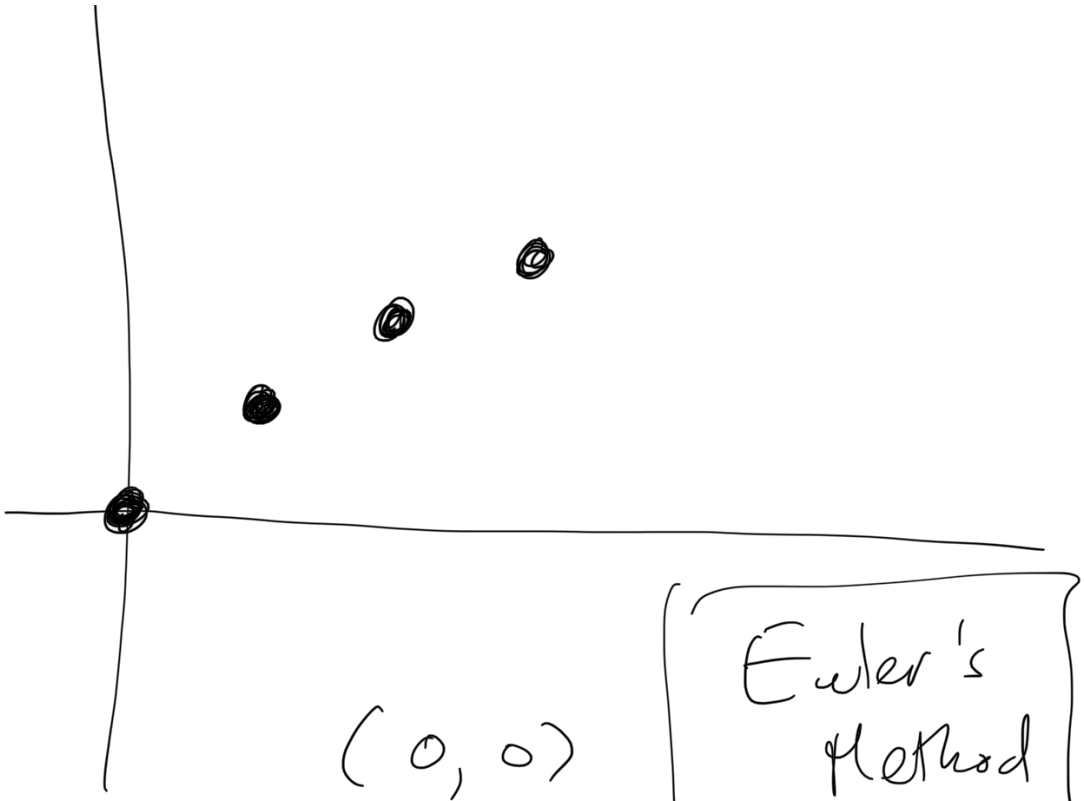
X	Y
$a_x = 0$	$a_y = -g$ ✓
$v_{ix} = v\cos\theta$	$v_{iy} = v\sin\theta$ ✓
$t = t$	$\Delta y = 0$ ✓
	$t = t$

$\Delta x = v_{ix} t$

$\Delta x =$ ——

$\Delta y = v_{iy} t + \frac{1}{2} a_y t^2$

$t =$ ——



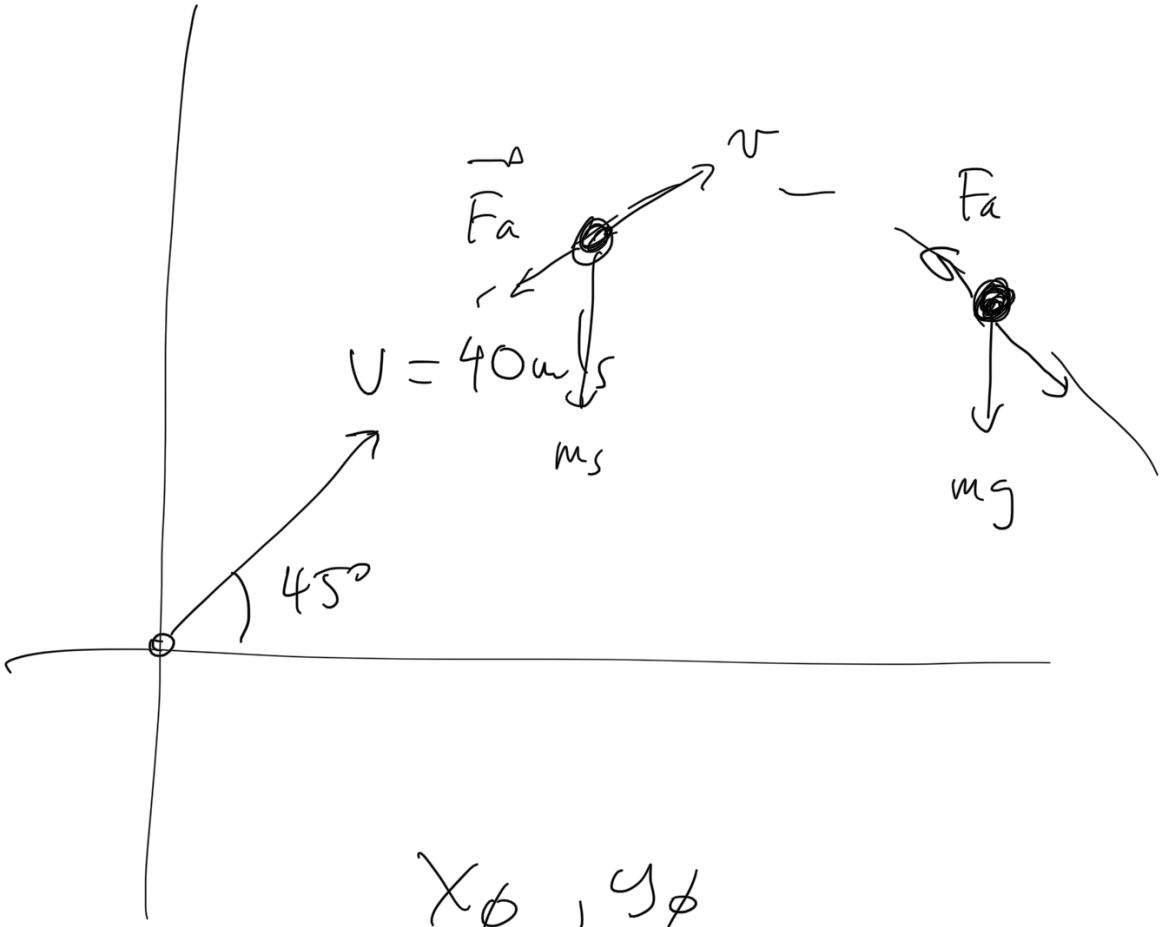
Euler's Method

$$\Delta t = .001 \text{ s}$$

$$v_f = v_i + at$$

$$v_{fx} = v_{ix} + a_x t^0$$

$$v_{fy} = v_{iy} + a_y t$$



x_ϕ , y_ϕ

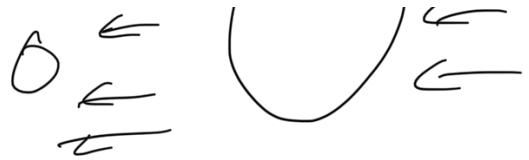
$= 0 \quad \uparrow$

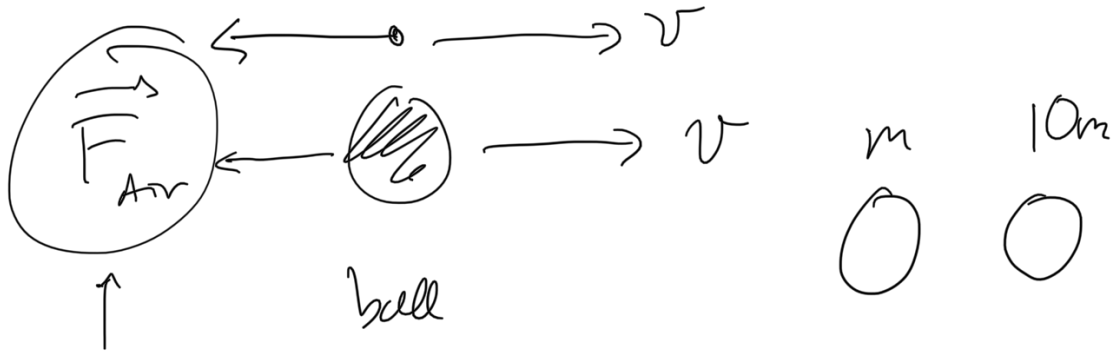
0.001

$v_0 = 40\ m/s \rightarrow 80\ mph$

NO! $125\ m \rightarrow 400\ ft.$

air resistance





air

nasty physics

$$|\vec{F}_{air}| = \frac{1}{2} C_D \rho A v^2$$

$$\vec{F}_a$$

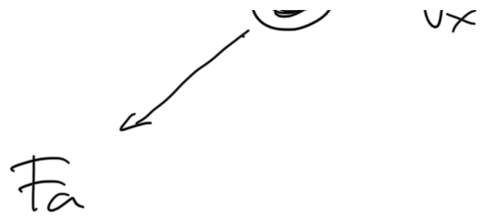
$$m$$

?

$$V_f = v_i + at$$

$$|\vec{v}| \cdot \vec{v}$$

$$F_{air}^{x} = C \cdot |\vec{v}| v_x$$



$$F_{ar}^{y} = C \cdot (|\vec{v}|)$$