Worksheet: Impulse and Momentum Practice

$F\,t = m\,v_{final} - m\,v_{initial}$

NAME:

1. Read the following problem
2. Highlight your “proof” for assigning variables
3. List the givens
4. Solve
5. Write your answer with the proper units

A soccer ball with a mass of .43 kg is heading toward a wall with a speed of 20 meters per second. After hitting the wall, the ball bounces back with a speed of 25 meters per second. The ball was in contact with the wall for 0.003 seconds. What is the average force the wall exerted on the ball? - 4 pts -

- Initial velocity - m/s, starting from rest, initially/beginning, how fast...
- Final velocity - m/s, comes to a stop/rest, finally/end, how fast...
- Mass - kg, how much stuff
- Time - s, how long…
- Force - N, a push or pull

Givens	Work

Answer

Jennifer, who has a mass of 50.0 kg, is riding at 35.0 m/s in her red sports car when she must suddenly slam on the brakes to avoid hitting a deer crossing the road. She strikes the airbag, that brings her body to a stop in 0.500 s. What average force does the seat belt exert on her? - 4 pts -

- Initial velocity - m/s, starting from rest, initially/beginning, how fast...
- Final velocity - m/s, comes to a stop/rest, finally/end, how fast...
- Mass - kg, how much stuff
- Time - s, how long…
- Force - N, a push or pull

Givens	Work

Answer

If Jennifer had not been wearing her seat belt and not had an airbag, then the windshield would have stopped her head in 0.002 s. What average force would the windshield have exerted on her? - 4 pts -

- Initial velocity - m/s, starting from rest, initially/beginning, how fast...
- Final velocity - m/s, comes to a stop/rest, finally/end, how fast...
- Mass - kg, how much stuff
- Time - s, how long…
- Force - N, a push or pull

Givens	Work

Answer

NASA's Langley Research Center has been experimenting with the use of airbags 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)? - 4 pts -

- Initial velocity - m/s, starting from rest, initially/beginning, how fast...
- Final velocity - m/s, comes to a stop/rest, finally/end, how fast...
- Mass - kg, how much stuff
- Time - s, how long…
- Force - N, a push or pull

Givens	Work

Answer

A player hits a softball with a mass of 0.125 kg with a bat. Just before the impact, the ball is traveling horizontally toward the bat at 30.0 m/s. If a force of -20 N (in the opposite direction than the ball was moving) is applied for 0.5 s, what is the final velocity of the ball? (HINT: The final velocity will be negative.) - 4 pts -

- Initial velocity - m/s, starting from rest, initially/beginning, how fast...
- Final velocity - m/s, comes to a stop/rest, finally/end, how fast...
- Mass - kg, how much stuff
- Time - s, how long…
- Force - N, a push or pull

Givens	Work

Answer