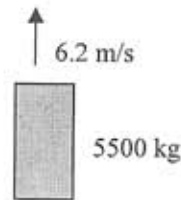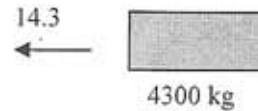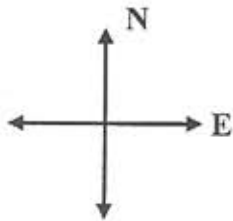4. A 5500-kg truck traveling north at 6.2 m/s collides with a 4300-kg truck moving west at 14.3 m/s. If the two trucks lock together upon impact, with what speed and in what direction do they move immediately after the collision? How much mechanical energy is lost in the collision? Account for this loss in energy.

N

E

14.3

4300 kg

6.2 m/s

5500 kg

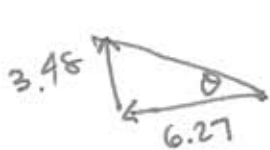|	$\hat{North}$	$\hat{West}$
Before	$(5500)(6.2)$ 34100	$(4300)(14.3)$ 61490
After	$(5500+4300) * V_N$	$(5500+4300) * V_W$

5. $(9800) V_N = 34100$

$V_N = 3.48$

$(9800) V_W = 61490$

$V_W = 6.27$

$|V| = \sqrt{V_N^2 + V_W^2} = 7.17 \text{ m/s}$

Energy Before
$\frac{1}{2}(5500)(6.2)^2$
$+\frac{1}{2}(4300)(14.3)^2$
$= 545363.5 \text{ Joules}$

Energy After
$\frac{1}{2}(9800)(7.17)^2$
251903.6 Joules

$293460 \text{ Joules lost}$
Heat
Sound

3.48

θ

6.27

$\theta = \tan^{-1}\left(\frac{3.48}{6.27}\right)$

$\theta = 29° \text{ North of West}$