Task. A jet plane lands with a speed of $v_0 = 96\ m/s$ and can accelerate at a maximum rate of $a = -4.20\ m/s^2$ as it comes to rest. From the instant the plane touches the runway, what is the minimum time needed before it can come to rest?

Solution. Assume that the plane accelerates with constant rate $a = -4.20\ m/s^2$. Then the relation between velocity and time is given by the following formula:

$$v(t) = v_0 + at.$$

We should find t_1 such that $v(t_1) = 0$, so

$$0 = v_0 + at_1,$$

whence

$$t_1 = -\frac{v_0}{a}.$$

Substituting values we obtain

$$t_1 = -\frac{v_0}{a} = -\frac{96}{-4.20} \approx 22.9s.$$

Answer. 22.9 s.