

Problem 2

elastic collisions $\Delta \vec{p} = 0, \Delta E = 0, \Delta KE = 0$

inelastic collisions $\Delta \vec{p} = 0, \Delta E = 0, \Delta KE \neq 0$

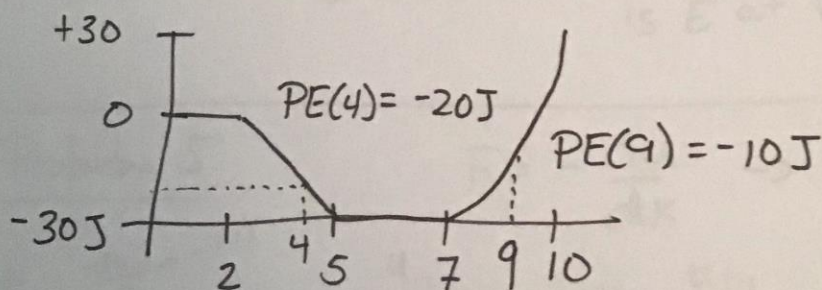
↳ change in form

↳ sticky collisions are a type of these

Problem 3

KE = 10J at x = 4m

what is KE at x = 9m



at x = 4

at x = 9

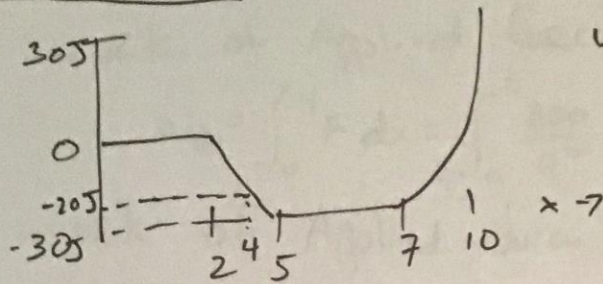
$$KE + PE = E = KE + PE$$

$$10J - 20J = E = KE - 10J$$

$$-10J = \cancel{KE} - 10J$$

$$KE = 0$$

Problem 4



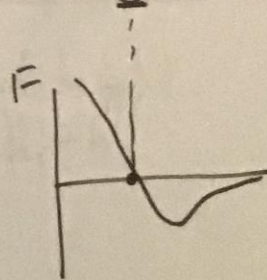
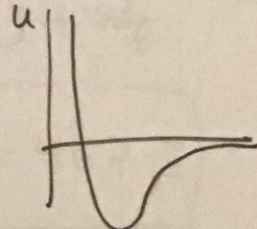
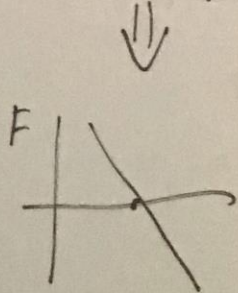
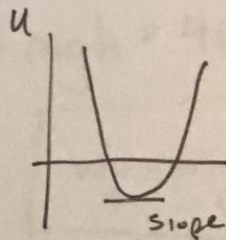
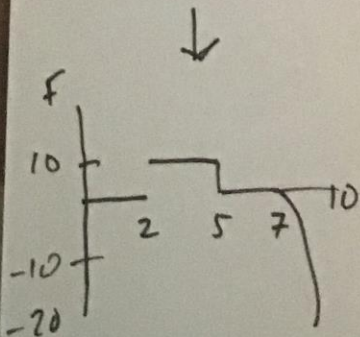
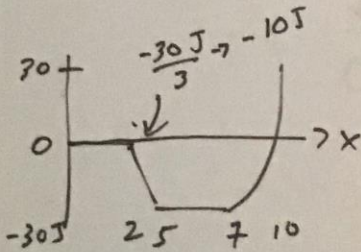
if $KE = +20J$ at $x = 4m$
 what is E at $x = 6m$

$$E = \underset{KE}{20J} - \underset{PE}{20J} = 0J$$

Energy is conserved. So E at $4m$ is E at $6m$.

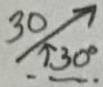
Problem 5

$$F = -\frac{du}{dx} \rightarrow - \text{Slope}$$



Problem 7 Pain!!

break into components



$$v_{ox} = v_0 \cos 30 = 26 \text{ m/s}$$

$$v_{oy} = v_0 \sin 30 = 15 \text{ m/s}$$

(no acc in x)

$$v_{xe} = 26 \text{ m/s}$$

changes \uparrow
while in air

$$v_{ye} = 15 \text{ m/s} - 9.8 \text{ m/s}^2 (0.5)$$

$$v_{ye} = 10.1 \text{ m/s}$$

time here
0.5s

And Position changes

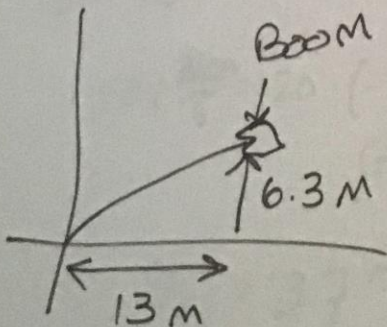
$$\Delta x = v_{ox} t$$

$$\Delta x = 13 \text{ m}$$

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

\downarrow 15 m \downarrow -9.8 m/s²

$$\Delta y = 6.3 \text{ m}$$



Problem 7.2)

Momentum Conserved

$$\Delta p_{x0} = \Delta p_{xf}$$

~~mass~~
 $m_e v_{ox} = m_1 v_{1ox} + m_2 v_{2x}$

↓
goes
straight
down
 $v_{1x} = 0$

↓
 $30 \cdot v_{2x}$

$$50 \cdot 26 =$$

$$v_{2x} = 43 \text{ m/s}$$

← weird units
 $\text{lbs} \frac{\text{m}}{\text{s}}$

whatever, lbs
cancels out
as is OK for
mass

$$\Delta p_{y0} = \Delta p_{yf}$$

$$50 \cdot 10 \cdot 1 = m_1 v_{1y} + m_2 v_{2y}$$

$$501 \frac{\text{lbsm}}{\text{s}} = 20 \cdot (-30 \text{ m/s}) + 30 v_{2y}$$

GIVEN

↑
SOLVE

$$v_{1y} = 37 \text{ m/s}$$

Problem 7.3)

Projectile Motion

$\uparrow \downarrow v_0 = -30 \text{ m/s}$
6.3m how
long

$\vec{v}_0 = (43\hat{i} + 37\hat{j}) \frac{\text{m}}{\text{s}}$
Find time & position
6.3m