Momentum HW

3) $m_c = 417.1 kg$
$v_c = 16 m/s$

$m_b = 172.2 kg$
$v_b = 12 m/s$

1. $P_{c_0} = 417.18 = 7506 \ kg \ m/s$
2. $P_{b_0} = 172.2 \cdot 12 = 15144 \ kg \ m/s$

3. Θ after crash?

$P_x = 7506 = v_x \cdot 1679$ $v_x = 4.47 \ m/s$
$P_y = 15144 = v_y \cdot 1679$ $v_y = 9.019 \ m/s$

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9.019

$\to 4.47 \ m/s$

$\tan \Theta = \dfrac{4.47}{9.019}$

$\Theta = 26.36°$ E of S

63.63° S of E
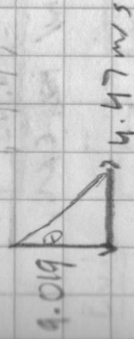
4. $v = 10.066$

5. $p = v \cdot 1679 = 16902 \ kg \ m/s$

$K = \frac{1}{2} mv^2 = \frac{1}{2} \dfrac{P^2}{m}$ $K_f = \dfrac{16902^2}{2(1679)} = 8.5074 J$

$K_0 = \frac{1}{2}(417)18^2 + \frac{1}{2}(1222)12^2 = 158416 \ J$

4) $K = \frac{1}{2} \dfrac{P^2}{m} = \frac{1}{2} mv^2$ $K_0 = \frac{1}{2}(535)(5.2)^2 = 17986$ $\Delta K = -7236.65$
$K_f = \dfrac{4387^2}{2(895.7)} = 10746.15$

$v_2 = -6.2 \ m/s$
$P_1 (?) 4387$ $P_2 = 360.3 \cdot (-6.2) = -2233.897$

$E_p = 2153.102 \ kg \ m/s$

5) $m_b = 20g$
$v = 100 \ m/s$ $m_b = 2 kg$ ... $\boxed{m \cdot v \cdot v}$ $v = 100 \ m/s$ $k = 800 \ N/m$ $k = ?$
$M = 2 kg$ $M = ?$

$x = ?$

$P_b = 0.02 kg \cdot 100 = 2 \ kg \ m/s$ $P_3 = 2 = 2.02 \cdot v_{block}$
$v = 0.99 \ m/s$

$K_3 = \frac{1}{2}(2.02)(0.99)^2 = 0.99009$

$K_5 = \frac{1}{2} kx^2$ $\frac{1}{2} kx^2 = 0.99009$ $kx^2 = 1.98019$ $x = 0.04978$
$x^2 = 0.002 47$