

Physics 30 Worksheet # 3: *Conservation of Momentum (1)*

1. A 2.50 kg ball moving at 7.50 m/s is caught by a 70.0 kg man while the man is standing on ice. How fast will the man / ball combination be moving after the ball is caught by the man?

2. A 1200 kg car traveling North at 20.0 m/s collides with a 1400 kg car traveling South at 22.0 m/s. The two cars collide and entangle. What is the resulting velocity of the wreckage?

3. A 5.00 kg ball hits a 75.0 kg man standing at rest on ice. The man catches the ball. How fast does the ball need to be moving in order to send the man off at a speed of 3.00 m/s?

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4. A 1.50×10^3 kg car traveling at 100 km/h South collides with a 1.20×10^3 kg car traveling North at 100 km/h. The heavier car continues to move South after the collision, but slows to 25.0 km/h. How fast is the lighter car moving after the collision?

5. A 92.0 kg football player running at 6.50 m/s North collides with an 85.0 kg football player running at 6.00 m/s South. The 92.0 kg football player continues moving at a velocity of 2.00 m/s after the collision. What is the velocity of the 85.0 kg football player after the collision?

6. A 75.0 kg man is standing at rest on ice while holding a 4.00 kg ball. If the man throws the ball at a velocity of 3.50 m/s forward, what will his resulting velocity be?
7. A person holding a 15.0 kg gun containing one 50.0 g bullet is riding on a train that is traveling at 75.0 km/h East. If the man fires the gun and the bullet moves with a velocity of 350 m/s East (relative to the train), what is the velocity of the gun relative to the ground?