Answer on Question #47734, Physics, Mechanics | Kinematics | Dynamics

Honda claims that its new super civic sports car will accelerate uniformly from rest to a speed of 87m/s in 8.0 seconds.

A) determine the acceleration

B) find the distance the car travels in the first 8 seconds.

Solution:

Given:

$v_i = 0\ \text{m/s},$

$v_f = 87\ \text{m/s},$

$t = 8\ \text{s},$

$a = ?,$

$d = ?$

The kinematic equation that describes an object's motion is:

$$v_f^2 = v_i^2 + 2ad$$

The symbol *d* stands for the displacement of the object. The symbol *a* stands for the acceleration of the object. And the symbol v stands for the velocity of the object; a subscript of i after the v indicates that the velocity value is the initial velocity value and a subscript of f indicates that the velocity value is the final velocity value.

The acceleration is

$$a = \frac{v_f - v_i}{t} = \frac{87 - 0}{8} = 10.875\ \text{m/s}^2$$

$$d = \frac{v_f^2 - v_i^2}{2a} = \frac{87^2}{2 \cdot 10.875} = 348\ \text{m}$$

Answer: $a = 10.875\ \text{m/s}^2,$

$d = 348\ \text{m}.$