Final → ∞ | 5 attempts

25% HW × 100/80

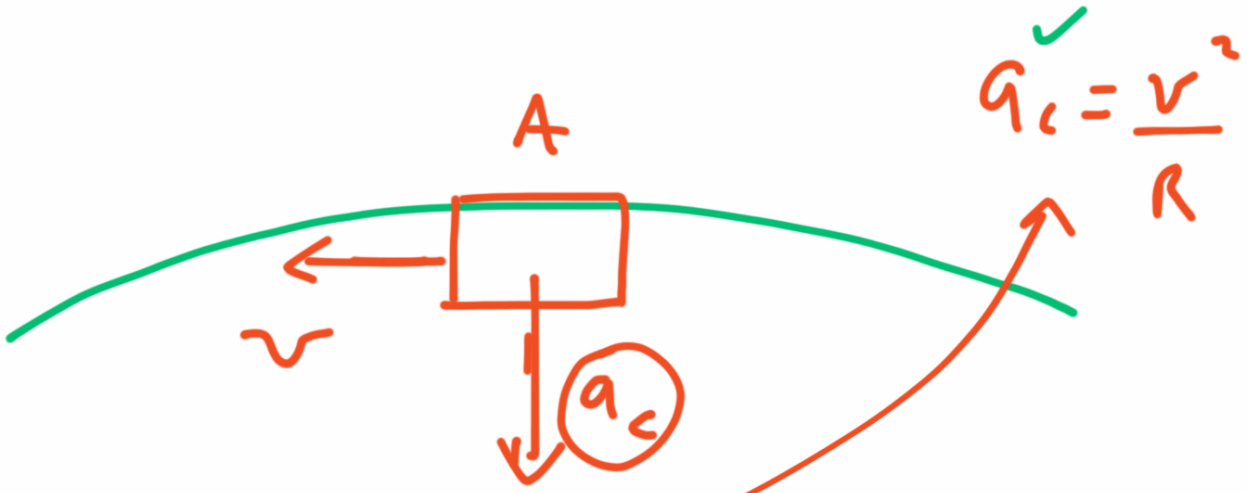
20% T1 × 100/80

~~20% T2~~

↳ 35% Final 100/80

80%

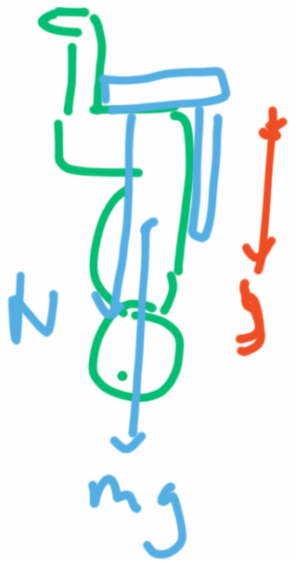
a) 5
b) 5
c) 5
d) 5



$$\Sigma F_y = m a_y$$

$$mg + N = m a_y$$

$$mg + N = m\frac{v^2}{R}$$

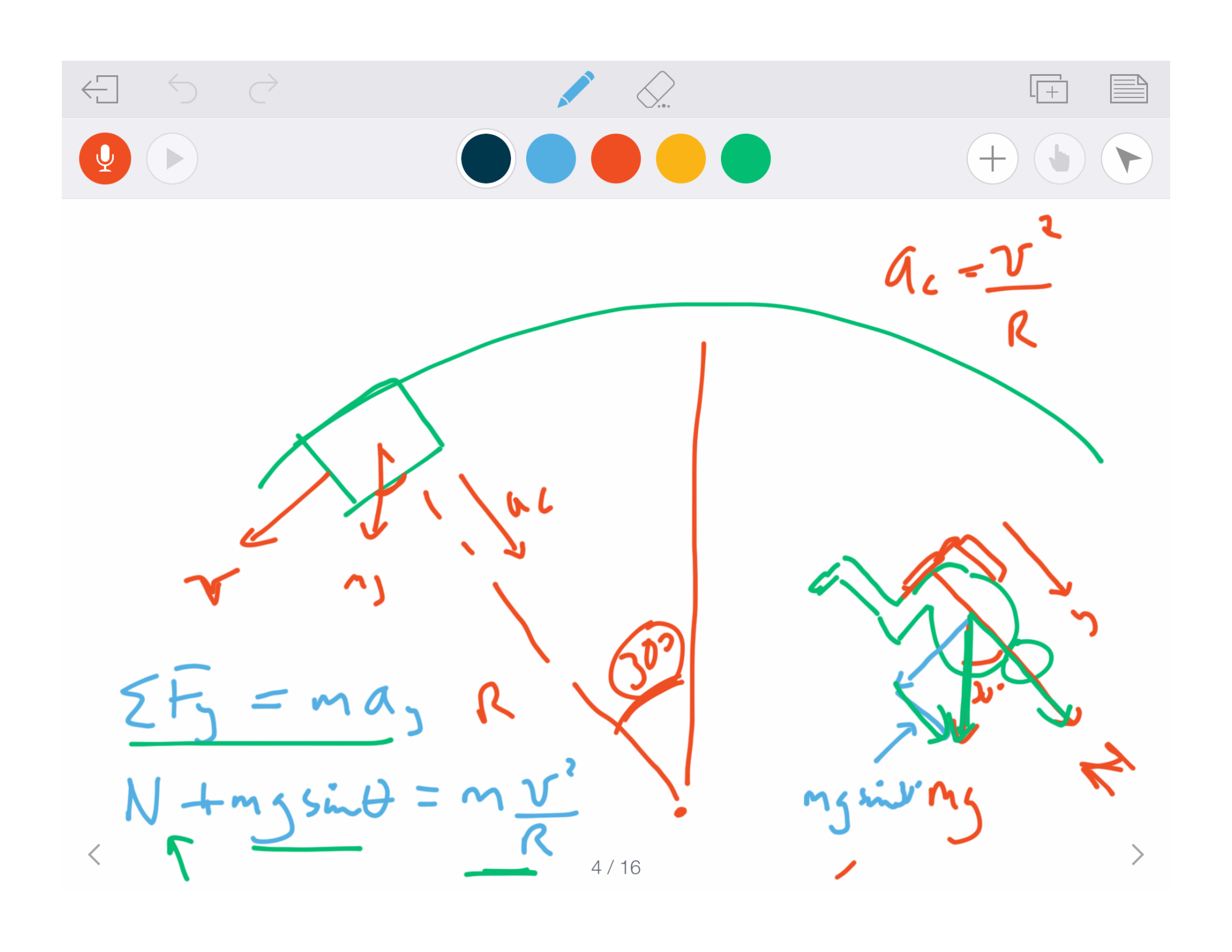


$$N = m\frac{v^2}{R} - mg$$

$$= m\left(\frac{v^2}{R} - g\right)$$

$$= 40\left(\frac{15.0^2}{8.6} - 9.8\right)$$

$$= 655\ \text{N}$$

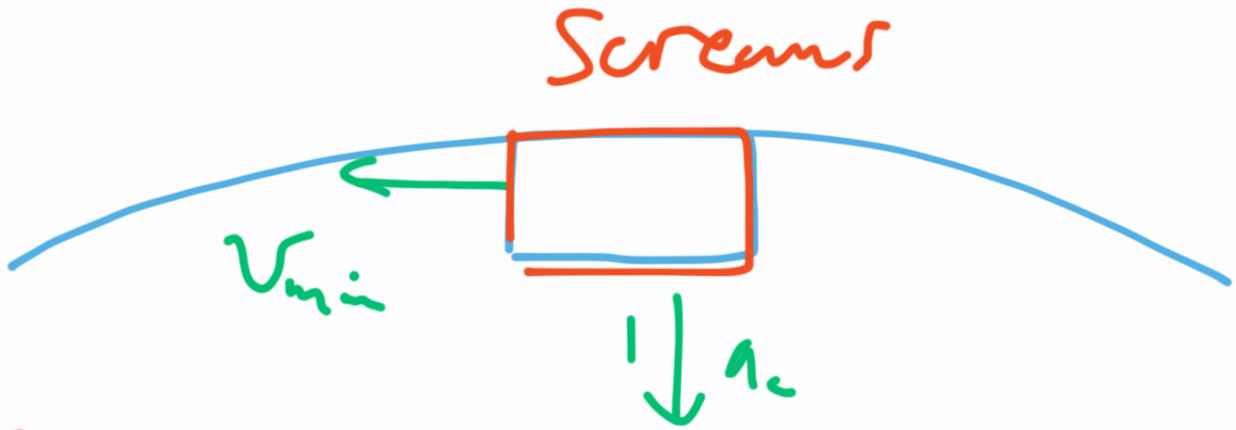

$a_c = \frac{v^2}{R}$
a_c
v
$\hat{j}$
R
30°
$\Sigma F_j = m a_j$
$N + mg\sin\theta = m\frac{v^2}{R}$
$mg\sin\theta$
mg
N

$$N = \frac{mv^2}{R} - mg\sin 60°$$

bigger smaller

$$= 807\ N$$

4) $N = \frac{mv^2}{R} - mg$ (sin θ)

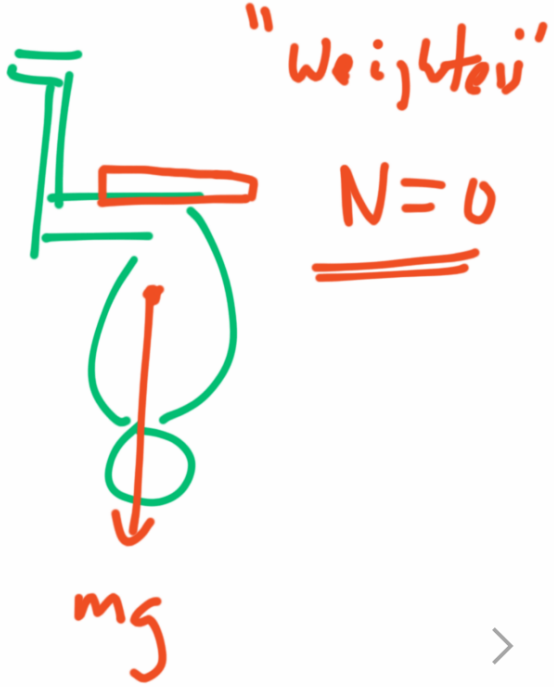


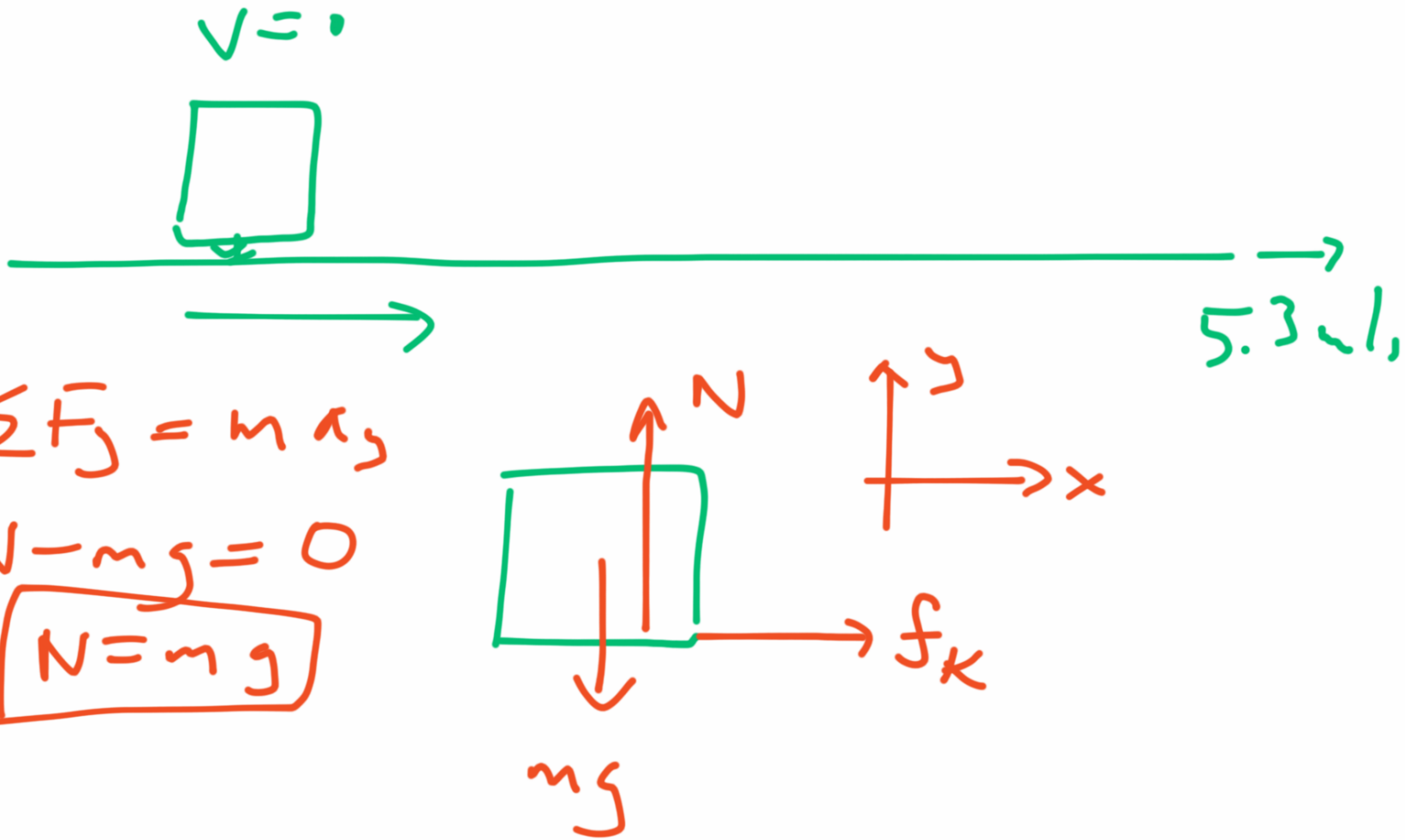
$$\Sigma F_y = ma_y$$

$$mg = m\frac{v_{min}^2}{R}$$

$$v_{min} = \sqrt{gR}$$

$$= 9.18\ m/s$$




V = 0
5.3 m/s
ΣFy = may
N − mg = 0
N = mg
N
y
x
fk
mg

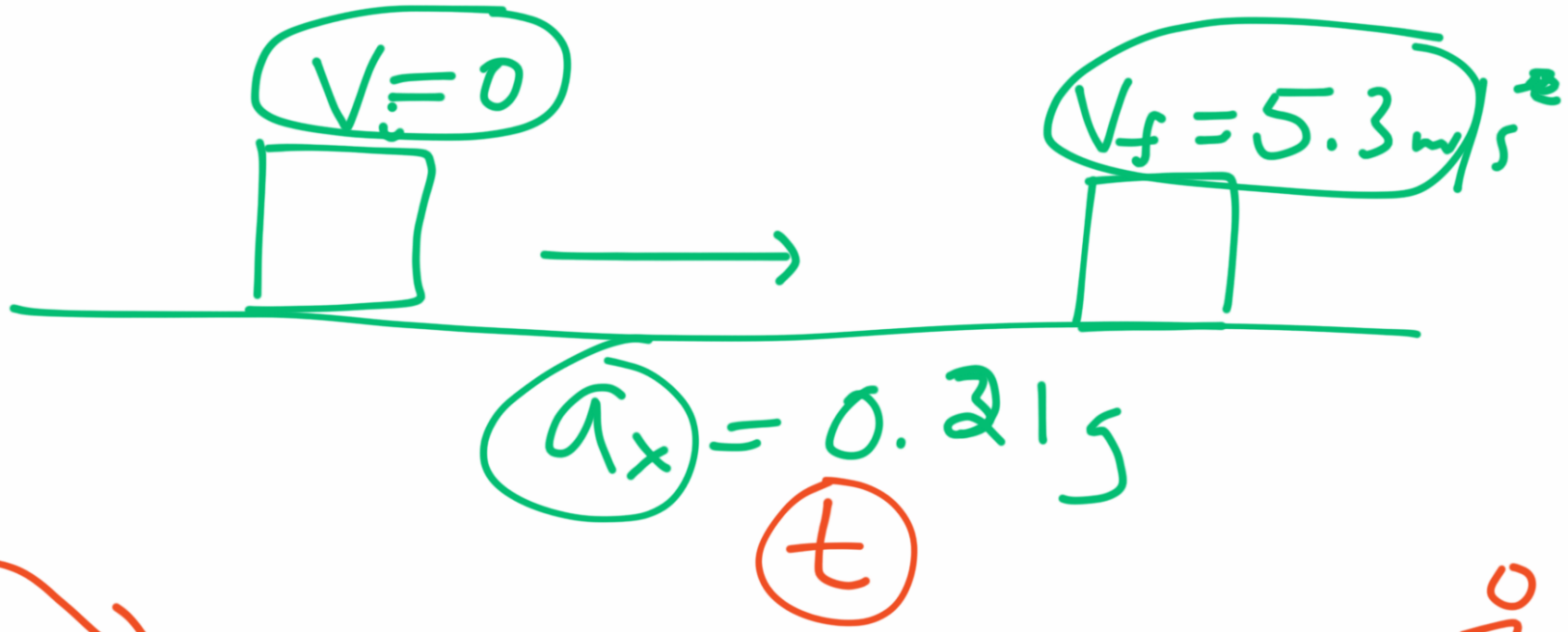
$$\Sigma F_x = m a_x$$

$$f_k = m a_x$$

$$\mu_k N = m a_x$$

$$\mu_k m g = m a_x$$

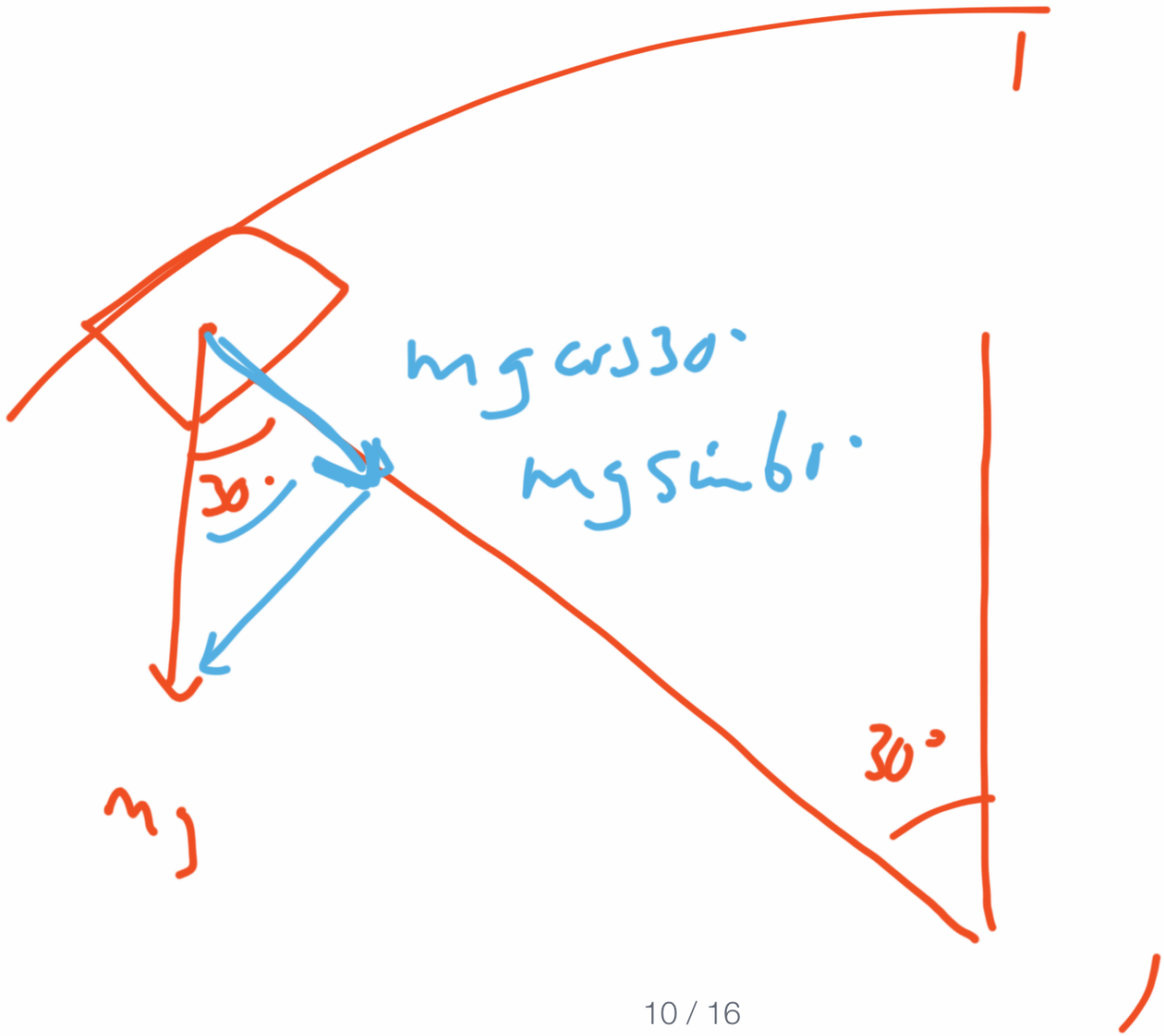
$$\boxed{a_x = \mu_k g = (0.21)(9.8)}$$

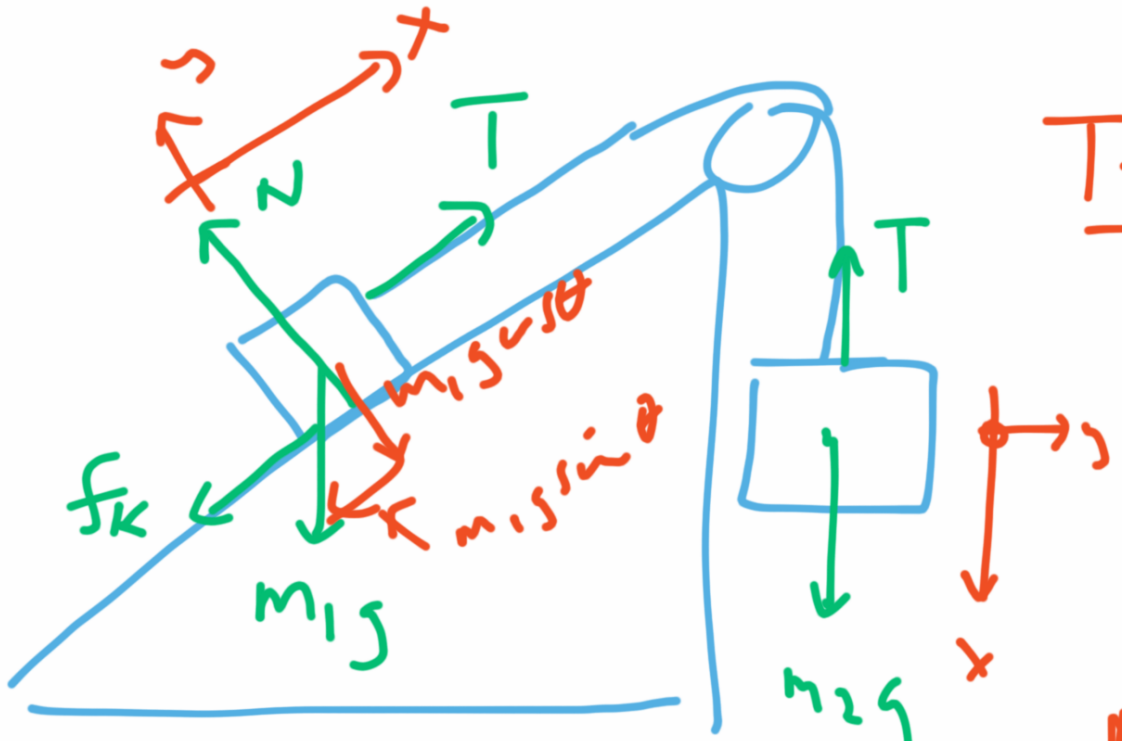


$$a = \frac{v_f - v_i}{t} \rightarrow t = \frac{v_f - v_i}{a}$$

$$t = \frac{5.3}{(0.21)(s)}$$

$$\boxed{t = 2.58\ s}$$


T
mg cos30°
mg sin60°
30°
30°
mg



$$\sum F_x = m a_x$$

$$T - f_k - m_1 g \sin\theta = m_1 a_x$$

$$\sum F_y = m a_y = 0$$

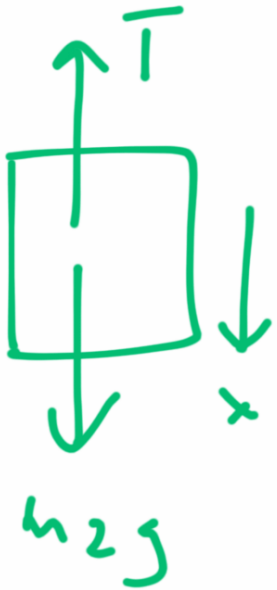
$$N - m_1 g \cos\theta = 0$$

$$N = m_1 g \cos\theta$$

$$f_k = \mu_k m_1 g \cos\theta$$

$$T - \mu_k m_1 g \cos\theta - m_1 g \sin\theta = m_1 a_x$$

$T - \mu_K m_1 g \cos\theta - m_1 g \sin\theta = m_1 a_x$



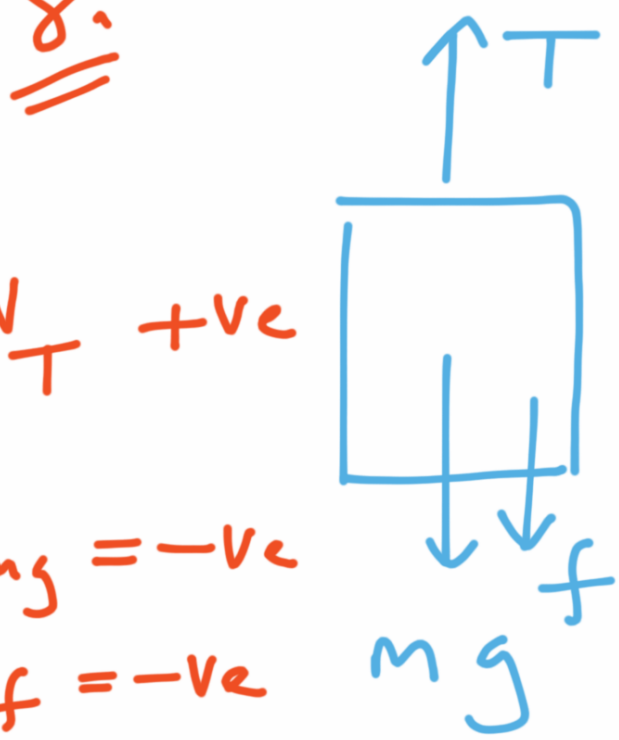
$+$

$m_2 g - T = m_2 a_x$

$m_2 g - \mu_K m_1 g \cos\theta - m_1 g \sin\theta = (m_1 + m_2) a_x$

$$a_x = \left(\frac{m_2 - \mu_k m_1 \cos\theta - m_1 \sin\theta}{m_1 + m_2} \right) g$$

$$= 2.43 \text{ m/s}^2$$



$f \approx 140\ N$

W_T +ve

W_{mg} = −ve

W_f = −ve

Work-Energy Theorem

$W_{all\ forces} = 0$

$W_{all\ forces} = \Delta K$

$= \frac{1}{2}m(\quad)^2 - \frac{1}{2}m(\quad)^2$

$= 0$

$$W_T + W_{ms} + W_f = 0$$

$$W_T + (-mgh) + (-fh) = 0$$

$$W_T = mgh + fh$$

$$= 636{,}090 \text{ J}$$

$$(6.36 \times 10^5)$$

b) $W_{mg} = -mgh$

$= -630,630\ J$

c) $W_f = -fh$

$= -5460\ J$

d) $W_{Tmax} = 0$

d) W_T