Task. A certain car is capable of accelerating at a rate of $a = 0.53\,m/s^2$. How long does it take for this car to go from a speed of $v_0 = 30\,mi/h$ to a speed of $v_1 = 32\,mi/h$?

Solution. Recall that one mile is equal to 1609 m, so

$$1\ mi/h = \frac{1609\ m}{3600\ s} = 0.447 m/s.$$

Since the acceleration of the car is constant, the relation between velocity and time is given by the following formula:

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

We should find $\bar{t}$ such that $v(\bar{t}) = v_1$, so

$$v_1 = v_0 + a\bar{t},$$

whence

$$\bar{t} = \frac{v_1 - v_0}{a}.$$

Substituting values we obtain

$$\bar{t} = \frac{v_1 - v_0}{a} = \frac{(32 - 30)\ mi/h}{0.53\ m/s^2} = \frac{2 * 0.447 m/s}{0.53\ m/s^2} = 1.69\ s.$$

Answer. 1.69 s.