1. Nathaniel is driving his sports car down a four-lane highway at 40m/s. He comes up behind a slow-moving dump truck and decides to pass it in the left-hand lane. If Nathaniel can accelerate at 5m/s/s, how long will it take for him to reach the speed of 60m/s?

Solution.

$v_0 = 40\dfrac{m}{s}$

$a = 5\dfrac{m}{s^2}$

$v_1 = 60\dfrac{m}{s}$

$t - ?$

The acceleration of the car is $\quad a = \dfrac{v_1 - v_0}{t}$,

where v_0 and v_1 are the initial and final velocity.

So, the necessary time is $\boxed{t = \dfrac{v_1 - v_0}{a}}$.

Let check the dimension: $\quad [t] = \dfrac{m/s}{m/s^2} = s$.

Let evaluate the quantity: $\quad t = \dfrac{60 - 40}{5} = 4(s)$.

Answer: 4 s.