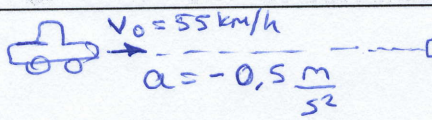
Study Questions 2

FULL NAME : ..... KEY .....

1.

A car traveling at 55 km/h slows down at a constant acceleration of 0.50 m/s^2. Calculate

(a) The distance the car moves before it stops.



$V_0 = 55 \frac{km}{h} = 55 \frac{km}{h} \cdot \frac{1000 m}{km} = 15.3 \frac{m}{s}$

Equations: $V_f^2 = V_0^2 + 2a\Delta x$

$\Delta x = \frac{V_f^2 - V_0^2}{2a} = \frac{0^2 - (15.3)^2}{2(-0,5)} = \frac{-234}{-1} = 234 m$

(b) The time it takes to stop.

$V_f = 0 \qquad V_f = V_0 + at \qquad t = \frac{V_f - V_0}{a} = \frac{0 - 15.3}{-0,5} = 30,6 s$

$t = 30,65$

(c) The distance it travels during the first and the fifth second.

$t_1 = 1s \qquad t_5 = 5s$

$\Delta x_1 = V_0 \cdot t_1 + \frac{1}{2}(-0,5) \cdot t_1^2$

$\Delta x_1 = 15,3 \cdot 1 + \frac{1}{2} \cdot (-\frac{1}{2}) \cdot 1^2 = 15,3 + (-\frac{1}{4}) = 15,30 - 0,25$

$\Delta x_1 = 15.05 m$

$\Delta x_5 = V_0 \cdot t_5 + \frac{1}{2}(-0,5) \cdot (5)^2$

$= 15,30 \cdot 5 + \frac{1}{2}(-\frac{1}{2}) \cdot 25$

$= 76,50 - 6,25 = 70,25 m$

$\Delta x_5 = 70,25 m$