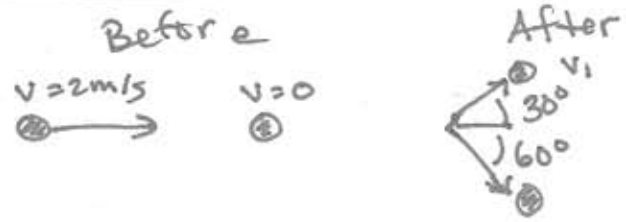

1.

		x	y
Before	①	(.5)(2)	0
	②	0	0
	Total	1	0
After	①	$(.5)V_1 \cos 30$	$(.5)V_1 \sin 30°$
	②	$(.5)V_2 \cos 60°$	$-(.5)V_2 \sin 60°$
	Total	$.433V_1 + .25V_2$	$.25V_1 - .433V_2$

x: $.433V_1 + .25V_2 = 1$ y: $.25V_1 - .433V_2 = 0$

$V_1 = 1.732V_2$

$.75V_2 + .25V_2 = 1$

$V_2 = 1$ m/s

$V_1 = 1.732$ m/s

K.E. before $\frac{1}{2}m_1V_1^2 + \frac{1}{2}m_2V_2^2 = \frac{1}{2}(.5)(2)^2 + 0 = 1$ Joule

K.E. after $\frac{1}{2}mV_1^2 + \frac{1}{2}mV_2^2 = \frac{1}{2}(.5)(1)^2 + \frac{1}{2}(.5)(1.732)^2$

$= 1$ Joule

Yes, energy was conserved — so collision is elastic.