

FIZIKA 9

*Oznaka **F9 01 01 00 01** – številka strani in zaporedna številka naloge v preizkusu

1. Poglavje: POSPEŠENO GIBANJE

F9 01 01 00 01

$$v = s/t = 1500 \text{ m} / 300 \text{ s} = 5 \text{ m/s} = 18 \text{ km/h}$$

F9 01 01 00 02

$$t = s/v = 1 \text{ km} / 4 \text{ km/h} = 0,25 \text{ h} = 15 \text{ min}$$

F9 01 01 00 03

$$s = v \cdot t = 2 \text{ m/s} \cdot 86400 \text{ s} = 172800 \text{ m}$$

F9 01 01 00 04

Pri odmevu mora zvok najprej prispeti do ovire, nato pa še nazaj.

$$v = s/t$$

$$s = v \cdot t = 343 \text{ m/s} \cdot 4 \text{ s} = 1372 \text{ m} \text{ (To je razdalja tja in nazaj.)}$$

$$\text{razdalja do gore} = s/2 = 1372 \text{ m} / 2 = 686 \text{ m}$$

(Lahko računamo tudi tako: Ker mora pri odmevu priti krik do gore in nazaj, potrebuje torej do gore samo polovičen čas, $t = 2 \text{ s}$. Naprej računamo $s = v \cdot t = 343 \text{ m/s} \cdot 2 \text{ s} = 686 \text{ m}$)

F9 01 01 00 05

$$v_{\text{kolesarja}} = s/t_{\text{kolesarja}}$$

$$t_{\text{kolesarja}} = s/v_{\text{kolesarja}} = 70 \text{ km} / 20 \text{ km/h} = 3,5 \text{ h} = 3 \text{ h } 30 \text{ min}$$

$$\text{ura prihoda kolesarja} = 7:30 + 3,5 \text{ h} = 11:00 = \text{ura prihoda avtomobila}$$

$$t_{\text{avtomobila}} = s/v_{\text{avtomobila}} = 70 \text{ km} / 105 \text{ km/h} = \frac{2}{3} \text{ h} = 40 \text{ min}$$

$$\text{ura odhoda avtomobila} = \text{ura prihoda avtomobila} - t_{\text{avtomobila}} = 11:00 - 40 \text{ min} = 10:20$$

F9 01 01 00 06

Ker gresta avtomobila enako hitro, se bosta srečala točno na polovici poti, zato upoštevamo, da bo en avto prevozil $s = 5 \text{ km}$.

$$v = s/t$$

$$t = s/v = 5 \text{ km} / 130 \text{ km/h} = 0,03846 \text{ h} = 138 \text{ s}$$

F9 01 01 00 07

$$s_{\text{pes}}^2 = a^2 + b^2 = (300 \text{ m})^2 + (400 \text{ m})^2 = 90000 \text{ m}^2 + 160000 \text{ m}^2 = 250000 \text{ m}^2$$

$$s_{\text{pes}} = \sqrt{(250000 \text{ m}^2)} = 500 \text{ m}$$

$$s_{\text{Brigita}} = a + b = 700 \text{ m}$$

$$v = s/t$$

$$t = s/v$$

$$t_{\text{Brigita}} = s_{\text{Brigita}} / v_{\text{Brigita}} = 700 \text{ m} / 3,5 \text{ m/s} = 200 \text{ s}$$

$$t_{\text{pes}} = s_{\text{pes}} / v_{\text{pes}} = 500 \text{ m} / 2,5 \text{ m/s} = 200 \text{ s}$$

Odgovor: Prispeta hkrati.

F9 01 01 00 08

$$t_1 = s_1/v_1 = 90 \text{ km} / 120 \text{ km/h} = 0,75 \text{ h}$$

$$t_2 = 65 \text{ km} / 130 \text{ km/h} = 0,5 \text{ h}$$

$$t_{\text{Anita}} = t_1 + t_{\text{postajališče}} + t_2 = 0,75 \text{ h} + 0,5 \text{ h} + 0,5 \text{ h} = 1,75 \text{ h} = 1 \text{ h } 45 \text{ min}$$

$$\text{ura prihoda Anite} = \text{ura odhoda Anite} + t_{\text{Anita}} = 10:00 + 1,75 \text{ h} = 11:45$$

$$t_{\text{Pija}} = \text{ura prihoda Pije} - \text{ura odhoda Pije} = 1 \text{ h } 35 \text{ min} = 95 \text{ min} = 5700 \text{ s}$$

$$s = s_1 + s_2 = 90 \text{ km} + 65 \text{ km} = 155 \text{ km} = 155000 \text{ m}$$

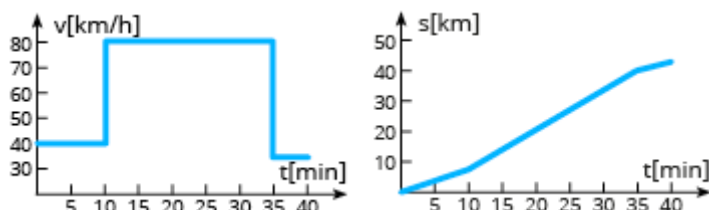
$$v_{\text{Pija}} = 155000 \text{ m} / 5700 \text{ s} = 27,2 \text{ m/s} = 98 \text{ km/h}$$

F9 01 01 00 09

$$v_{\text{Jure}} = s_{\text{Jure}} / t_{\text{Jure}} = 10 \text{ km} / 1,05 \text{ h} = 10000 \text{ m} / 3780 \text{ s} = 2,65 \text{ m/s} = 9,5 \text{ km/h}$$

$$v_{\text{Tina}} = s_{\text{Tina}} / t_{\text{Tina}} = 12 \text{ km} / 1,25 \text{ h} = 12000 \text{ m} / 4500 \text{ s} = 2,67 \text{ m/s} = 9,6 \text{ km/h}$$

Hitreje teče Tina.

F9 01 01 00 10

(sliki FIZ9_01_01_00_10_A in FIZ9_01_01_00_10_D)

FIZ9_01_02_00

F9 01 02 00 01

$$\Delta v = v - v_0 = 25 \text{ m/s} - 0 \text{ m/s} = 25 \text{ m/s}$$

$$a = \Delta v / t = 25 \text{ m/s} / 3 \text{ s} = 8,33 \text{ m/s}^2$$

F9 01 02 00 02

$$\Delta v = a \cdot t = 2 \text{ m/s}^2 \cdot 20 \text{ s} = 40 \text{ m/s}$$

$$v = \Delta v - v_0 = 40 \text{ m/s} - 0 \text{ m/s} = 40 \text{ m/s}$$

F9 01 02 00 03

$$\Delta v = v - v_0 = 27,78 \text{ m/s} - 55,56 \text{ m/s} = - 27,78 \text{ m/s}$$

(negativno, ker je pojemanje; lahko tudi $\Delta v = v_0 - v = 27,78 \text{ m/s}$ in računamo s to številko)

$$t = \Delta v / a = 27,78 \text{ m/s} / 40 \text{ m/s}^2 = 0,69 \text{ s}$$

F9 01 02 00 04

Da, ko telo zavira.

F9 01 02 00 05

$$\Delta v = v - v_0 = 62,5 \text{ m/s} - 0 \text{ m/s} = 62,5 \text{ m/s}$$

$$a = \Delta v / t = 62,5 \text{ m/s} / 0,004 \text{ s} = 15625 \text{ m/s}^2$$

F9 01 02 00 06

$$\Delta v = a \cdot t = 10 \text{ m/s}^2 \cdot 3 \text{ s} = 30 \text{ m/s}$$

Ker je pojemanje, je sprememba negativna $\rightarrow \Delta v = - 30 \text{ m/s}$

$$v_0 = v - \Delta v = 0 \text{ m/s} - (- 30 \text{ m/s}) = 30 \text{ m/s} = 108 \text{ km/h}$$

(Lahko bi računali brez upoštevanja negativnosti pri pojemku, torej: $\Delta v = v_0 - v$; $v_0 = \Delta v + v =$

$$30 \text{ m/s} + 0 \text{ m/s} = 30 \text{ m/s} = 108 \text{ km/h}$$

F9 01 02 00 07

hitrosti; pospeška

F9 01 02 00 08

$$\Delta v = v - v_0 = 36,11 \text{ m/s} - 11,11 \text{ m/s} = 25 \text{ m/s}$$

$$t = \Delta v / a = 25 \text{ m/s} / 5 \text{ m/s}^2 = 5 \text{ s}$$

F9 01 02 00 09

pot; časom

F9 01 02 00 10

$$\Delta v = v - v_0 = 27,78 \text{ m/s} - 16,67 \text{ m/s} = 11,11 \text{ m/s}$$

$$a = \Delta v / t = 11,11 \text{ m/s} / 5 \text{ s} = 2,2 \text{ m/s}^2$$

$$\Delta v = 36,11 \text{ m/s} - 27,78 \text{ m/s} = 8,33 \text{ m/s}$$

$$t = \Delta v / a = 8,33 \text{ m/s} / 2,2 \text{ m/s}^2 = 3,8 \text{ s}$$

$$\langle v \rangle = (v + v_0) / 2 = (130 \text{ km/h} + 60 \text{ km/h}) / 2 = (36,11 \text{ m/s} + 16,67 \text{ m/s}) / 2 = 26,4 \text{ m/s} = 95 \text{ km/h}$$

FIZ9_01_02_01

F9 01 02 01 01

$$s = \frac{1}{2} a \cdot t^2 = \frac{1}{2} \cdot 1 \text{ m/s}^2 \cdot (8 \text{ s})^2 = 32 \text{ m}$$

F9 01 02 01 02

$$\Delta v = v - v_0 = 5 \text{ m/s} - 0 \text{ m/s} = 5 \text{ m/s}$$

$$a = \Delta v / t = 5 \text{ m/s} / 10 \text{ s} = 0,5 \text{ m/s}^2$$

$$s = \frac{1}{2} a \cdot t^2 = \frac{1}{2} \cdot 0,5 \text{ m/s}^2 \cdot (10 \text{ s})^2 = 25 \text{ m}$$

F9 01 02 01 03

$$a = s / (\frac{1}{2} t^2) = 160 \text{ m} / (\frac{1}{2} \cdot (8,5 \text{ s})^2) = 4,43 \text{ m/s}^2$$

F9 01 02 01 04

kvadratom; 16

F9 01 02 01 05

$$\Delta v = v - v_0 = 27,78 \text{ m/s} - 0 \text{ m/s} = 27,78 \text{ m/s}$$

$$a = \Delta v / t = 27,78 \text{ m/s} / 6 \text{ s} = 4,63 \text{ m/s}^2$$

$$s = \frac{1}{2} a \cdot t^2 = \frac{1}{2} \cdot 4,63 \text{ m/s}^2 \cdot (6 \text{ s})^2 = 83,3 \text{ m}$$

F9 01 02 01 06

$$a = s / (\frac{1}{2} t^2) = 2890 \text{ m} / (\frac{1}{2} \cdot (34 \text{ s})^2) = 5 \text{ m/s}^2$$

F9 01 02 01 07

$$s = \frac{1}{2} a \cdot t^2 = \frac{1}{2} \cdot 0,5 \text{ m/s}^2 \cdot (40 \text{ s})^2 = 400 \text{ m}$$

F9 01 02 01 08

$$a = s / (\frac{1}{2} t^2) = 70 \text{ m} / (\frac{1}{2} \cdot (5 \text{ s})^2) = 5,6 \text{ m/s}^2$$

$$\Delta v = a \cdot t = 5,6 \text{ m/s}^2 \cdot 5 \text{ s} = 28 \text{ m/s}$$

$$v = v_0 + \Delta v = 0 \text{ m/s} + 28 \text{ m/s} = 28 \text{ m/s} = 100,8 \text{ km/h}$$

F9 01 02 01 09

$$v = s / t = 5320 \text{ km} / 137 \text{ h} = 38,83 \text{ km/h} = 10,78 \text{ m/s} = 21 \text{ vozlov}$$

$$a = \Delta v / t = 10,78 \text{ m/s} / 180 \text{ s} = 0,06 \text{ m/s}^2$$

F9 01 02 01 10

$$a_1 = \Delta v_1 / t_1 = 1,94 \text{ m/s} / 180 \text{ s} = 0,011 \text{ m/s}^2$$

$$s_1 = \frac{1}{2} a_1 \cdot t_1^2 = \frac{1}{2} \cdot 0,011 \text{ m/s}^2 \cdot (180 \text{ s})^2 = 174,6 \text{ m}$$

$$s_2 = v_2 \cdot t_2 = 1,94 \text{ m/s} \cdot 1020 \text{ s} = 1978,8 \text{ m}$$

$$a_3 = \Delta v_3 / t_3 = 2,5 \text{ m/s} / 60 \text{ s} = 0,042 \text{ m/s}^2$$

$$s_3 = \frac{1}{2} a_3 \cdot t_3^2 = \frac{1}{2} \cdot 0,042 \cdot (60 \text{ s})^2 = 75 \text{ m}$$

$$s_4 = 900 \text{ m}$$

$$t_4 = s_4 / v_4 = 900 \text{ m} / 2,5 \text{ m/s} = 360 \text{ s} = 6 \text{ min}$$

$$t_5 = 30 \text{ min} - t_1 - t_2 - t_{\text{počitek}} - t_3 - t_4 = 30 \text{ min} - 3 \text{ min} - 17 \text{ min} - 2 \text{ min} - 1 \text{ min} - 6 \text{ min} = 1 \text{ min}$$

$$a_5 = \Delta v_5 / t_5 = 2,5 \text{ m/s} / 60 \text{ s} = 0,042 \text{ m/s}^2$$

$$s_5 = 75 \text{ m}$$

$$s = s_1 + s_2 + s_3 + s_4 + s_5 = 174,6 \text{ m} + 1978,9 \text{ m} + 75 \text{ m} + 900 \text{ m} + 75 \text{ m} = 3203,5 \text{ m} = 3,2 \text{ km}$$

F9 01 02 01 11

$$a_3 = \Delta v_3 / t_3 = 10 \text{ m/s} / 30 \text{ s} = 0,3 \text{ m/s}^2$$

$$t_{\text{maratonec}} = s / v_{\text{maratonec}} = 42 \text{ km} / 10 \text{ km/h} = 4,2 \text{ h} = 15120 \text{ s}$$

$$a_1 = \Delta v_1 / t_1 = 8,33 \text{ m/s} / 30 \text{ s} = 0,28 \text{ m/s}^2$$

$$s_1 = \frac{1}{2} a_1 \cdot t_1^2 = \frac{1}{2} \cdot 0,28 \text{ m/s}^2 \cdot (30 \text{ s})^2 = 125 \text{ m}$$

$$s_2 = v_1 \cdot t_2 = 8,33 \text{ m/s} \cdot 2670 \text{ s} = 22241 \text{ m}$$

$$s_3 = \frac{1}{2} a_3 \cdot t_3^2 = \frac{1}{2} \cdot 0,3 \text{ m/s}^2 \cdot (30 \text{ s})^2 = 150 \text{ m}$$

$$s_4 = s - s_1 - s_2 - s_3 = 42000 \text{ m} - 125 \text{ m} - 22241 \text{ m} - 150 \text{ m} = 19484 \text{ m}$$

$$t_4 = s_4 / v_4 = 19484 \text{ m} / 10 \text{ m/s} = 1948,4 \text{ s}$$

$$t_{\text{popravilo}} = t_{\text{maratonec}} - t_1 - t_2 - t_3 - t_4 = 15120 \text{ s} - 30 \text{ s} - 2670 \text{ s} - 30 \text{ s} - 1948 \text{ s} = 10442 \text{ s} = 174 \text{ min}$$

FIZ9_01_03_00

F9 01 03 00 01

A, B, D

F9 01 03 00 02

Enakomerno pospešeno

F9 01 03 00 03

D

F9 01 03 00 04

Enaka teži padala in padalca

F9 01 03 00 05

Enaka nič

FIZ9_01_03_01

F9 01 03 01 01

$$m = F/a = 200 \text{ N} / 4 \text{ m/s}^2 = 50 \text{ kg}$$

F9 01 03 01 02

$$a = \Delta v/t = 16,666.. \text{ m/s} / 0,05 \text{ s} = 333,33 \text{ m/s}^2$$

$$F = m \cdot a = 0,4 \text{ kg} \cdot 333,33 \text{ m/s}^2 = 133,33 \text{ N}$$

F9 01 03 01 03

$$a = F/m = 9000 \text{ N} / 750 \text{ kg} = 12 \text{ m/s}^2$$

F9 01 03 01 04

$$a = \Delta v/t = 13 \text{ m/s} / 0,012 \text{ s} = 1083,33 \text{ m/s}^2$$

$$F = m \cdot a = 0,058 \text{ kg} \cdot 1083,33 \text{ m/s}^2 = 62,83 \text{ N}$$

F9 01 03 01 05

Vrv ni napeta zgolj zaradi pospeševanja, temveč tudi zaradi teže dvigala.

$$F_g = m \cdot g = 8000 \text{ N}$$

$$F_1 = m \cdot a = 800 \text{ kg} \cdot 0,25 \text{ m/s}^2 = 200 \text{ N}$$

$$F = F_g + F_1 = 8200 \text{ N}$$

F9 01 03 01 06

Pospešek telesa je -2 m/s^2 .

Smer rezultante zunanjih sil je nasprotna smeri gibanja telesa.

Graf hitrosti v odvisnosti od časa za to gibanje bi bila premica.

F9 01 03 01 07

je nič

F9 01 03 01 08

velikosti rezultante sil; mase

F9 01 03 01 09

maso, silo in pospeškom

F9 01 03 01 10

$$a = \Delta v/t = 28,83 \text{ m/s} / 6 \text{ s} = 4,81 \text{ m/s}^2$$

$$F = m \cdot a = 62 \cdot 4,81 \text{ m/s}^2 = 298 \text{ N}$$

$$s = \frac{1}{2} a \cdot t^2 = \frac{1}{2} \cdot 4,81 \text{ m/s}^2 \cdot (6 \text{ s})^2 = 86,5 \text{ m}$$

F9 01 03 01 11

v desno

F9 01 03 01 12

$$F = F_{\text{desno}} - F_{\text{levo}} = 45 \text{ N} - 26 \text{ N} = 19 \text{ N} \text{ (vsota sil v smeri pospeševanja)}$$

$$a = F/m = 19 \text{ N} / 25 \text{ kg} = 0,76 \text{ m/s}^2$$

F9 01 03 01 13

$$F = F_{\text{Anže}} + F_{\text{Klemen}} - F_{\text{trenje}} = 280 \text{ N} + 250 \text{ N} - 420 \text{ N} = 110 \text{ N}$$

$$a = F/m = 110 \text{ N} / 160 \text{ kg} = 0,69 \text{ m/s}^2$$

$$\Delta v = a \cdot t = 0,69 \text{ m/s}^2 \cdot 2,5 \text{ s} = 1,72 \text{ m/s}$$

$$v = \Delta v + v_0 = 1,72 \text{ m/s} + 0 \text{ m/s} = 1,72 \text{ m/s}$$

$$s = \frac{1}{2} a \cdot t^2 = \frac{1}{2} \cdot 0,69 \text{ m/s}^2 \cdot (2,5 \text{ s})^2 = 2,15 \text{ m}$$

F9 01 03 01 14

$$s_1 = v \cdot t_1 = 35 \text{ m/s} \cdot 1,5 \text{ s} = 52,5 \text{ m}$$

$$a = F/m = 15000 \text{ N} / 1800 \text{ kg} = 8,33 \text{ m/s}^2$$

$$t_2 = \Delta v/a = 35 \text{ m/s} / 8,33 \text{ m/s}^2 = 4,2 \text{ s}$$

$$s_2 = \frac{1}{2} a \cdot t_2^2 = \frac{1}{2} \cdot 8,33 \text{ m/s}^2 \cdot (4,2 \text{ s})^2 = 73,5 \text{ m}$$

$$s = s_1 + s_2 = 126 \text{ m}$$

$$t_1' = 1,5 \text{ s} \cdot 140 \% = 1,5 \text{ s} \cdot 1,4 = 2,1 \text{ s}$$

$$s_1' = v \cdot t_1' = 35 \text{ m/s} \cdot 2,1 \text{ s} = 73,5 \text{ m}$$

$$s' = s_1' + s_2 = 147 \text{ m}$$

FIZ9_01_03_02

F9 01 03 02 01

400 N; 2 N; 50000 N

F9 01 03 02 02

$$m = F_{gZemlja} / g_{Zemlja} = 100 \text{ N} / 10 \text{ m/s}^2 = 10 \text{ kg}$$

$$F_{gLuna} = m \cdot g_{Luna} = 10 \text{ kg} \cdot 1,6 \text{ m/s}^2 = 16 \text{ N}$$

F9 01 03 02 03

800 N (velikost je vedno pozitivna količina)

F9 01 03 02 04

$$g_{Lune} = s / (\frac{1}{2} \cdot t^2) = 10 \text{ m} / (\frac{1}{2} \cdot (3,5 \text{ s})^2) = 1,63 \text{ m/s}^2$$

$$F_{gLune} = m \cdot g_{Lune} = 16 \text{ kg} \cdot 1,6 \text{ m/s}^2 = 26,12 \text{ N}$$

F9 01 03 02 05

železna krogla (zaradi sile vzgona)

F9 01 03 02 06

teža

F9 01 03 02 07

9 kg

F9 01 03 02 08

oba hkrati

F9 01 03 02 09

$$g = F/m = 133 \text{ N} / 7 \text{ kg} = 19 \text{ m/s}^2$$

F9 01 03 02 10

$$F = F_g - F_{upora} = 560 \text{ N} - 120 \text{ N} = 440 \text{ N}$$

$$a = F/m = 440 \text{ N} / 56 \text{ kg} = 7,9 \text{ m/s}^2$$

F9 01 03 02 11

$$t_1 = \sqrt{(s / (\frac{1}{2} a))} = \sqrt{(45 \text{ m} / (\frac{1}{2} \cdot 10 \text{ m/s}^2))} = 3 \text{ s}$$

$$t_2 = s / v_{zvoka} = 45 \text{ m} / 343 \text{ m/s} = 0,13 \text{ s}$$

$$t = t_1 + t_2 = 3 \text{ s} + 0,13 \text{ s} = 3,13 \text{ s}$$

FIZ9_01_04_00

F9 01 04 00 01

$$\text{frekvencia} = N/t = 800 / 60 \text{ s} = 13,33 \text{ Hz}$$

F9 01 04 00 02

$$t_0 = t/N = 1 \text{ s} / 3 = 0,33 \text{ s}$$

$$v = 2 \pi r / t_0 = 2 \cdot \pi \cdot 2 \text{ m} / 0,33 \text{ s} = 37,7 \text{ m/s}$$

F9 01 04 00 03

$$v = 2 \pi r / t_0 = 2 \cdot \pi \cdot 150000000 \text{ km} / 8760 \text{ h} = 107589 \text{ km/h}$$

F9 01 04 00 04

$$t_0 = 1 \text{ dan} = 86400 \text{ s}$$

$$v = 2 \pi r / t_0 = 2 \cdot \pi \cdot 42400000 \text{ m} / 86400 \text{ s} = 3083 \text{ m/s} = 3,08 \text{ km/s}$$

F9 01 04 00 05

obodna; smer; velikost

F9 01 04 00 06

$$t = N/\square = 1/0,02 \text{ Hz} = 50 \text{ s}$$

F9 01 04 00 07

$$v = s/t = 1,5 \text{ m} / 2 \text{ s} = 0,75 \text{ m/s}$$

$$t_0 = 2 \pi r / v = 2 \cdot \pi \cdot 0,07 \text{ m} / 0,75 \text{ m/s} = 0,59 \text{ s}$$

$$\text{frekvencia} = 1/t_0 = 1 / 0,59 \text{ s} = 1,7 \text{ Hz}$$

F9 01 04 00 08

$$t_0 = 2 \pi r_{\text{Vesna}} / v_{\text{Vesna}} = 2 \cdot \pi \cdot 3 \text{ m} / 2,7 \text{ m/s} = 7 \text{ s}$$

$$r_{\text{Leja}} = v_{\text{Leja}} \cdot t_0 / (2 \cdot \pi) = 1,8 \text{ m/s} \cdot 7 \text{ s} / (2 \cdot \pi) = 2,0 \text{ m}$$

F9 01 04 00 09

$$t_0 = 4 \cdot t = 4 \cdot 1 \text{ s} = 4 \text{ s}$$

$$v = 2 \pi r / t_0 = 2 \cdot \pi \cdot 8 \text{ m} / 4 \text{ s} = 12,6 \text{ m/s} = 45 \text{ km/h}$$

F9 01 04 00 10

$$t_{0\text{Pedala}} = t/N = 1 \text{ s} / 2 = 0,5 \text{ s}$$

$$v_{\text{zobnikPedala}} = 2 \pi r_{\text{zobnikPedala}} / t_0 = 2 \cdot \pi \cdot 0,06 \text{ m} / 0,5 \text{ s} = 0,75 \text{ m/s}$$

$$v_{\text{zobnikPedala}} = v_{\text{zobnikKolo}}$$

$$t_{0\text{Kolo}} = 2 \pi r_{\text{zobnikKolo}} / v_{\text{zobnikKolo}} = 2 \cdot \pi \cdot 0,03 \text{ m} / 0,75 \text{ m/s} = 0,25 \text{ s}$$

$$v_{\text{kolo}} = 2 \pi r_{\text{kolo}} / t_{0\text{Kolo}} = 2 \cdot \pi \cdot 0,36 \text{ m} / 0,25 \text{ s} = 9 \text{ m/s}$$

$$t = s/v = 11000 \text{ m} / 9 \text{ m/s} = 1222,22 \text{ s} = 20 \text{ min}$$

F9 01 04 00 11

$$t_0 = t/N = 6,0 \text{ s} / 9 = 0,667 \text{ s}$$

$$v = 2 \pi r / t_0 = 2 \cdot \pi \cdot 0,2 \text{ m} / 0,667 \text{ s} = 1,88 \text{ m/s} = 1,9 \text{ m/s}$$