A bullet accelerates from a stop to 1000m/s to the East. It accelerates at 10000m/s2 in the same direction. How long did it take the bullet to reach its final velocity?

Solution.

If v_0 is the initial velocity, then v_t the velocity after time *t,* the acceleration is

$$a = \frac{v_t - v_0}{t}$$

In our case,

$$v_t = 1000\ \frac{m}{s}$$

$$a = 10000\ \frac{m}{s^2}$$

And $v_0 = 0\ \frac{m}{s}$ because the bullet accelerates from a stop.

Then $$t = \frac{v_t - v_0}{a} = \frac{v_t}{a} = \frac{1000}{10000} = 0.1s$$

It takes *0.1s* for bullet to reach its final velocity.

Answer:

$$t = 0.1\ s$$