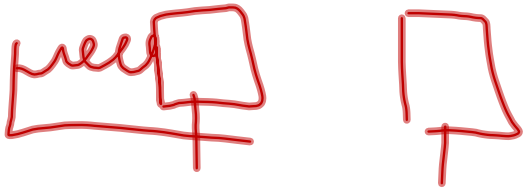


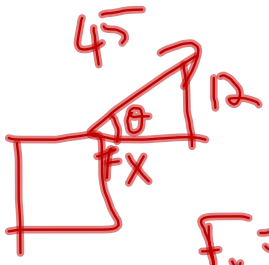
$x = -5cm$ $x = 0$

$W_{nc} = \Delta KE$

$\cancel{\frac{1}{2}kx_i^2} - \frac{1}{2}kx_f^2$

$(-\frac{1}{2})(500)(.05m)^2$

$= .625J$

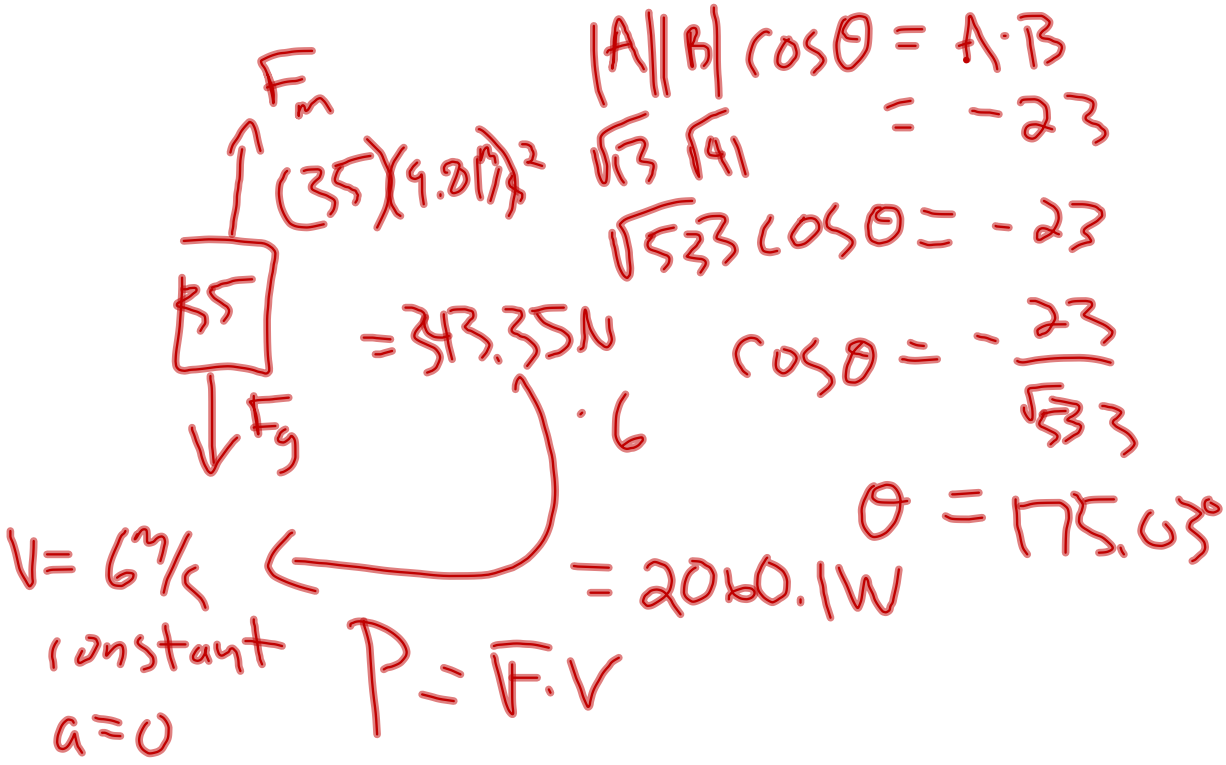


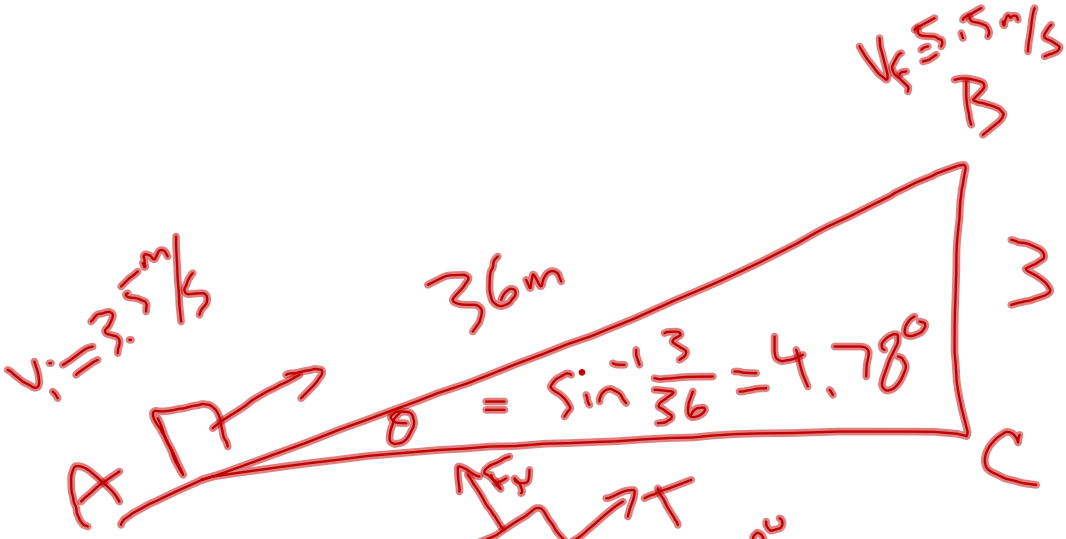
$F_x = \sqrt{45^2 - 12^2}$

$\cancel{\frac{1}{2}mv_f^2} - \frac{1}{2}mv_i^2$

$(43.37)(4)$ $\frac{1}{2}mv^2 = .625$

$= 173.48\ N \cdot m$ $v = .707\ m/s$


F_m
$(35)(9.81)^2$
$= 343.35N$
F_g
$V = 6 m/s$
constant
$a = 0$
$|A||B|\cos\theta = A \cdot B$
$\sqrt{13}\sqrt{41}\cos\theta = -23$
$\sqrt{533}\cos\theta = -23$
$\cos\theta = -\frac{23}{\sqrt{533}}$
$\theta = 175.03°$
$\cdot 6$
$= 2060.1W$
$P = F \cdot V$



$m = 3.45\ kg$

$a = constant$

No friction

$F \cdot v_{av}$

$$v_f^2 = v_i^2 + 2a\Delta x$$

$$5.5^2 = 3.5^2 + 2a(36)$$

$$a = .25\ m/s^2$$

$$v_{av} = \frac{5.5 + 3.5}{2} = 4.5\ m/s$$

$$\frac{x}{T}$$

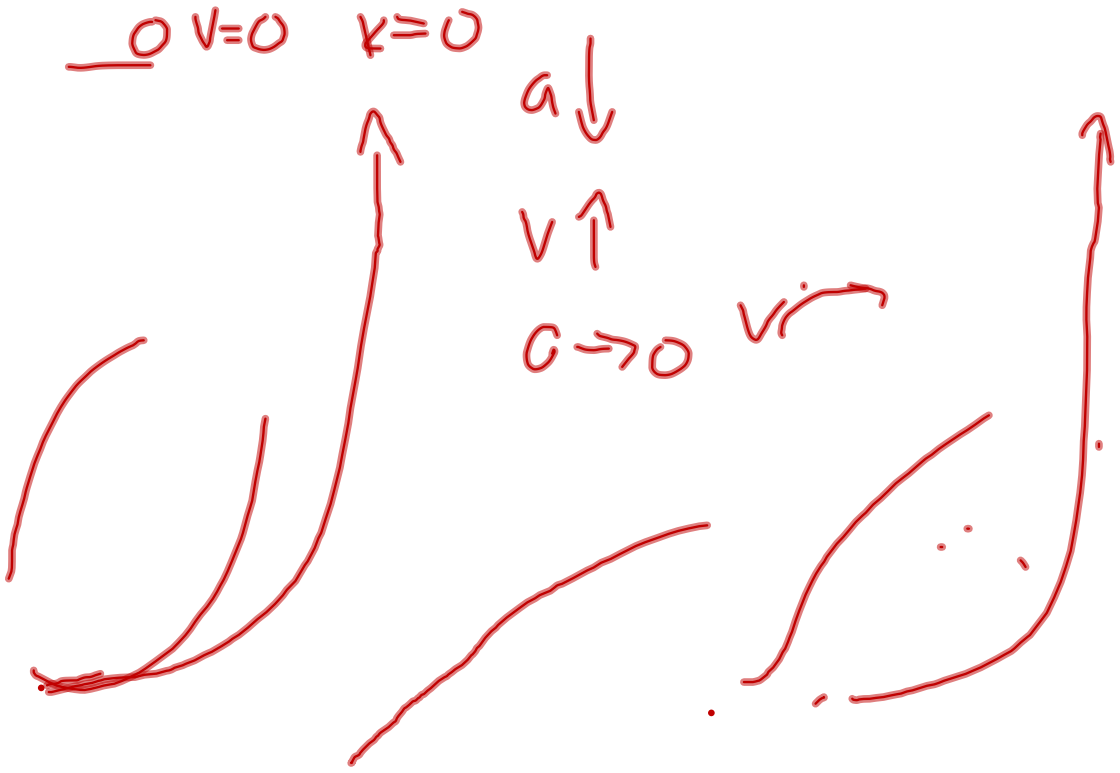
$$-mg\sin 4.78 = (3.45)(9.81)(\sin 4.78°) = 2.82$$

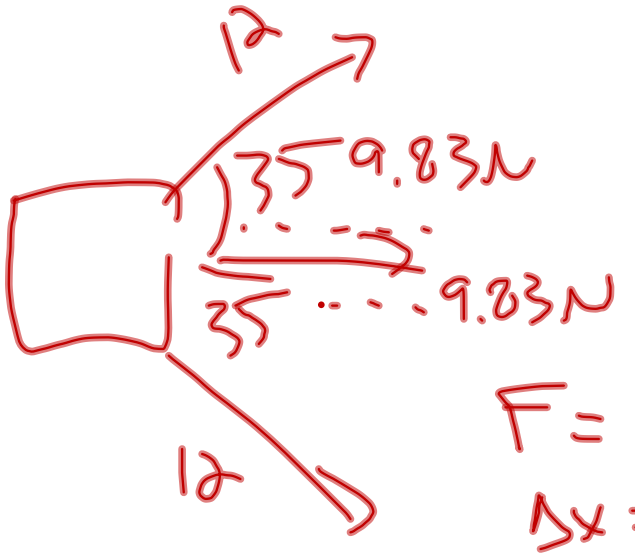
$$\frac{}{ma}$$

$$T - 2.82 = ma$$

$$T = ma + 2.82 = 3.6825\ N$$

$$P = 16.5\ W$$


v=0
k=0
a
v
c→0
v



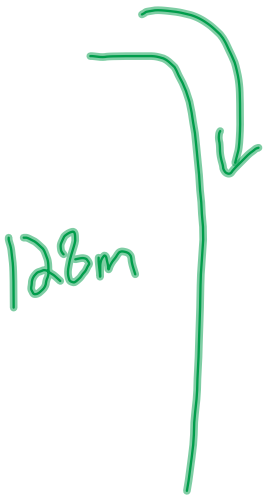
$F = 19.66N$

$\Delta x = 15m$

$2 \cdot 12 \cdot \cos 35 \cdot 15$

$F\Delta x = 19.66(15)$

$= 294.9J$



$$\dot{m} = \frac{dm}{dt} = 1.4 \times 10^6 \text{ kg/s}$$

$\frac{1}{2}U \Rightarrow$ Electric

$P = ?$

$$P = \frac{1}{2}\frac{\Delta U}{\Delta t}$$

$$= \frac{1}{2}\frac{d(mgh)}{dt} = \frac{1}{2} g \cdot h \cdot \frac{dm}{dt}$$

$$= \frac{1}{2}\left(9.81 \frac{m}{s^2}\right)(128\,m)\left(1.4 \times 10^6 \text{ kg/s}\right)$$

$$= 879 \text{ MW}$$

#25

F_x

$U = \frac{C}{x}$

C = constant

$= \frac{C}{x}$ $U = C \cdot x^{-1}$

$\frac{dU}{dx} - C x^{-2}$

* $dU = -\vec{F} \cdot d\vec{l}$ because $F \Rightarrow F_x$

$dU = -F_x dx$

$F_x = -\frac{dU}{dx}$

a) $= C x^{-2}$ or $\frac{C}{x^2}$

b) $x > 0$ Away from origin

$x < 0$ Towards origin

c) $x > 0$

$U \downarrow 0$

d) C is neg.

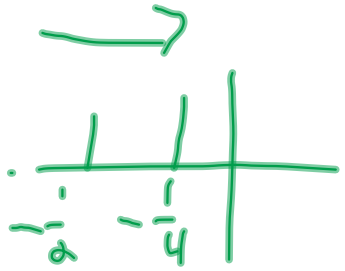
what happens. F_x

$x > 0$ Towards origin.

$x < 0$ Away from origin

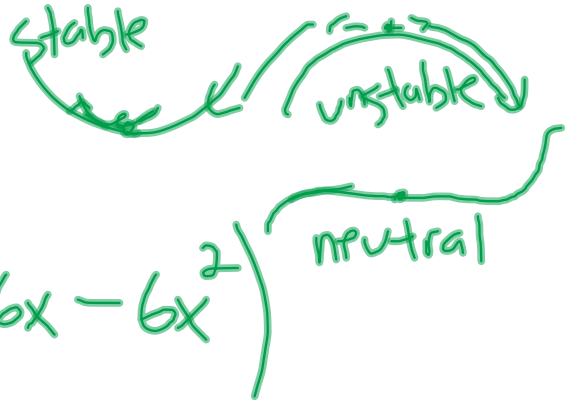
$U = -\frac{C}{x}$ $x > 0$

$U \uparrow$



#28

$U(x) = 3x^2 - 2x^3$



a) $F_x = -\frac{dU}{dx} = -(6x - 6x^2)$

$6x^2 - 6x \quad 6x(x-1)$

b) $= 0$

$x = 0$
$x = 1$
} equilibrium points

c) $12x - 6$ $x = 0$ - Unstable
$x = 1$ + Stable

Conservation of Mech. Energy

$K = KE$

$W_{total} = \Delta KE_{system} = \Delta K_{system}$

$= W_{ext} + W_{int.\ cons.} + W_{int.\ noncons.}$

$= W_e + W_c + W_{nc}$

$-W_c = \Delta U$

$W_{total} = W_e + W_{nc} - \Delta U$

$\Delta K = W_e + W_{nc} - \Delta U$

Total Mechanical Energy

$= K + U$

$\Delta K + \Delta U = \Delta ME$ or ΔE_{mech}

so $\Delta E_{mech} = W_{ext} + W_{nc}$

$W_{ext} = \Delta E_{mech} - W_{nc}$