

$$\frac{1.5}{0.35} = 4.3$$

$$\frac{500N}{218} = 2.3$$

$$45 \text{ kg} \quad 15 \text{ m/s} \quad 20 \text{ kg}$$

$$0.22$$

$$(45 + 20) 15 \text{ m/s} = 975 \text{ kg m/s}$$

$$45(v) = 975 \text{ kg m/s}$$

$$v = 21.7 \text{ m/s}$$

$$45(9.81) = 441.5 \text{ N}$$

$$\bar{F}_f = 441.5 \text{ N} (.22) = 97.1 \text{ N}$$

$$97.1 \text{ N} = (45) (a) = 2.15 \text{ m/s}^2$$

$$0^2 = (21.7)^2 + 2(-2.15)\Delta x \quad 109 \text{ m}$$

$$0 = 21.7 + \overset{2.15}{a} (t)$$

$$t = 10 \text{ sec}$$

$$3) \quad 2.5 \text{ kg} \quad V_f = \sqrt{2 a \Delta x}$$

$$2.5 \text{ kg} (8.85) = 22 \text{ kg m/s}$$

$$22 \text{ kg m/s} = 0.6 \text{ V}$$

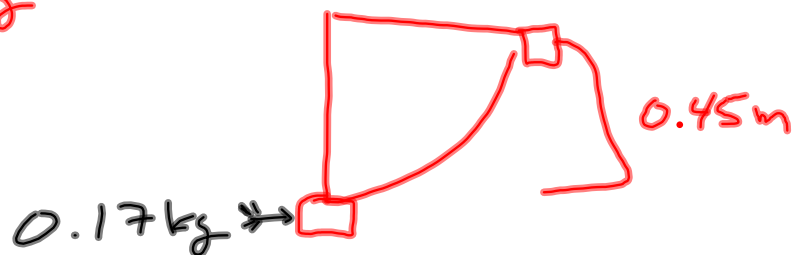
$$V = 36.9 \text{ m/s}$$

$$(36.9 \text{ m/s})^2 = V_i^2 + 2(9.81)(4 \text{ m})$$

$$V_i = 35.8 \text{ m/s}$$

4) 0.75 kg

$v_1$



$$0 = v_2^2 + 2(-9.81)(.45\text{m})$$

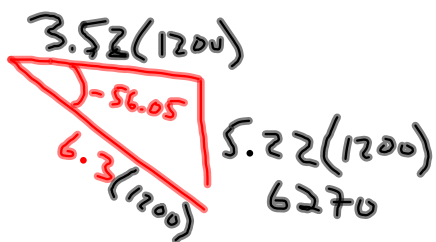
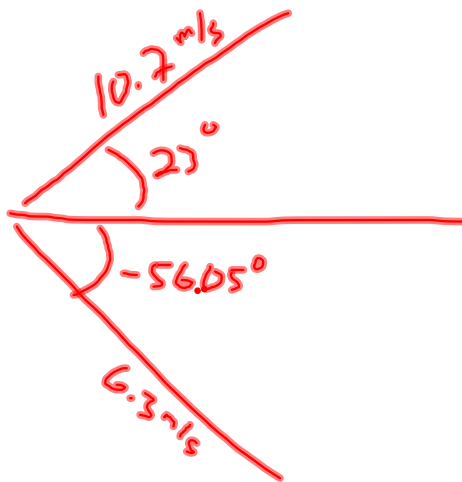
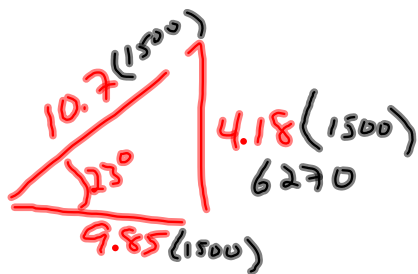
$$v_2 = 3\text{ m/s}$$

$$(3\text{ m/s})(.92\text{ kg}) = 2.8\text{ kg}\cdot\text{m/s}$$

$$v(.17) = 2.8 \quad = 16.5\text{ m/s}$$

5) 1500kg  $V_c$

1200kg  $V_r$



$$\begin{aligned}
 &14775 + 4222 \\
 &9.85(1500) + 3.57(1200) \\
 &18997 \text{ kg} \cdot \text{m/s} \\
 &18997 = 1500V \\
 &V = 12.6 \text{ m/s}
 \end{aligned}$$

$$6) \frac{1.2 (15 - -30)}{.0024} = 27500N$$

$$7) \quad 1000 \text{ kg} (24) = 24000 \text{ kg} \cdot \text{m/s}$$

$$1800 \text{ kg} (v) =$$

$$\Delta x = 11 \text{ m} \quad \mu = 0.143$$

$$F_f = 0.143 (2800) (9.81)$$

$$3927.9 \text{ N}$$

$$3927.9 \text{ N} = 2800 (a)$$

$$a = 1.4 \text{ m/s}^2$$

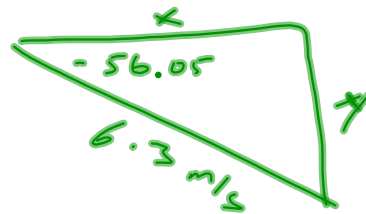
$$0^2 = v_i^2 + 2(-1.4)(11 \text{ m})$$

$$v_i = 5.5 \text{ m/s} (2800) = 15400 \text{ kg} \cdot \text{m/s}$$

$$24000 - 1800 v = 15400$$

$$(21.9 \text{ m/s})$$

$$1500 \text{ kg } V_1 + 1200(0) =$$



$$12.64 \checkmark$$

$$x \cdot 1500 V_1 + 0 = 9.84(1500) + 3.5(1200)$$

$$y \cdot 0 + 0 = 4.18(1500) - 5.3(1200)$$

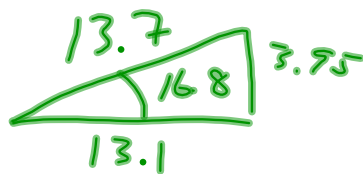
8 a)  $13.5 \text{ m/s}$



$$13.5(1500) + \underset{13.1}{12.7}(1200) = 2700(V_x)$$

$$0 + 8.9(1200) = 2700 V_y$$

$$3.95 \text{ m/s} = V_y$$



$$9) \quad 20000 \text{ kg}$$

$$m = \quad \text{kg}$$

$$30000 \text{ m/s}$$

$$300 \text{ m/s}$$

$$30000 \text{ m/s} (m) =$$

$$300 \text{ m/s} (5000)$$

$$30000 (m)$$

$$20000 \text{ kg} \cdot v = 30000 (m) +$$

$$F \Delta t = m v$$

$\uparrow$       $\uparrow$       $\uparrow$   
 $\quad$     $1 \text{ sec}$     $30000$

10)

14 kg

6 kg

$$v = \sqrt{2(9.81)(2)}$$

$$v = 6.3 \text{ m/s}$$

$$2.5 - .5$$

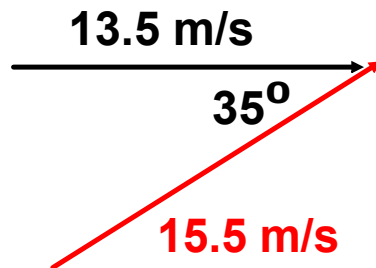
$$6.3 \text{ m/s} (14) + 0 = 6 \text{ kg} (v)$$

$$14.6 \text{ m/s}$$

$$14.6 = \sqrt{2a\Delta x} = 10.9 \text{ m}$$

$$11.4 \text{ m}$$

5a)



Jamie x direction:  $13.5\text{m/s} (1500\text{kg}) = 20,250 \text{ kgm/s}$   
 Jamie y direction: 0

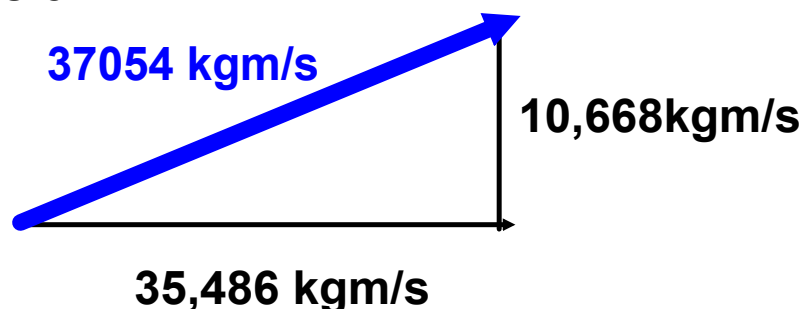
Bro x direction:  $1200\text{kg} (\text{Cos}(35)(15.5 \text{ m/s})) = 15236 \text{ kgm/s}$   
 Bro y direction:  $1200\text{kg} (\text{Sin}935)(15.5 \text{ m/s}) = 10668 \text{ kgm/s}$

Before collision

Total x direction:  $(20,250 + 15236) \text{ kgm/s} = 35,486 \text{ kgm/s}$

Total y direction:  $(0 + 10,668)\text{kg m/s} = 10,668\text{kgm/s}$

After collision



$$37054 \text{ kgm/s} / (1500+1200)\text{kg} = 13.7 \text{ m/s}$$

$$\tan(\Theta) = 10,668/35,486 = 16.7^\circ \text{ N of E}$$

