Answer on Question #62647-Physics-Classical Mechanics

A bullet is fired through a board 11.7 cm thick, with a line of motion perpendicular to the face of the board. If the bullet enters with a speed of 381 m/s and emerges with a speed of 211 m/s, what is its acceleration as it passes through the board?

Solution

We use the kinematic formula:

$$v_f^2 - v_i^2 = -2aS$$

a is the magnitude of acceleration of bullet.

$$a = \frac{v_i^2 - v_f^2}{2S} = \frac{381^2 - 211^2}{2 \cdot 0.117} = 4.30 \cdot 10^5 \frac{m}{s^2}.$$

The acceleration is negative (the final velocity of bullet is less than initial).

Answer: $\mathbf{4.30 \cdot 10^5 \frac{m}{s^2}}$.