

Question #14201

The formulas for $S(t), v(t)$, when object is moving with constant acceleration, are given by:

$v = v_0 + at; S = v_0 t + \frac{at^2}{2}$. Knowing, that for $t = 9.15\text{s}, v = 52\text{ m/s}, S = 219\text{ m}$, obtain system of two equations: $52 = v_0 + 9.15 \cdot a, 219 = 9.15 \cdot v_0 + a \frac{(9.15)^2}{2}$. Plugging the first equation, into second: $219 = (52 - 9.15 a) \cdot 9.15 + \frac{a}{2} (9.15)^2$, which gives $a \approx 6.13\text{ m/s}^2$, and using first equation, $v_0 = 52\text{ m/s} - 9.15\text{ s} \cdot 6.13\text{ m/s}^2 = -4.09\text{ m/s}$.