Zadaci - Brzina i put kod RPPK (prvi deo)

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1. Telo se kreće bez početne brzine ubrzanjem $13\frac{m}{s^2}$. Kolika je brzina tela u 5s i koliki je put telo prešlo za to vreme?

$$a = 13\frac{m}{s^2}$$

$$t = 5s$$

$v =?$ $S=?$

$$v = a \cdot t$$

$$v = 13\frac{m}{s^2} \cdot 5s$$

$$v = 65\frac{m}{s}$$

$$v^2 = 2 \cdot a \cdot S$$

$$v^2 = 2 \cdot 13\frac{m}{s^2} \cdot 162{,}5m$$

$$v^2 = 4225 \left(\frac{m}{s}\right)^2$$

$$v = \sqrt{4225 \left(\frac{m}{s}\right)^2} = 65\frac{m}{s}$$

$$S = \frac{a \cdot t^2}{2}$$

$$S = \frac{13\frac{m}{s^2} \cdot (5s)^2}{2}$$

$$S = \frac{13\frac{m}{s^2} \cdot 25 \ s^2}{2}$$

$$S = \frac{325m}{2}$$

$$S = 162{,}5m$$

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2. Telo ima početnu brzinu $10 \frac{m}{s}$ i ubrzanje $2\frac{m}{s^2}$. Kolika je brzina tela u 3s i koliki je put telo prešlo za to vreme?

$$v_0 = 10 \frac{m}{s}$$

$$a = 2\frac{m}{s^2}$$

$$t = 3s$$

$$v = ? \qquad S = ?$$

$$v = v_0 + a \cdot t$$

$$v = 10 \frac{m}{s} + 2\frac{m}{s^2} \cdot 3s$$

$$v = 10 \frac{m}{s} + 6 \frac{m}{s}$$

$$v = 16 \frac{m}{s}$$

$$S = v_0 \cdot t + \frac{a \cdot t^2}{2}$$

$$S = 10 \frac{m}{s} \cdot 3s + \frac{2\frac{m}{s^2} \cdot (3s)^2}{2}$$

$$S = 30m + \frac{2\frac{m}{s^2} \cdot 9 \ s^2}{2}$$

$$S = 30m + \frac{18m}{2}$$

$$S = 30m + 9m$$

$$S = 39m$$

$$v^2 = v_0^2 + 2 \cdot a \cdot S$$

$$v^2 = \left(10 \frac{m}{s}\right)^2 + 2 \cdot 2\frac{m}{s^2} \cdot 39m = 100 \left(\frac{m}{s}\right)^2 + 156 \left(\frac{m}{s}\right)^2$$

$$v^2 = 256\left(\frac{m}{s}\right)^2$$

$$v = \sqrt{256 \left(\frac{m}{s}\right)^2} = 16 \frac{m}{s}$$

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3. Telo ima početnu brzinu $19 \frac{m}{s}$ i ubrzanje $-3\frac{m}{s^2}$. Kolika je brzina tela u 2s i koliki je put telo prešlo za to vreme?

$$v_0 = 19 \frac{m}{s}$$

$$a = -3 \frac{m}{s^2}$$

$$t = 2s$$

$v =?$ S=?

$$v = v_0 - a \cdot t$$

$$v = 19 \frac{m}{s} - 3 \frac{m}{s^2} \cdot 2s$$

$$v = 19\frac{m}{s} - 6\frac{m}{s}$$

$$v = 13 \frac{m}{s}$$

$$S= v_0 \cdot t - \frac{a \cdot t^2}{2}$$

$$S= 19 \frac{m}{s} \cdot 2s - \frac{3\frac{m}{s^2} \cdot (2s)^2}{2}$$

$$S= 38m - \frac{3\frac{m}{s^2} \cdot 4 \ s^2}{2}$$

$$S= 38m - \frac{12m}{2}$$

$$S=38m - 6m$$

$$S=32m$$

$$v^2 = v_0^2 - 2 \cdot a \cdot S$$

$$v^2 = \left(19 \frac{m}{s}\right)^2 - 2 \cdot 3\frac{m}{s^2} \cdot 32m = 361 \left(\frac{m}{s}\right)^2 - 192 \left(\frac{m}{s}\right)^2$$

$$v^2 = 169\left(\frac{m}{s}\right)^2$$

$$v = \sqrt{169 \left(\frac{m}{s}\right)^2} = 13 \frac{m}{s}$$