Answer on Question#37935- Physics – Other

A race car acceleration from 0 m/s to 30 m/s with a displacement of 45 m. what is the vehicle's acceleration ?

Solution:
The equation of motion for the car (d = 45m):

$$x: d = \frac{at^2}{2} \quad (1)$$

Rate equation for the car ($V = 30\frac{m}{s}$):

$$V = at$$

$$t = \frac{V}{a} \quad (2)$$

(2)in(1):

$$d = \frac{a}{2} \cdot \left(\frac{V}{a}\right)^2 = \frac{V^2}{2a}$$

$$a = \frac{V^2}{2d} = \frac{\left(30\frac{m}{s}\right)^2}{2 \cdot 45m} = 10\frac{m}{s^2}$$

Answer: acceleration of the car is equal to $10\frac{m}{s^2}$.