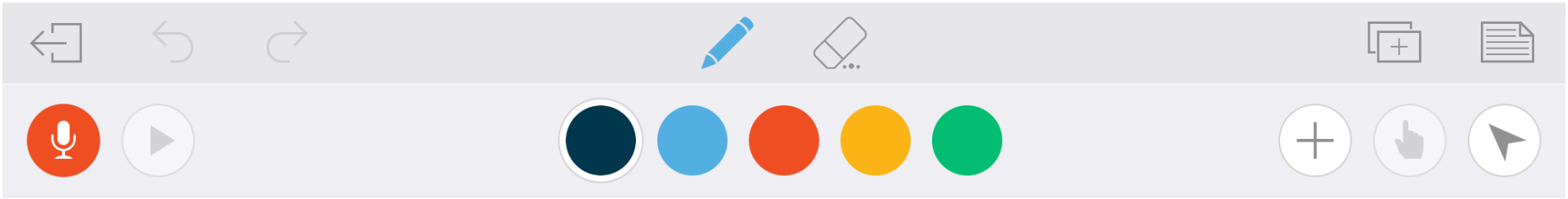


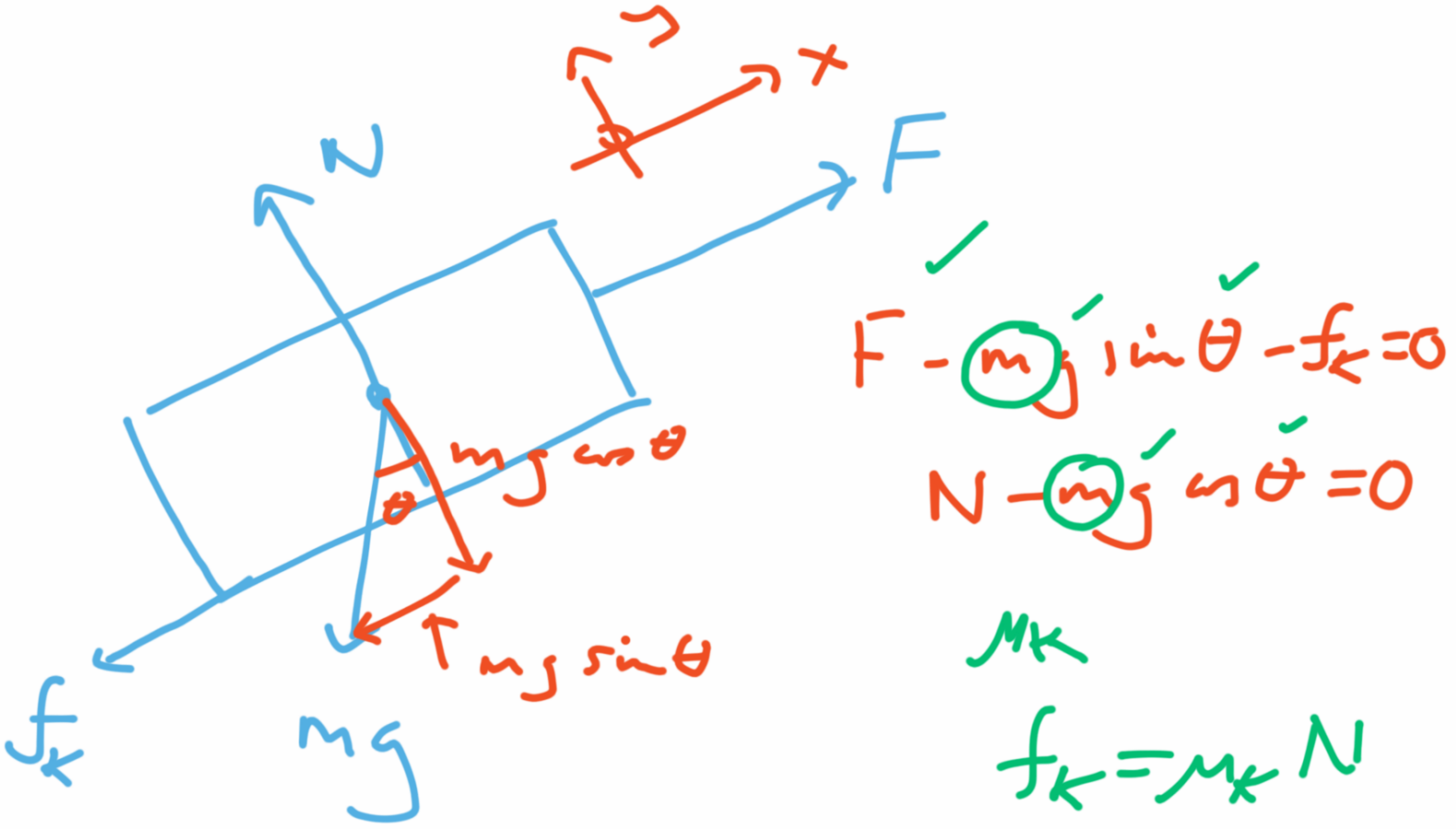
Friday, March 27, 2020

"Constant speed"

$\vec{a} = 0$

$a_x = 0, \quad a_y = 0$

$\Sigma F_x = 0, \quad \Sigma F_y = 0$


y
x
N
F
$mg\cos\theta$
θ
$mg\sin\theta$
f_k
mg
$F - mg\sin\theta - f_k = 0$
$N - mg\cos\theta = 0$
μ_k
$f_k = \mu_k N$

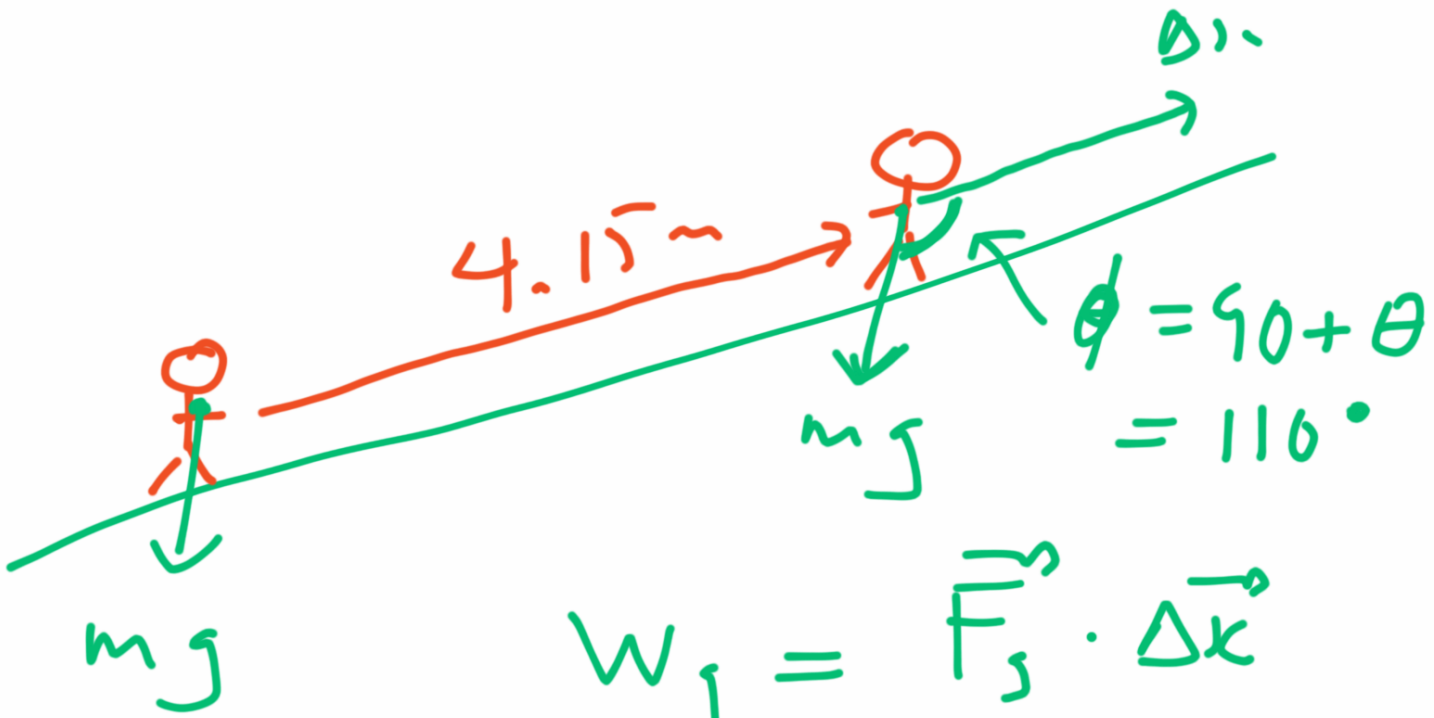
$$W_{man/earth} = \vec{F} \cdot \Delta\vec{x}$$

$$= |\vec{F}||\Delta\vec{x}| \cos\theta \quad (\theta = 0^\circ)$$

$$= |\vec{F}||\Delta\vec{x}|$$

$$= (515)(4.15)$$

$$= 2137 \text{ J}$$



$$W_g = \vec{F}_g \cdot \Delta\vec{x}$$

$$= (mg)(\Delta x)\cos\phi$$

$$= (mg)(\Delta x)(-.342$$

$(80)(9.8)(4.15)(-.342)$

$= -1113\ \text{J}$

$W_{\text{gas/surroundings}} = 1113\ \text{J}$

$W_{\text{total}} = 1113\ \text{J} + 2137\ \text{J}$

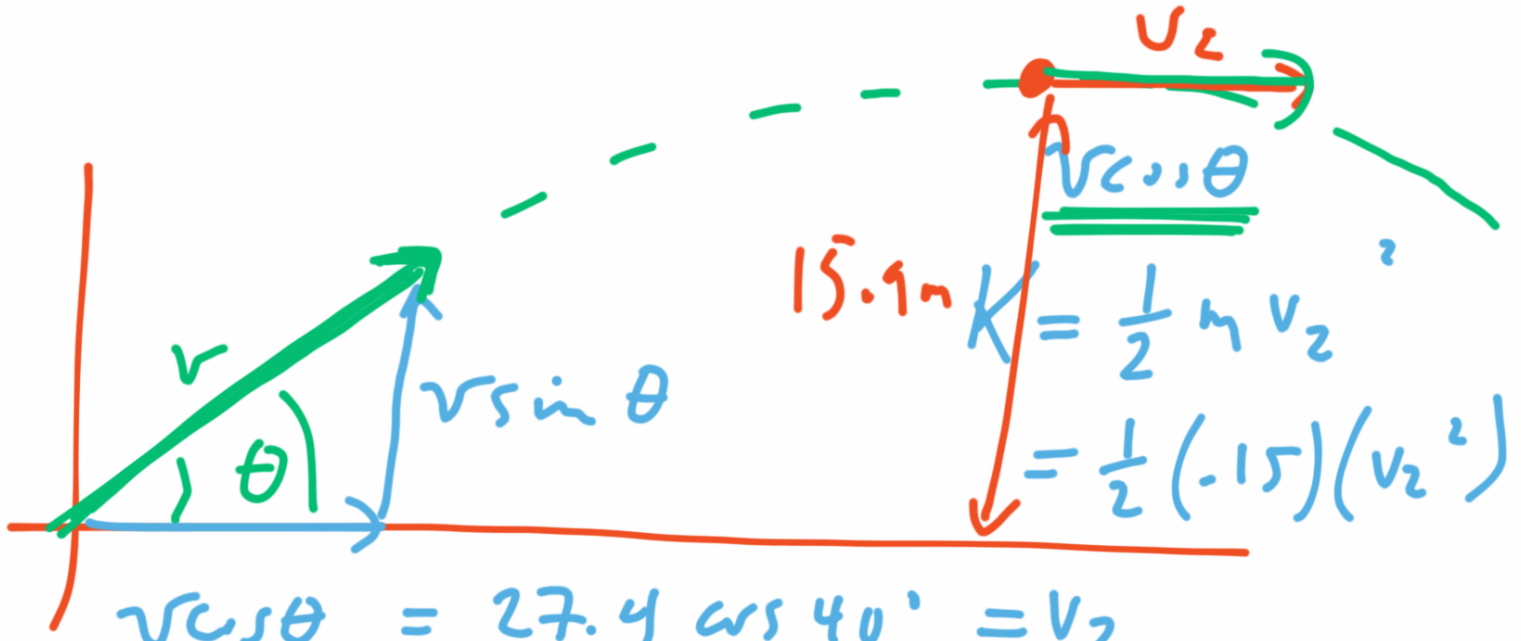
$= 3250\ \text{J}$

10.

$$K = \frac{1}{2} m v^2 = \frac{1}{2}(2004)(36.11)^2 = 1.31 \times 10^6 \text{ J}$$

a) $$v = 130 \frac{\text{km}}{\text{hr}} \times \frac{1000 \text{ m}}{1 \text{ km}} \times \frac{1 \text{ hr}}{3600 \text{ s}}$$

$$= 36.11 \text{ m/s}$$



$K = \frac{1}{2} m v_2^2$

$= \frac{1}{2}(.15)(v_2^2)$

$v\cos\theta = 27.4 \cos 40^\circ = v_2$

$= 33.0\,J$

constant

$a_x = 0$

$a_y = -g$

a)

(b) $K_i = \frac{1}{2} m v^2 = \frac{1}{2}(.15)(27.4)^2$

$= 56.3 \text{ J}$ ✓

$K_f = 33.0 \text{ J}$ ✓

(c) $\Delta K = K_f - K_i = -23.3 \text{ J}$

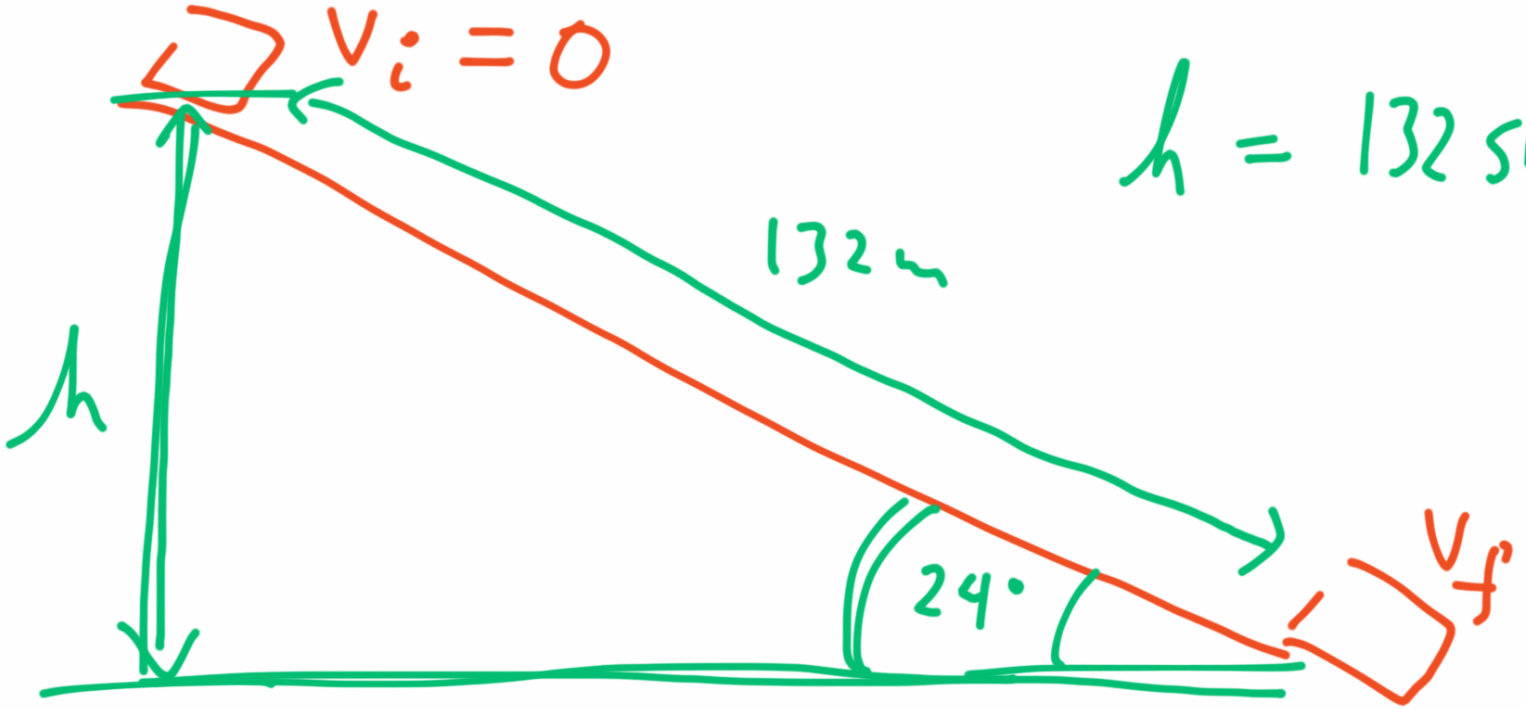
$W_g = \Delta K = -mgh$

$$-mgh = -23.3\ J$$

d) $$h = \frac{-23.3\ J}{-(0.15)(9.8)}$$

$$= 15.9\ m$$

Find q_{xm}



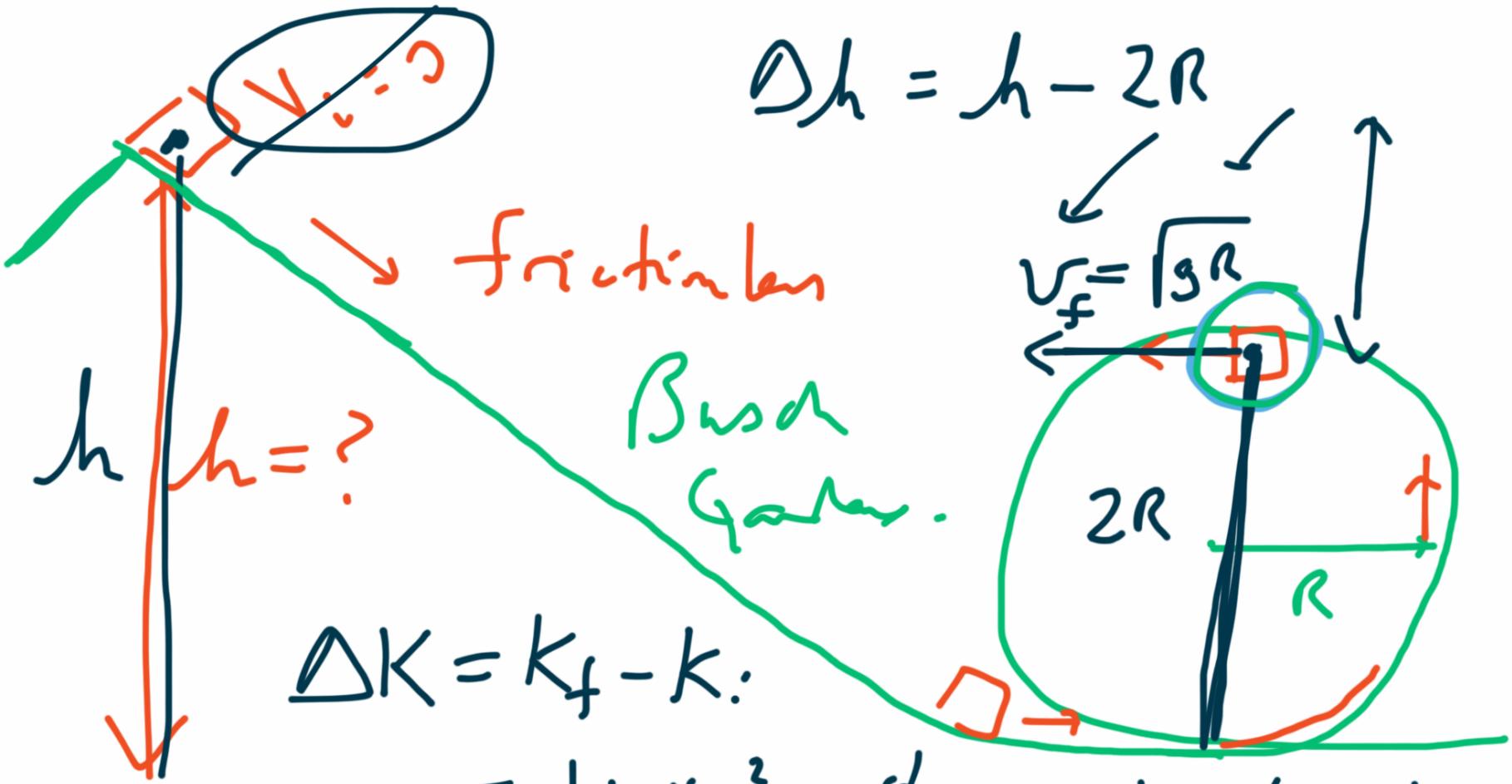
$$W_g = mgh$$

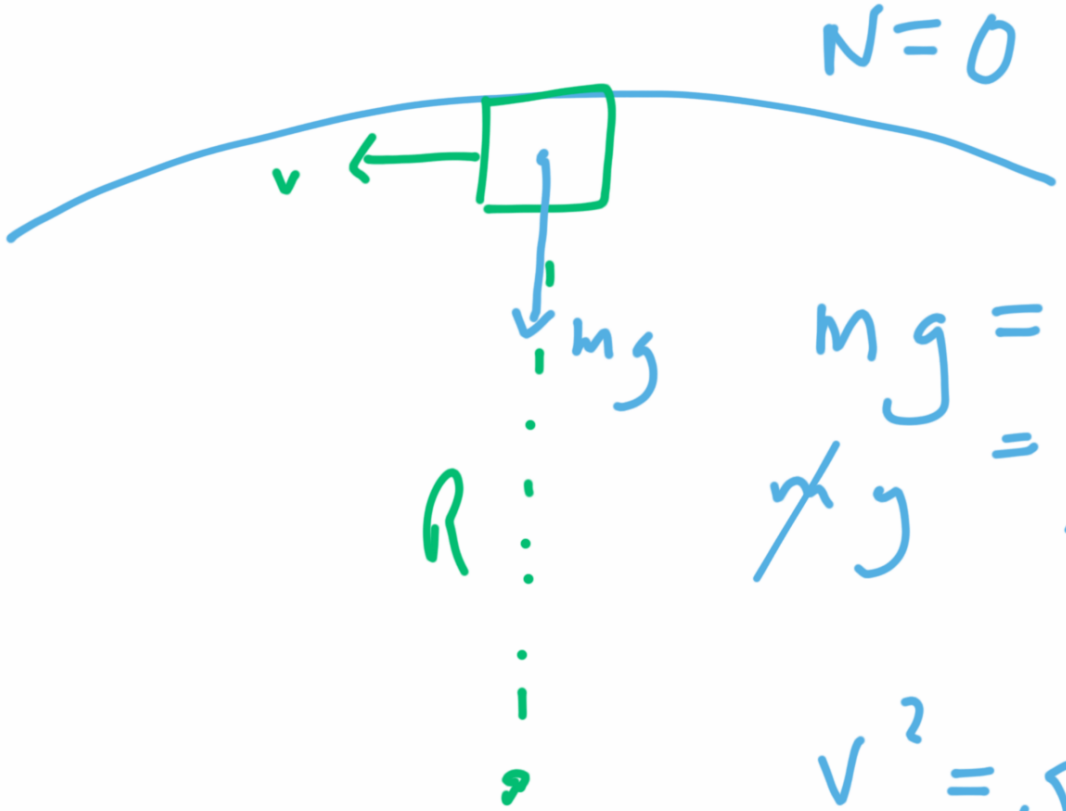
$$W_g = \Delta K$$

$$mgh = \frac{1}{2}mv_f^2 - \frac{1}{2}mv_i^2 \qquad (v_i = 0)$$

$$v_f^2 = 2gh$$

$$v_f = \sqrt{2gh} = 32.4 \text{ m/s}$$


$v_i = ?$
fricción
Bush
Galileo.
h
$h = ?$
$\Delta h = h - 2R$
$v_f = \sqrt{gR}$
$2R$
R
$\Delta K = K_f - K_i$
$= \frac{1}{2} m v_f^2 - \phi$
$= \frac{1}{2} m (gR)$
$\Delta K = \frac{1}{2} m g R$



$$mg = ma$$

$$\cancel{m}g = \frac{\cancel{m}v^2}{R}$$

$$v^2 = gR$$

$$\boxed{v = \sqrt{gR}}$$

$$W_g = mg\,(\text{change in height})$$

$$= mg(h - 2R)$$

$$= \Delta K = \frac{1}{2}mgR$$

$$mg(h - 2R) = \frac{1}{2}mgR$$

$$h - 2R = \frac{1}{2}R$$

$$h = 2R + \frac{1}{2}R$$

$$\boxed{h = \frac{5}{2}R}$$

✓✓

Due Date: midnight on Monday

Momentum & Collisions

+

Rotational Motion.