

Key

Momentum Review Problems

Solve the problems below and find the correct answer on the board. Write the correct letter in the spaces provided to answer the question below:

Every year the President of the US pardons a turkey and it goes to a public farm called Frying Pan Park, Herndon, VA. Which president is believed to be the first to pardon a turkey and start this annual tradition? (You will have to unscramble the letters)

Word Problem	Work Shown	Letter
A bicycle has a momentum of 24 kg-m/s. What momentum would it have if it had twice the mass and was moving at the same speed?	$P = 48 \text{ kg}\cdot\text{m/s}$	
According to the Guinness Book of World Records, the fastest recorded baseball pitch was delivered by Nolan Ryan in 1974. The pitch was clocked at 45.0 m/s. Determine the impulse required to give a 0.145-kg baseball such a momentum.	$I = m \Delta v$ $I = .145(45 \frac{\text{m}}{\text{s}})$ $I = 6.5 \text{ kg}\cdot\frac{\text{m}}{\text{s}}$	
Jerome plays middle linebacker for South's varsity football team. In a game against cross-town rival North, he delivered a hit to North's 82-kg running back, changing his eastward velocity of 5.6 m/s into a westward velocity of 2.5 m/s. Determine the initial momentum of the running back.	$\Delta p \text{ Jerome} = \Delta p \text{ running back}$ $\Delta p = m(v_f - v_i)$ $\Delta p = 82 \text{ kg}(-5.6 - 2.5)$ $\Delta p = 664 \text{ kg}\cdot\text{m/s}$	
NASA's Langley Research Center has been experimenting with the use of air bags to soften the landings of crew exploration vehicles (CEV) on land. What stopping time will be required in order to safely stop a 7250 kg CEV moving at 7.65 m/s with an average force of 426000 N (an average force of 6 Gs)?	$Ft = m \Delta v$ $426000 = 7250(7.65)$ $t = .13 \text{ s}$	
An 82-kg male and a 48-kg female pair figure skating team are gliding across the ice at 7.4 m/s, preparing for a throw jump maneuver. The male skater tosses the female skater forward with a speed of 8.6 m/s. Determine the speed of the male skater immediately after the throw.	$(82 + 48)(7.4) = 82(v_f) + 48(8.6)$ $962 = 82(v_f) + 413$ $549 = 82(v_f)$ $v_f = 6.7 \frac{\text{m}}{\text{s}}$	
Rex ($m=86 \text{ kg}$) and Tex (92 kg) board the bumper cars at the local carnival. Rex is moving at a full speed of 2.05 m/s when he rear-ends Tex who is at rest in his path. Tex and his 125-kg car lunge forward at 1.40 m/s. Determine the post-collision speed of Rex and his 125-kg car.	$211(2.05) + 0 = 211(v_f) + 217(1.40)$ $433 + 0 = 211(v_f) + 304$ $129 = 211(v_f)$ $v_f = .61 \text{ m/s}$	

$Rex \ m = 86 + 125 = 211$
 $Tex \ m = 92 + 125 = 217$

President _____