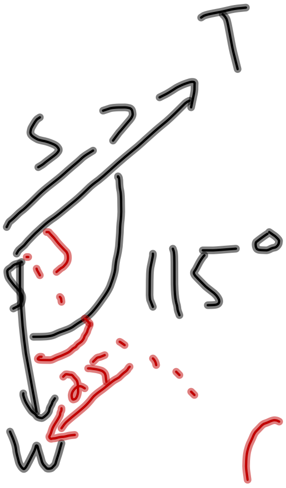
$$W = F_x \Delta x$$

$$W = F_x \Delta x$$

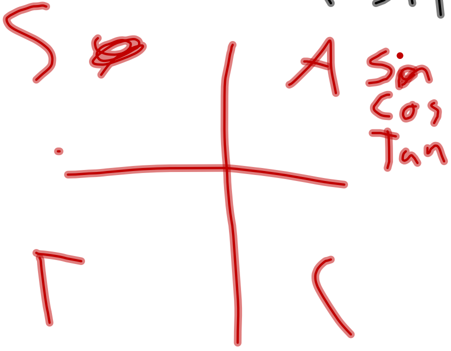
$$W_T = ST$$

$$W_W = -W\sin 25 \cdot s$$



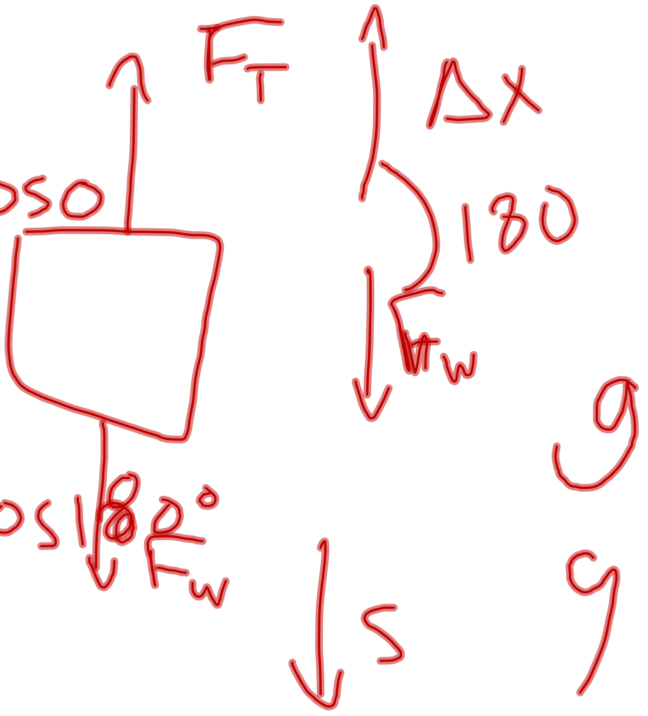
$$W_w = W\cos 115 \cdot s$$

$$\cos 115 = -\sin 25$$



$$W_{F_T} = F_T \Delta x \cos 0$$

$$W_{F_w} = F_w \Delta x \cos 180°$$



$$W = F_x \Delta x \text{ or } F\cos\theta\,\Delta x$$

↗ individual Force + Individual
work

$$\text{Total Work} = \sum W = W_{net}$$

$$W_{net} = F_{net_x} \Delta x$$

$$W_{net} = \underbrace{ma \cdot \Delta x}$$

$$v_f^2 = v_i^2 + 2\boxed{a\Delta x}$$

$$\frac{-v_i^2 \quad -v_i^2}{2 \qquad\quad 2}$$

$$a\Delta x = \boxed{\frac{v_f^2 - v_i^2}{2}}$$

$$W_{net} = m\left(\frac{v_f^2 - v_i^2}{2}\right)$$

$$= \tfrac{1}{2}m(v_f^2 - v_i^2)$$

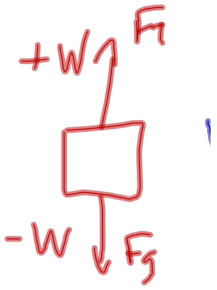
$$= \tfrac{1}{2}mv_f^2 - \tfrac{1}{2}mv_i^2$$

$$= KE_f - KE_i$$

$$W_{net} = \Delta KE$$

$$-\left(\vec{F}_T\right)\left(\vec{\Delta x}\right) = \tfrac{1}{2}mv_f - \tfrac{1}{2}mv_i^2$$

$$W_{net} = 0$$



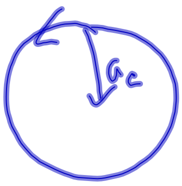
$$\Rightarrow F_{net} = 0$$

$$\Rightarrow a = 0$$

$$\Rightarrow v = \text{constant}$$

$$a_c = \frac{v^2}{r}$$

$$a \neq 0$$



$$F_{net} \neq 0$$

$$\Delta KE = \boxed{W_{net}\ ?} \begin{matrix} = 0 \\ \neq 0 \end{matrix}$$

W = Change in energy state

Mechanical Energy

- Energy of position & movement

Kinetic Energy $= \frac{1}{2}mv^2$
- Energy of motion

Potential Energy → Has possibility to change it's energy state

Units = J

Gravitational

mgh

mass → m

gravity → g

height relative to some other point. i.e. Δy → h

Elastic/Springs

$= \frac{1}{2}kx^2$

Spring constant → k

Displacement from equilibrium → x

Law of Conservation of Mechanical Energy.

In the absence of any external forces or non-conservative forces or enery, in a system Mechanical Energy is Conserved.

$$ME_i = ME_f$$

$$PE_i + KE_i = PE_f + KE_f$$

m = .1238kg

$mgh = PE = .935J$

$\frac{1}{2}mv^2 = KE = 0$

$.935 = \frac{1}{2}mv^2$

77m

$= \frac{1}{2}(.1238)v^2$

$.935 = .0619v^2$

$v^2 = 15.1$

$v = 3.89 m/s$

$PE = mgh = 0$

$KE = \frac{1}{2}mv^2 = .935$

$W = F_x \Delta x$

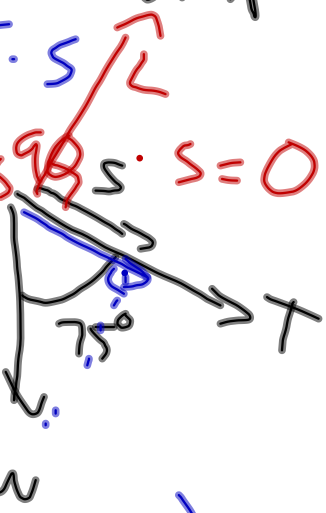
$W = F\cos\theta\,\Delta x$

* as long θ = between the displacement + force

$= T\cos\theta \cdot s$

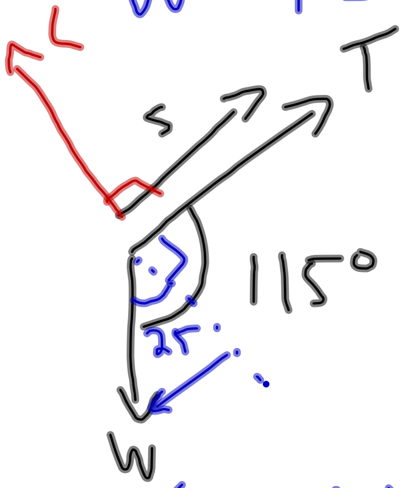
$W_T = T \cdot s$

$W_L = L \cdot \cos 90 \cdot s = 0$



$W_W = (W\cos 75)\cdot s$

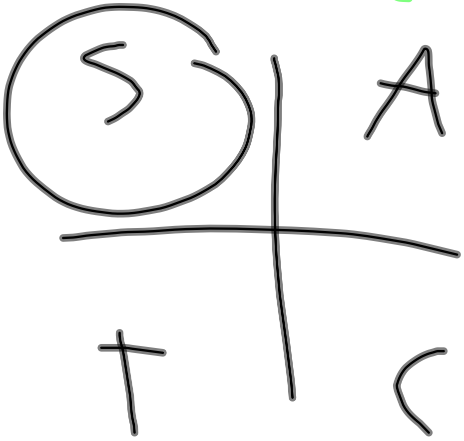
$W = T \cdot s$

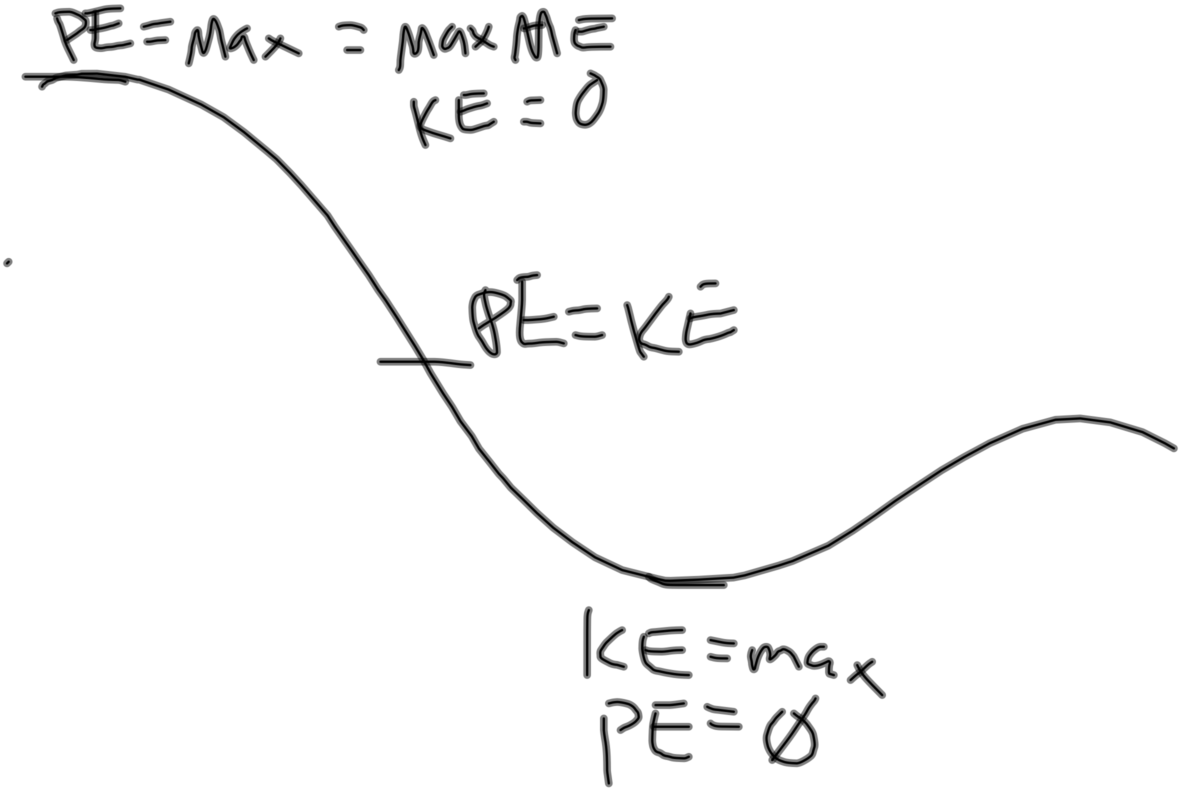


$W_W = (-W\sin 25)\cdot s$

$W_W = (W\cos 115)\cdot s$

$-\sin 25 = \cos 115$




PE = max = max ME
KE = 0
PE = KE
KE = max
PE = 0

$$W_{net} = F_{net_x} \Delta x \qquad KE = \frac{1}{2} m v^2$$

$$= m \boxed{a \cdot \Delta x}$$

$$V_f^2 = V_i^2 + 2 \boxed{a \Delta x}$$

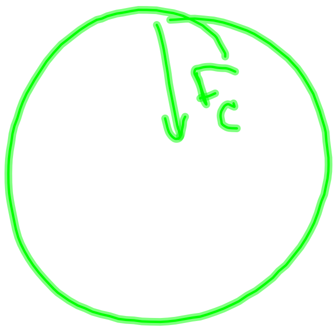
$$\frac{V_f^2 - V_i^2}{2} = \frac{\cancel{2} a \Delta x}{\cancel{2}}$$

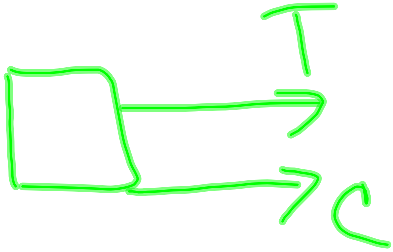
$$= m \cdot \left(\frac{V_f^2 - V_i^2}{2} \right)$$

$$= \frac{1}{2} m \left(V_f^2 - V_i^2 \right)$$

$$= \frac{1}{2} m V_f^2 - \frac{1}{2} m V_i^2$$

$$= \Delta KE$$





$T \cdot \Delta x$

$a = \frac{v^2}{r}$

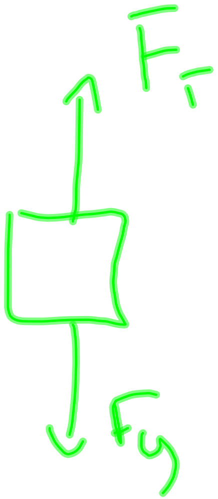
$\Delta KE = KE_f - 0 = W_{net}$

$= \underset{\uparrow}{W_T} + W_c$

$0 \quad W_{net}$

$0 \quad F_{net}$

$\Sigma F = 0$



$a = 0$

Mechanical Energy

(→ positron + movement)

⇒ Potential Energy

↙ Gravitational ↘ Elastic

$PE = mgh$

$PE_{sr} = 1/2kx^2$

Spring constant ↓ disp from eq

⇒ Kinetic Energy

→ Energy of motion

$= 1/2mv^2$

For gravitational P.E.

$PE = mgh$

mass → g ← gravity, h ← height relative to some point.

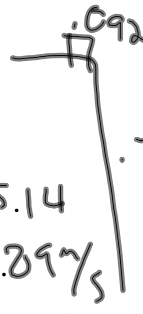
Law of Conservation of Mechanical Energy

In the absence of any outside non conservative forces or energy M.E. is conserved.

$$ME_i = ME_f$$

$$PE_i + KE_i = PE_f + KE_f$$

$KE_i = 0$



$\Rightarrow PE_i = (.0925)(9.81)(.77)$

$= .7\ J$

$v^2 = 15.14$

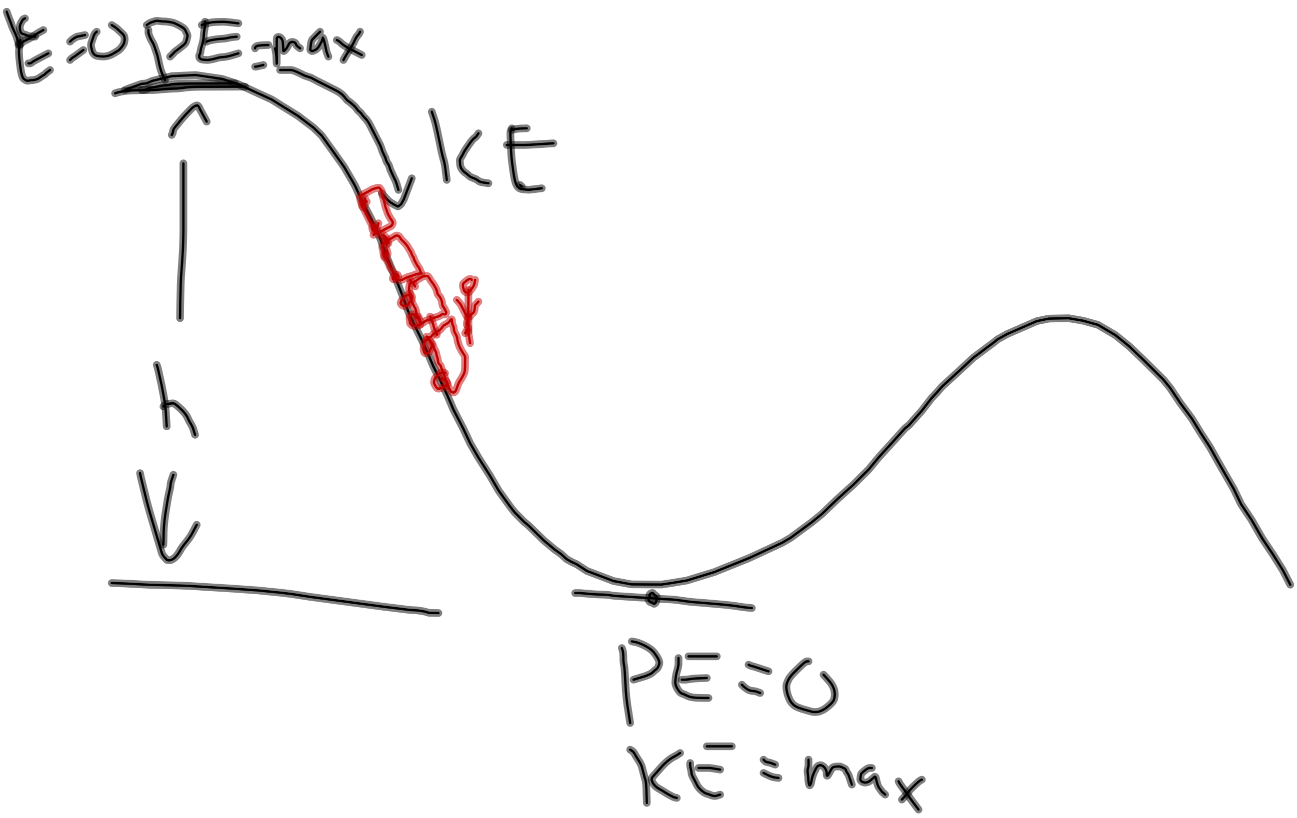
$v = 3.89\,m/s$

$PE_f = 0$

$1/2mv^2 = KE_f = .7J$

$2\cancel{(1/2)}(.092)v^2 = .\cancel{7.2}$

$.0925 \qquad 1.4/.0925$


KE=0 PE=max
KE
h
PE=0
KE=max