Name:_____ Date:_____ Pd.:_____

# PRACTICE: MOMENTUM AND IMPULSE

*Objective: Use the impulse-momentum theorem to solve for an unknown variable.*

1. An official major league baseball has a mass of 0.14 kg. A pitcher throws a 40 m/s fastball which is hit by the batter straight back up the middle at a speed of 46 m/s.
    a. What is the impulse of the ball during the collision with the bat?
    b. If this collision occurs during a time of 0.012 seconds, what is the average force exerted by the bat on the ball?

2. How much force is required to stop a 60 kg person traveling at 30 m/s during a time of
    a. 5.0 seconds
    b. 0.50 seconds
    c. 0.05 seconds

3. A tennis ball may leave a top player's racket on the serve with a speed of 65.0 m/s. The ball's mass is 0.0600 kg and it is in contact with the racket for 0.0300 s. Assume the ball begins at rest.
    a. What is the change in momentum of the tennis ball during the collision with the racket?
    b. What is the average force exerted on the ball by the racket?

4. A 0.15kg baseball moving at 26 m/s is slowed to a stop by a catcher who exerts a constant force of -390 N. How long does it take this force to stop the ball?

5. A 0.45kg dodge ball is thrown at an opposing player at a velocity of 38 m/s to the right. Unfortunately, it misses the player and bounces off the wall at 28m/s to the left. What is the impulse of the ball hitting the wall?

* this worksheet is adopted from
http://www.milwaukeehighschoolofthearts.org/about/staff/homework/6364d3f0f495b6ab9dcf8d3b5c6e0b01/MomentumImpulseWkst.pdf