Physics 4A
Fall 2025

Name _____

Lab: 8:00 am 11:20 am 2:40 pm (circle one)

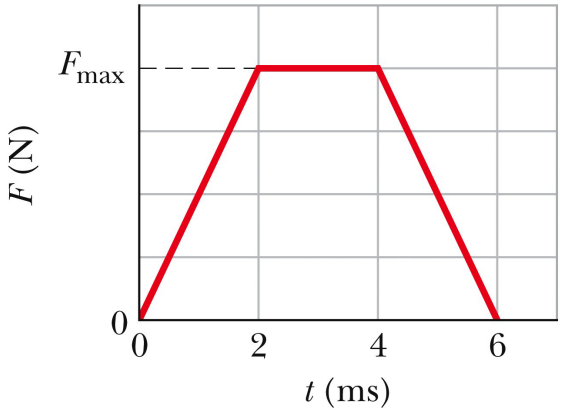
Quiz #9: Impulse and Momentum

Problem 1 (2 points)
A rifle of mass M is initially at rest but free to recoil. It fires a bullet of mass m and velocity v (relative to the ground). After firing, the velocity of the rifle (relative to the ground) is:

a) $-mv$
b) $-Mv/m$
c) $-mv/M$
d) $-v$
e) mv/M

Problem 2 (4 points)
A 5.00 kg object is traveling at 4.50 m/s to the right and collides with a 15.0 kg object traveling at 2.75 m/s to the left. If the two objects stick together after the collision, what is their combined velocity after the collision?

Problem 3 (4 points)
The figure below shows the magnitude of the force F versus time t during the collision of a 75 g superball with a wall. The initial velocity of the ball is 32 m/s perpendicular to the wall. The ball rebounds directly back with a speed of 28 m/s, also perpendicular to the wall. What is F_{max}, the maximum magnitude of the force on the ball from the wall during the collision? (Note: time is in milliseconds)



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