a bullet strikes a plank of thickness 5cm with velocity 1000m/s and emerges out with velocity of 400m/s. Calculate the average retardation of bullet.

Acceleration is defined as the rate of change of velocity with respect to time, in a given direction. If we write the definition for acceleration in mathematical terms we obtain:

$$a = \frac{v - u}{t}$$

v – initial velocity, u – final velocity.

Distance equals:

$$s = \frac{v + u}{2} t$$

If we now combine the two equations that we have derived, we can create another equation:

$$s = \frac{v^2 - u^2}{2a}$$

Therefore, retardation of bullet equals:

$$a = \frac{v^2 - u^2}{2s} = \frac{1000^2 - 400^2}{2 * 0.05} = 8400000 \frac{m}{s^2}$$

Answer: $8400000 \frac{m}{s^2}$