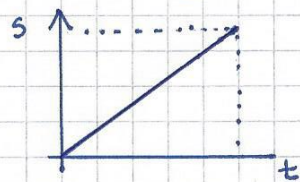


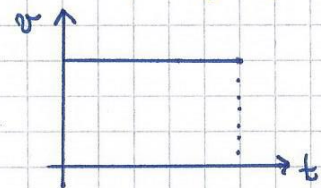
Gibanja i sila - ponavljanje

JEDNOLIKO GIBANJE

a) s, t graf



b) v, t graf $\Rightarrow v = \text{stalna}$

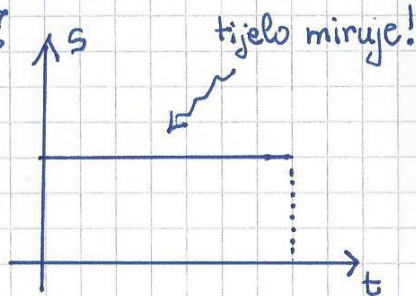


FORMULA: $v = \frac{s}{t}$

izvedene formule: $s = v \cdot t$, $t = \frac{s}{v}$

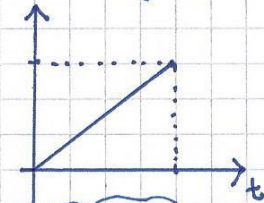
$\frac{\text{km}}{\text{h}} \cdot 1,6 \rightarrow \frac{\text{m}}{\text{s}}$ $\frac{\text{m}}{\text{s}} \cdot 3,6 \rightarrow \frac{\text{km}}{\text{h}}$

VAŽNO!

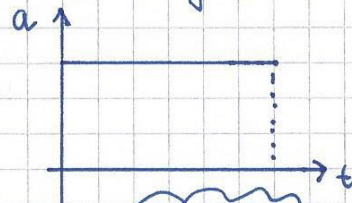


JEDNOLIKO UBRZANO GIBANJE

a) v, t graf



b) a, t graf



FORMULA:

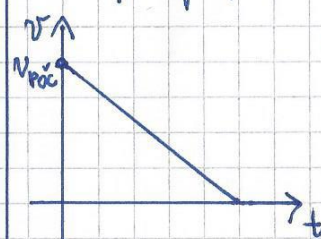
$a = \frac{\Delta v}{\Delta t}$ $\Delta v = v_{\text{kon}} - v_{\text{poč}}$

izvedene formule:

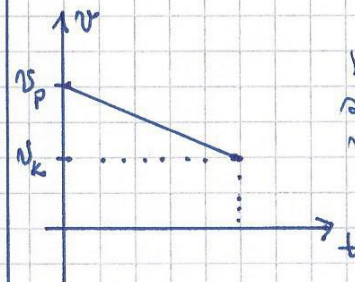
$a = \frac{v}{t} \Rightarrow v = a \cdot t$ $t = \frac{v}{a}$

JEDNOLIKO USPORENO GIBANJE

a) v, t graf



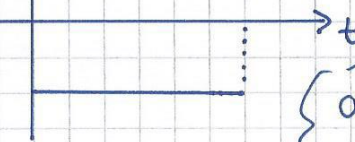
tijelo se zaustavilo



brzina se smanjila s $v_{\text{poč}}$ na v_{kon} !

b) a, t graf

a



a je stalna $a < 0$

$a = \frac{\Delta v}{\Delta t}$

$\Delta v = v_{\text{kon}} - v_{\text{poč}}$

II. NEWTONOV ZAKON

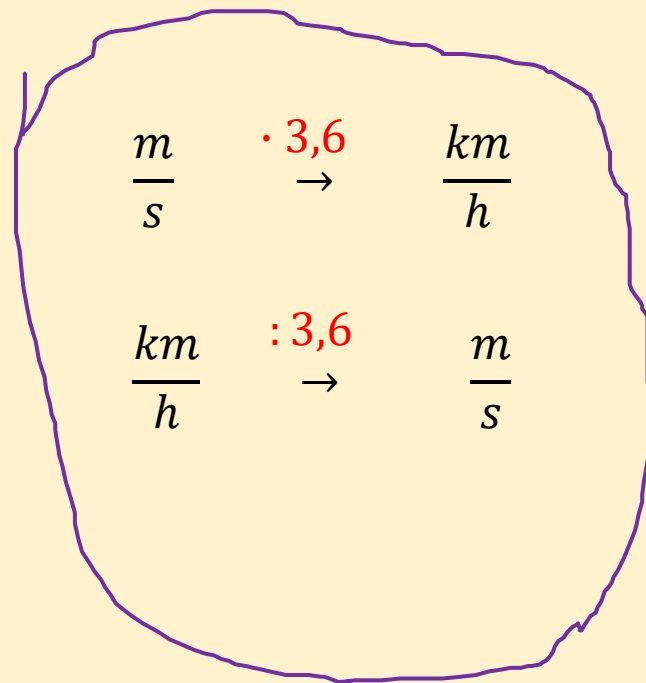
$F = m \cdot a \Rightarrow a = \frac{F}{m}$, $m = \frac{F}{a}$

SREDNJA BRZINA

$\bar{v} = \frac{\Delta s_k}{t_{\text{uk}}}$



Zadatak 1. Preračunaj:



a) $5 \text{ m/s} = \underline{\hspace{10em}} \text{ km/h}$

b) $72 \text{ km/h} = \underline{\hspace{10em}} \text{ m/s}$

Zadatak 1. Preračunaj:

$$\text{a) } 5 \text{ m/s} = \underline{5 \cdot 3,6 \text{ km/h}} = 18 \text{ km/h}$$

$$\text{b) } 72 \text{ km/h} = \underline{72 : 3,6 \text{ m/s}} = 20 \text{ m/s}$$

Zadatak 2. Tijelo se giba jednoliko brzinom 16km/h . Koliko je vremena potrebno tijelu da prijeđe put od 48km ?

Zadatak 2. Tijelo se giba **jednoliko** brzinom 16km/h. Koliko je vremena potrebno tijelu da prijeđe put od 48km?

$$v = \frac{s}{t}$$

$$s = v \cdot t$$

$$t = \frac{s}{v}$$

Handwritten solution on grid paper:

$$v = 16 \frac{\text{km}}{\text{h}}$$
$$s = 48 \text{ km}$$

$$t = \frac{s}{v}$$
$$t = \frac{48 \text{ km}}{16 \frac{\text{km}}{\text{h}}}$$
$$t = 3 \text{ h}$$

Zadatak 3. Tijelu se za 5s poveća brzina od 5m/s na 20m/s.
Kojom akceleracijom se giba tijelo?

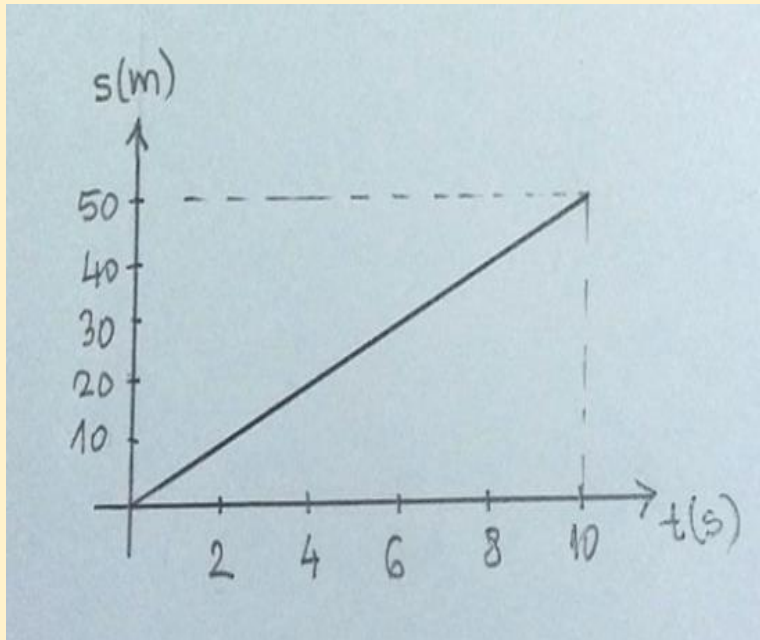
Zadatak 3. Tijelu se za 5s **poveća brzina** od 5m/s na 20m/s.
Kojom **akceleracijom** se giba tijelo?

$$\begin{array}{l} v_{\text{POČ}} = 5 \text{ m/s} \\ v_{\text{KON}} = 20 \text{ m/s} \end{array} \left. \vphantom{\begin{array}{l} v_{\text{POČ}} = 5 \text{ m/s} \\ v_{\text{KON}} = 20 \text{ m/s} \end{array}} \right\} \Delta v = v_{\text{KON}} - v_{\text{POČ}} = 20 \frac{\text{m}}{\text{s}} - 5 \frac{\text{m}}{\text{s}} = 15 \frac{\text{m}}{\text{s}}$$
$$\Delta t = 5 \text{ s}$$

$$a = \frac{\Delta v}{\Delta t} = \frac{15 \frac{\text{m}}{\text{s}}}{5 \text{ s}} = 3 \frac{\text{m}}{\text{s}^2}$$

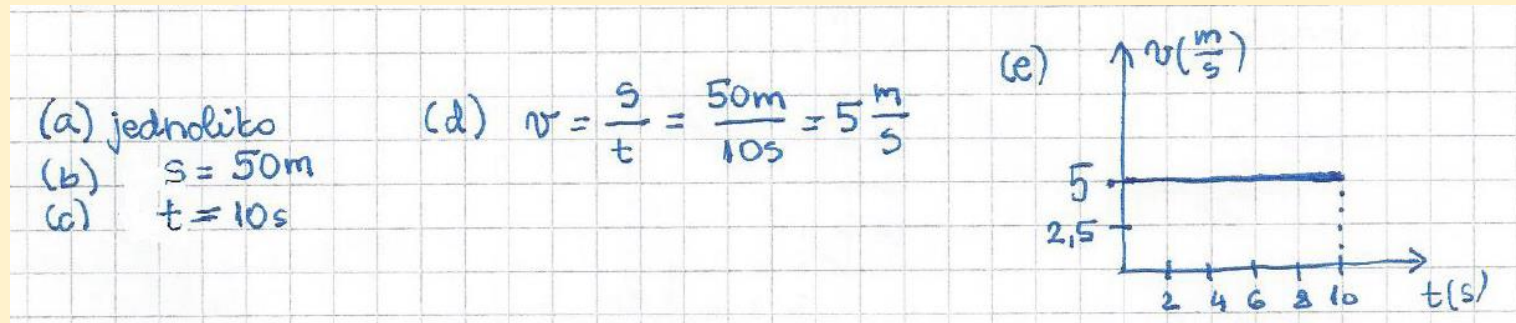
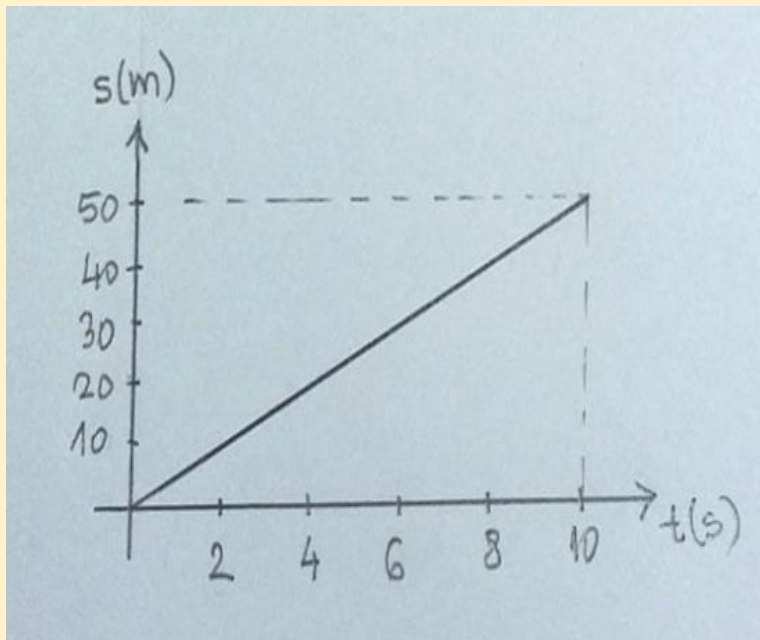
Zadatak 4. Gibanje tijela prikazano je grafom puta (s,t graf).

- (a) Kako se tijelo giba?
- (b) Koliki je ukupni put tijelo prešlo?
- (c) Koliko se dugo tijelo giba?
- (d) Odredi brzinu kojom se tijelo giba.
- (e) Nacrtaj v,t graf!



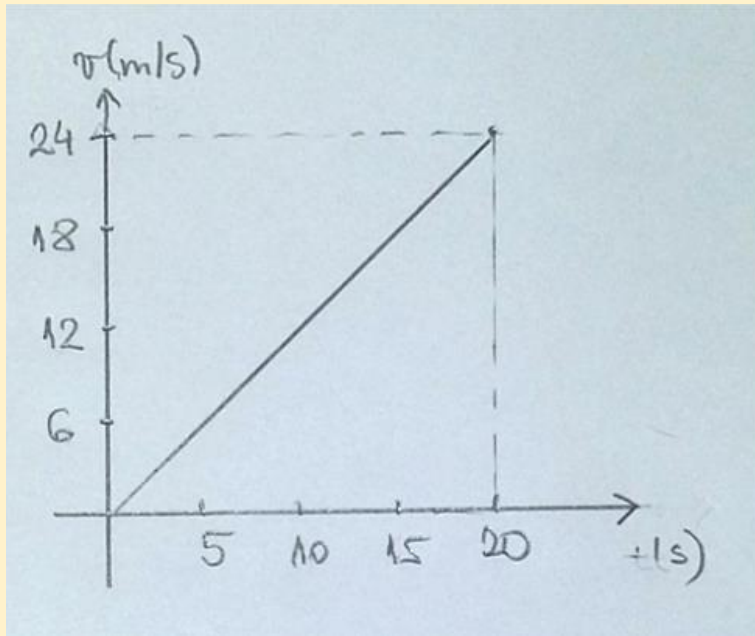
Zadatak 4. Gibanje tijela prikazano je **grafom puta** (s, t graf).

- (a) Kako se tijelo giba?
- (b) Koliki je ukupni put tijelo prešlo?
- (c) Koliko se dugo tijelo giba?
- (d) Odredi brzinu kojom se tijelo giba.
- (e) Nacrtaj v, t graf!



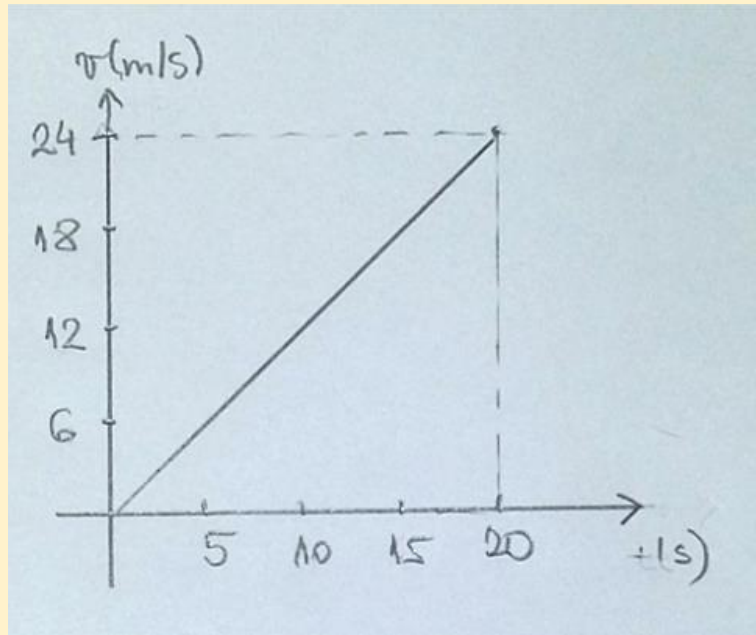
Zadatak 5. Na slici je graf ovisnosti brzine o vremenu (v,t graf) nekog tijela koje se giba.

- (a) Kako se tijelo giba?
- (b) Odredi akceleraciju tijela!
- (c) Nacrtaj a,t graf gibanja tijela!



Zadatak 5. Na slici je **graf ovisnosti brzine o vremenu (v,t graf)** nekog tijela koje se giba.

- (a) Kako se tijelo giba?
- (b) Odredi akceleraciju tijela!
- (c) Nacrtaj a,t graf gibanja tijela!



(a) jednoliko ubrzano

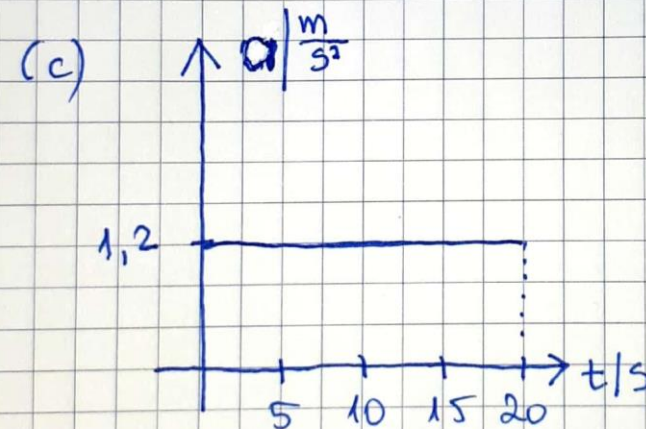
$$(b) \Delta v = v_2 - v_1 = 24 \frac{\text{m}}{\text{s}} - 0 \frac{\text{m}}{\text{s}} = 24 \frac{\text{m}}{\text{s}}$$

$$\Delta t = t_2 - t_1 = 20 \text{s} - 0 \text{s} = 20 \text{s}$$

$$a = \frac{\Delta v}{\Delta t}$$

$$a = \frac{24 \frac{\text{m}}{\text{s}}}{20 \text{s}}$$

$$a = 1,2 \frac{\text{m}}{\text{s}^2}$$



Zadatak 6. Na tijelo mase 10 kg djeluje od samog početka gibanja sila od 10 N tijekom 10s.

(a) Izračunaj akceleraciju tijela.

(b) Izračunaj brzinu koju postigne tijelo.

(c) Nacrtaj za to gibanje v,t i a,t graf.

Zadatak 6. Na tijelo mase 10 kg **djeluje** od samog početka gibanja **sila od 10 N** tijekom 10s.

- (a) Izračunaj akceleraciju tijela.
- (b) Izračunaj brzinu koju postigne tijelo.
- (c) Nacrtaj za to gibanje v,t i a,t graf.

$$v_1 = 0 \frac{m}{s} \text{ (od početka gibanja } \Rightarrow \text{ iz mirovanja)}$$

$$m = 10 \text{ kg}$$

$$F = 10 \text{ N}$$

$$\Delta t = 10 \text{ s}$$

a) $F = m \cdot a$

$$a = \frac{F}{m}$$

$$a = \frac{10 \text{ N}}{10 \text{ kg}}$$

$$a = 1 \frac{m}{s^2}$$

b) $\Delta v = ?$

$$a = \frac{\Delta v}{\Delta t}$$

$$\Delta v = a \cdot \Delta t$$

$$\Delta v = 1 \frac{m}{s^2} \cdot 10 \text{ s}$$

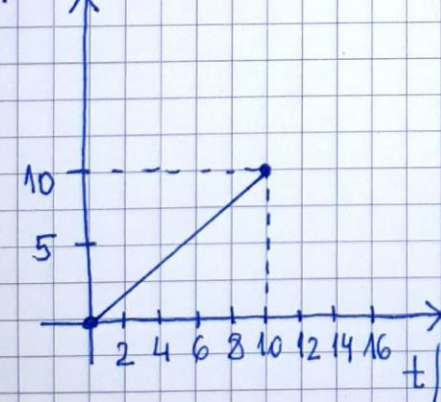
$$\Delta v = 10 \frac{m}{s}$$

$$\Delta v = v_2 - v_1$$

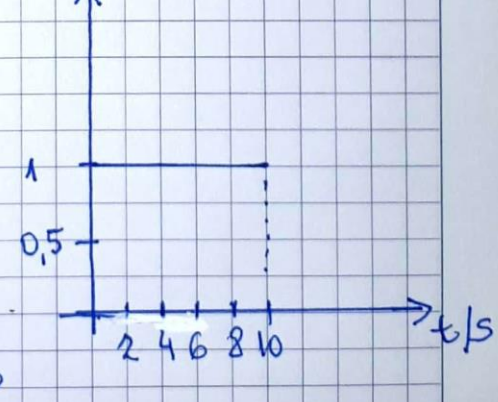
$$10 \frac{m}{s} = v_2 - 0 \frac{m}{s}$$

$$v_2 = 10 \frac{m}{s}$$

c) $v / \frac{m}{s}$



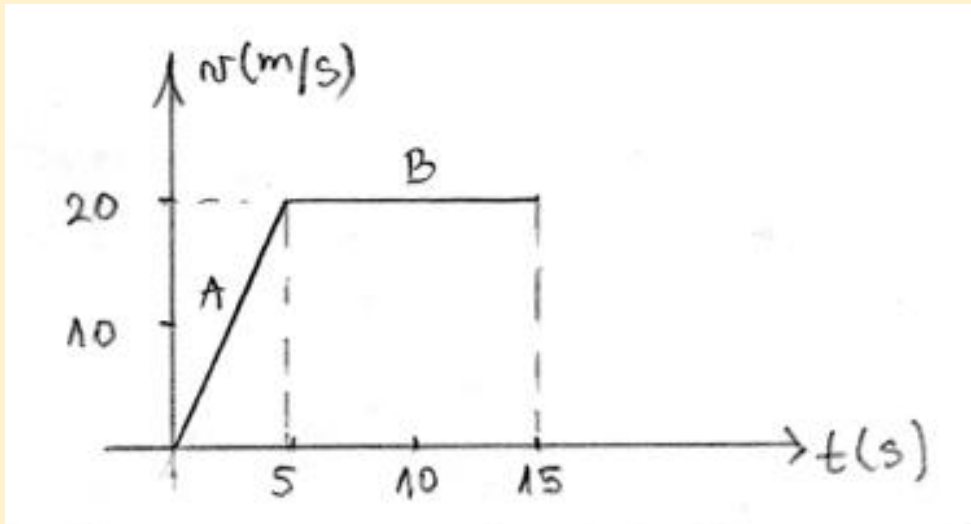
$a / \frac{m}{s^2}$



Zadatak 7.

Na slici je v, t graf nekog tijela koje se giba.

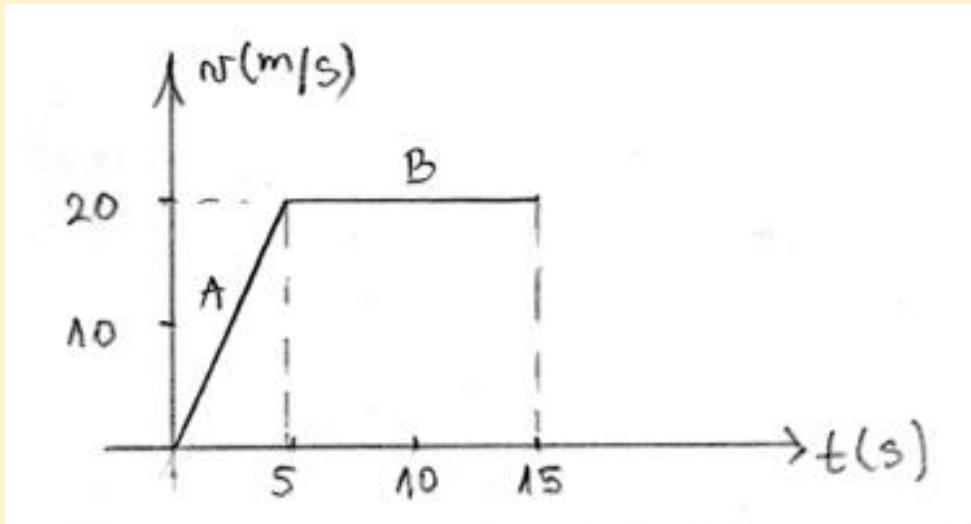
- (a) Kako se tijelo giba na dionicama A i B?
- (b) Odredi akceleraciju tijela na pojedinim dijelovima puta.
- (c) Nacrtaj a, t graf.



Zadatak 7.

Na slici je v, t graf nekog tijela koje se giba.

- Kako se tijelo giba na dionicama A i B?
- Odredi akceleraciju tijela na pojedinim dijelovima puta.
- Nacrtaj a, t graf.



- A - jednoliko ubrzano
- B - jednoliko

$$b) \boxed{A} \quad \Delta v = v_2 - v_1 = 20 \frac{m}{s} - 0 \frac{m}{s} = 20 \frac{m}{s}$$
$$\Delta t = t_2 - t_1 = 5s - 0s = 5s$$

$$a = \frac{\Delta v}{\Delta t}$$

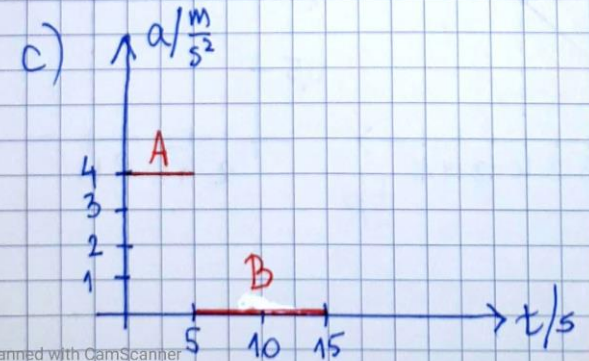
$$a = \frac{20 \frac{m}{s}}{5s}$$

$$a = 4 \frac{m}{s^2}$$

$$\boxed{B} \quad \Delta v = 20 \frac{m}{s} - 20 \frac{m}{s} = 0$$

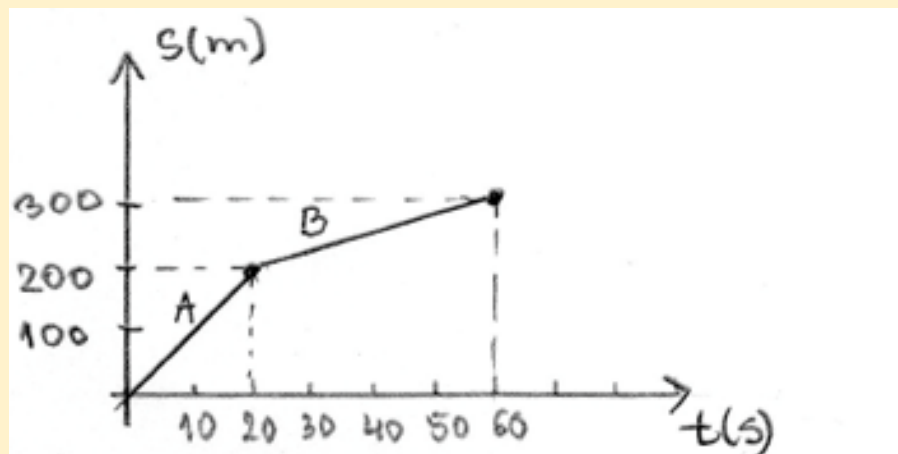
$$\Delta t = 15s - 5s = 10s$$

$$a = \frac{\Delta v}{\Delta t} = 0 \frac{m}{s^2}$$



Zadatak 8. Gibanje tijela prikazano je s,t grafom.

- (a) Kako se tijelo giba na dionicama A i B?
- (b) Odredi brzine kojima se tijelo giba na svakoj pojedinoj dionici.
- (c) Nacrtaj v,t graf.
- (d) Kolika je srednja brzina gibanja tijela?



Zadatak 9. Tijelo se giba brzinom 5 m/s tijekom 10 sekundi.

- (a) Nacrtaj v,t graf.
- (b) Izračunaj put koji tijelo prijeđe u tih 10 sekundi.
- (c) Nacrtaj s,t graf.