

a body travels 200cm in first 2seconds and 220cm in next 5second. Calculate the velocity at the end of the seventh second from the start.

Suppose, initial speed of body was v_0 m/s. Then speed at moment time t equals:

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

a – acceleration

Distance traveled in first 2 second equals:

$$d_1 = v_0 * 2sec + \frac{a(2sec)^2}{2} = 2v_0 + 2a$$

Distance traveled in next 5 second equals:

$$d_2 = (v_0 + 2sec * a)5sec + \frac{a(5sec)^2}{2} = 5v_0 + \frac{45}{2}a$$

where $v_0 + 2sec * a$ velocity at end of 2nd second.

$$\begin{cases} 2v_0 + 2a = 2 \\ 5v_0 + \frac{45}{2}a = 2.2 \end{cases}$$

$$2*(2) - 5*(1):$$

$$10v_0 - 10v_0 + 45a - 20a = 4.4 - 20$$

$$a = -\frac{15.6}{25} \frac{m}{s^2} = -0.624 \frac{m}{s^2}, \quad v_0 = 1 - a = 1.624 \frac{m}{s}$$

Velocity at the end of the seventh second equals:

$$v = v_0 + a * 7 = 1.624 - 0.624 * 7 = -2.744 \frac{m}{s}$$

$$\text{Answer: } -2.744 \frac{m}{s}$$