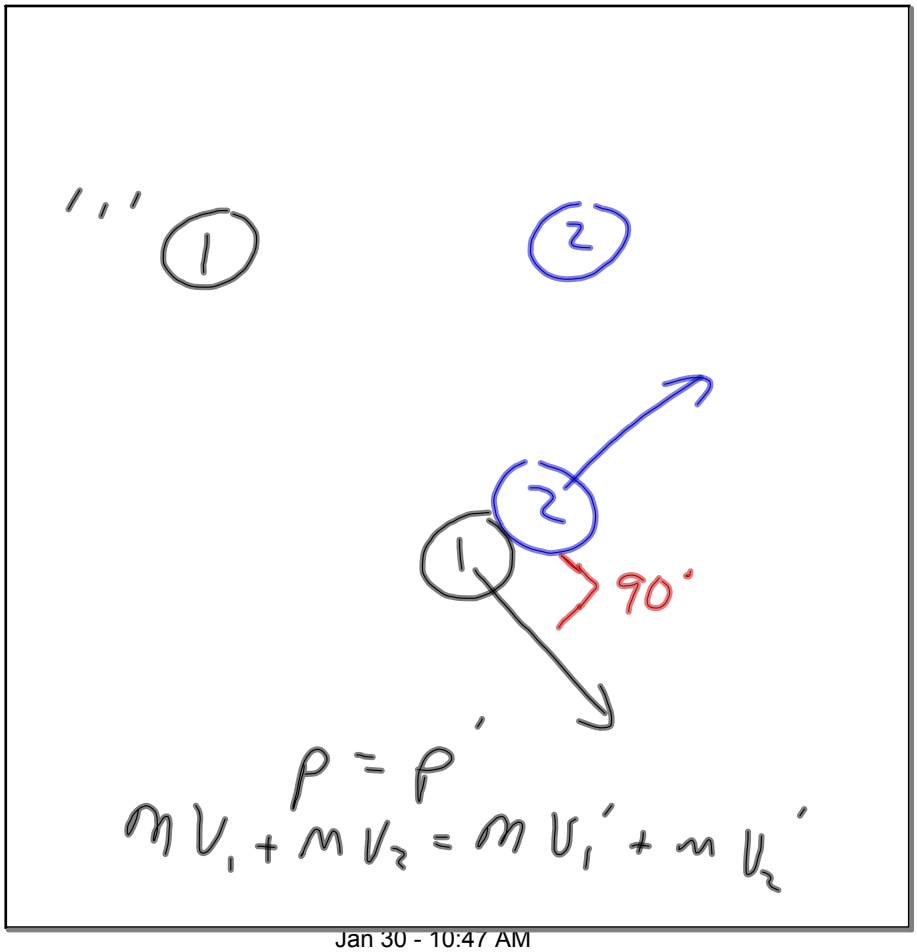
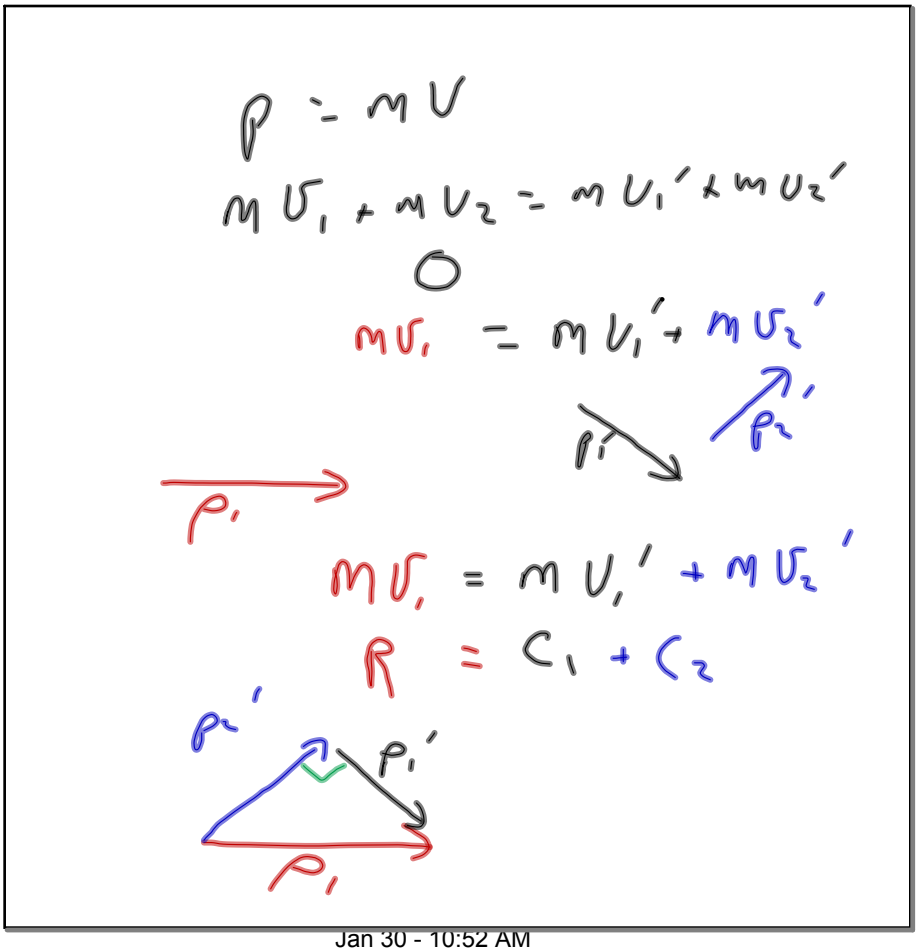


Jan 30 - 10:47 AM



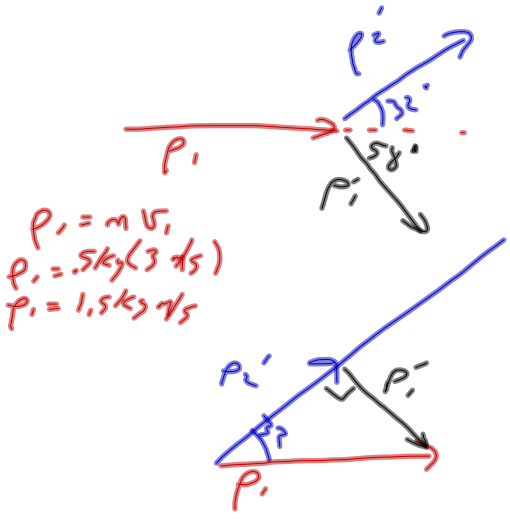
Jan 30 - 10:52 AM

A 500 g cue ball traveling at 3.0 m/s strikes a 500 g stationary #2 ball. After the collision the #2 ball takes off at 32 degrees above its original position.

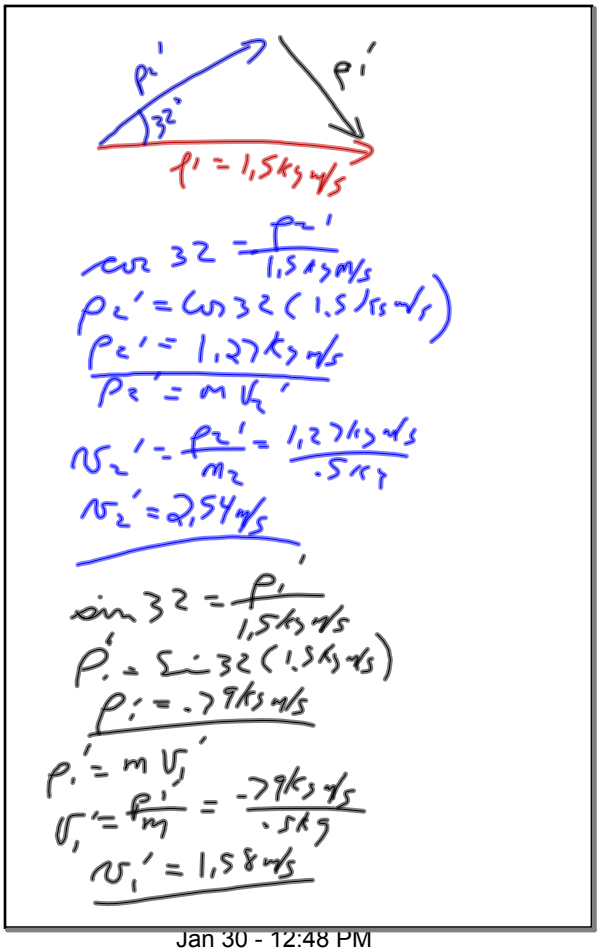
Feb 4-7:15 AM

ex 1

A 500 g cue ball traveling at 3.0 m/s strikes a 500 g stationary #2 ball. After the collision the #2 ball takes off at 32 degrees above its original position.



Jan 30 - 10:56 AM



$\cos 32 = \frac{p_2'}{1.5\ kg\ m/s}$

$p_2' = \cos 32\,(1.5\ kg\ m/s)$

$p_2' = 1.27\ kg\ m/s$

$p_2' = m v_2'$

$v_2' = \frac{p_2'}{m_2} = \frac{1.27\ kg\ m/s}{.5\ kg}$

$v_2' = 2.54\ m/s$

$\sin 32 = \frac{p_1'}{1.5\ kg\ m/s}$

$p_1' = \sin 32\,(1.5\ kg\ m/s)$

$p_1' = .79\ kg\ m/s$

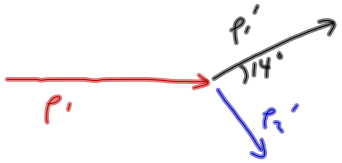
$p_1' = m v_1'$

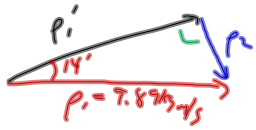
$v_1' = \frac{p_1'}{m} = \frac{.79\ kg\ m/s}{.5\ kg}$

$v_1' = 1.58\ m/s$

Jan 30 - 12:48 PM

A 2.3 kg ball traveling at 4.3 m/s strikes a stationary ball of 2.9 kg. What are the respective velocities of each ball if the 1st ball takes off at a 14 degree angle after they strike?





$p_1 = m v_1$

$p_1 = 2.3\ kg\,(4.3\ m/s)$

$p_1 = 9.89\ kg\ m/s$

$p_1' = \cos 14\,(9.89\ kg\ m/s)$

$p_1' = 9.60\ kg\ m/s$

$v_1' = \frac{p_1'}{m} = \frac{9.60\ kg\ m/s}{2.3\ kg} = 4.2\ m/s$

$p_2' = \sin 14\,(9.89\ kg\ m/s)$

$p_2' = 2.39\ kg\ m/s$

$v_2' = \frac{p_2'}{m_2} = \frac{2.39\ kg\ m/s}{2.9\ kg}$

$v_2' = .83\ m/s$

Jan 31 - 10:28 AM

What force is applied to a 6.2 kg head traveling at 78 km/hr if it stops in 0.083 s?

F = ?

a = ?

d = ?

Feb 4-7:16 AM

What force is applied to a 6.2 kg head traveling at 78 km/hr if it stops in 0.083 s?

m = 6.2 kg
v = 78 km/hr
22 m/s
t = 0.083 s
F = ?
a = ?
d = ?

$a = \frac{F}{m} = \frac{-1600\,N}{6.2\,kg}$

$a = -260\,m/s^2$

Ft =mv

F = mv/t = 6.2 kg(22 m/s)/0.083 s

Fv = 1600 N

$a = \frac{\Delta v}{t} = \frac{0 - 22\,m/s}{.083\,s}$

$a = -260\,m/s^2$

$d = \bar{v}t$

$d = 11\,m/s\,(.083) = .91\,m$

$d = \frac{1}{2}at^2 = \frac{1}{2}(260\,m/s^2)(.083\,s)^2 = .90\,m$

$d = \frac{v_2^2 - v_1^2}{2a} = \frac{0 - (22\,m/s)^2}{2(260\,m/s^2)} = .93\,m$

Jan 31 - 10:43 AM

What impulse does an apple give a 45 g bullet traveling at 424 m/s if it slows it to 380 m/s as hits and exits the unfortunate apple?

Ft =?
F = ?
dia. = 11.0 cm

Feb 4-7:17 AM

What impulse does an apple give a 45 g bullet traveling at 424 m/s if it slows it to 380 m/s as hits and exits the unfortunate apple?

m = 45 g
v1 = 424 m/s
v2 = 380 m/s
Ft = ?
dia. of apple is 11.0 cm
F = ?

$Ft = \Delta mv$

$Ft = .045kg(380 m/s - 424 m/s)$

$Ft = 1.98 kg\,m/s$

$d = \bar{v}t$

$t = \frac{d}{\bar{v}} = \frac{.11\,m}{\left(\frac{424 m/s + 380 m/s}{2}\right)}$

$t = .00027 s$

n, $F = ma$, $a = \frac{\Delta v}{t}$

$Ft = mv$

$F = mv/t = \frac{1.98 kg\,m/s}{.00027 s}$

$F = 7300 N$

Jan 31 - 12:44 PM

What impulse is applied to a 325 g ball thrown at 91 mph if it is hit and flies out at 105 mph? What average force is applied to the ball as it is thrown if the pitcher's wind-up and pitch is 2.1 m?

Feb 4-7:20 AM

What impulse is applied to a 325 g ball thrown at 91 mph if it is hit and flies out at 105 mph? What average force is applied to the ball as it is thrown if the pitcher's wind-up and pitch is 2.1 m?

$\Delta v = v_2 - v_1$

$Ft = mv$

$Ft = .325\ kg[-47\ m/s - (41\ m/s)] = -28.6\ kg\ m/s$

$a = v^2/2d = (41\ m/s)^2/[2(2.1\ m)] = 400\ m/s^2$

$t = d/\bar{v} = 2.1\ m\ (20.5\ m/s) = .102\ s$

$Ft = mv \qquad F = mv/t = .325\ kg(41\ m/s)/.102\ s = 131\ N$

or, $F = ma = .325\ kg(400\ m/s^2) = 130\ N$

Feb 4-7:26 AM