Seminari 1

Matematičke metode za informatičare

Damir Horvat

FOI, Varaždin

Sadržaj

Oznake

prvi zadatak

drugi zadatak

treći zadatak

četvrti zadatak

peti zadatak

Dijeljenje dužine u zadanom omjeru

Oznake

Oznake

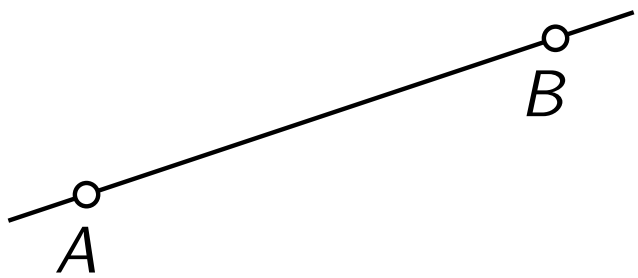
- AB

Oznake

- AB $\overleftrightsquigarrow$ pravac kroz točke A i B

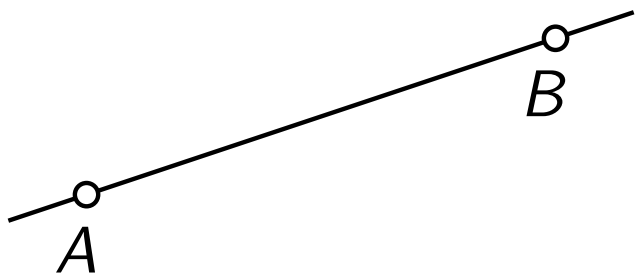
Oznake

- $AB \leftsquigarrow$ pravac kroz točke A i B



Oznake

- AB ⇜ pravac kroz točke A i B



- $\overline{AB}$

Oznake

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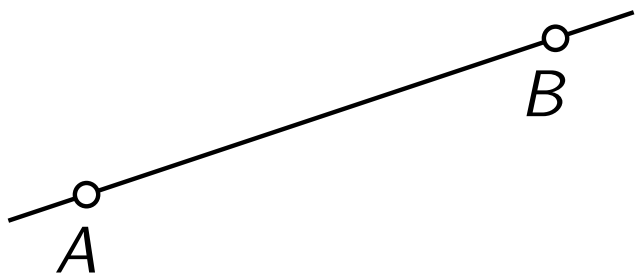

- $\overline{AB}$ ⇜ dužina čiji su krajevi točke A i B

Oznake

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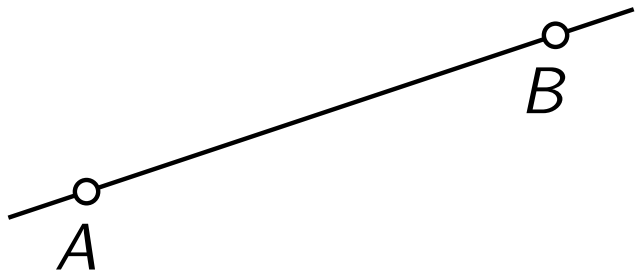

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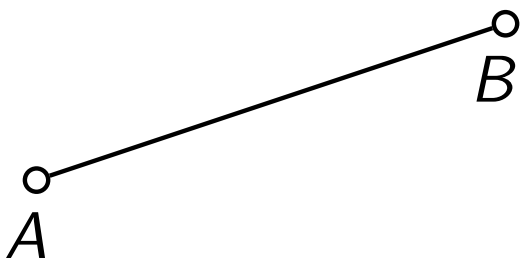

Oznake

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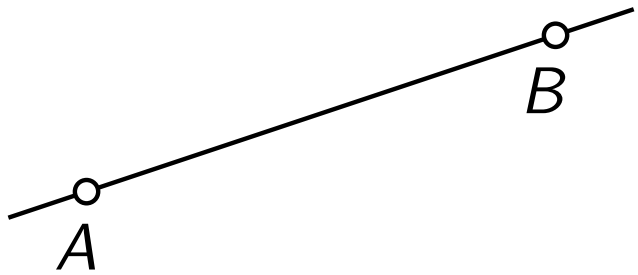

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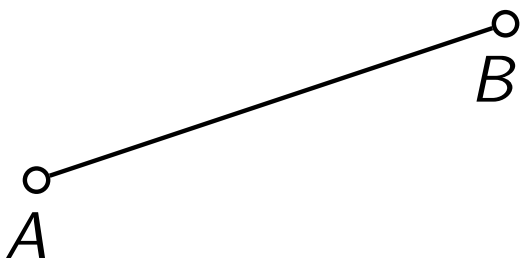

- $|AB|$

Oznake

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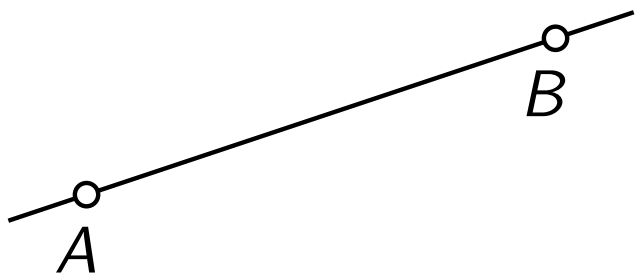
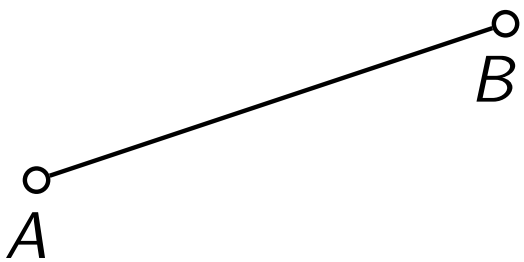


- $\overline{AB}$ ⇜ dužina čiji su krajevi točke A i B



- $|AB|$ ⇜ duljina dužine $\overline{AB}$

Oznake

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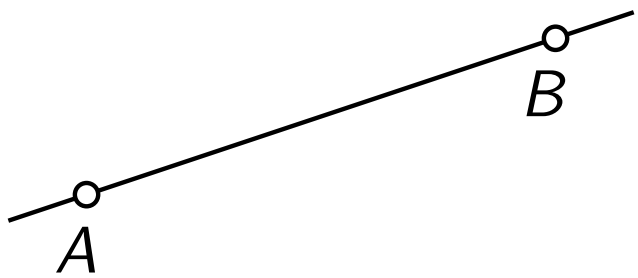

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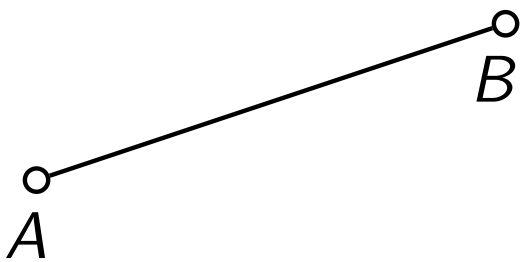

- $|AB|$ ⇜ duljina dužine $\overline{AB}$ (nenegativni realni broj)

- $\overrightarrow{AB}$

- $\overrightarrow{AB}$ orijentirana dužina čiji početak je točka A, a kraj točka B

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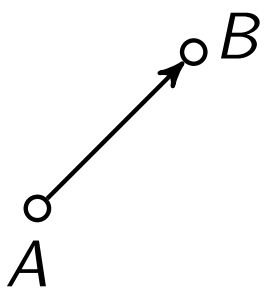
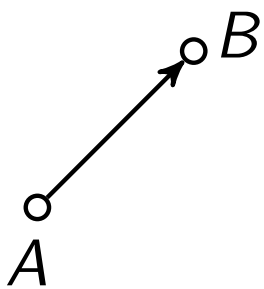


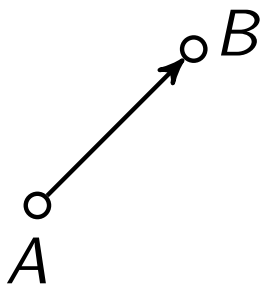
orijentirana dužina $\overrightarrow{AB}$

- $\overrightarrow{AB}$ ↜ orijentirana dužina čiji početak je točka A, a kraj točka B
- $\left[\overrightarrow{AB}\right]$



orijentirana dužina $\overrightarrow{AB}$

- $\overrightarrow{AB}$ ⇜ orijentirana dužina čiji početak je točka A, a kraj točka B
- $\left[\overrightarrow{AB}\right]$ ⇜ vektor čiji reprezentant je orijentirana dužina $\overrightarrow{AB}$



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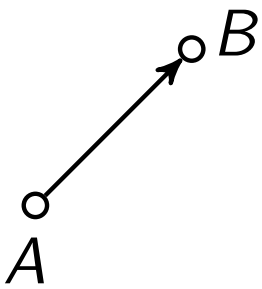
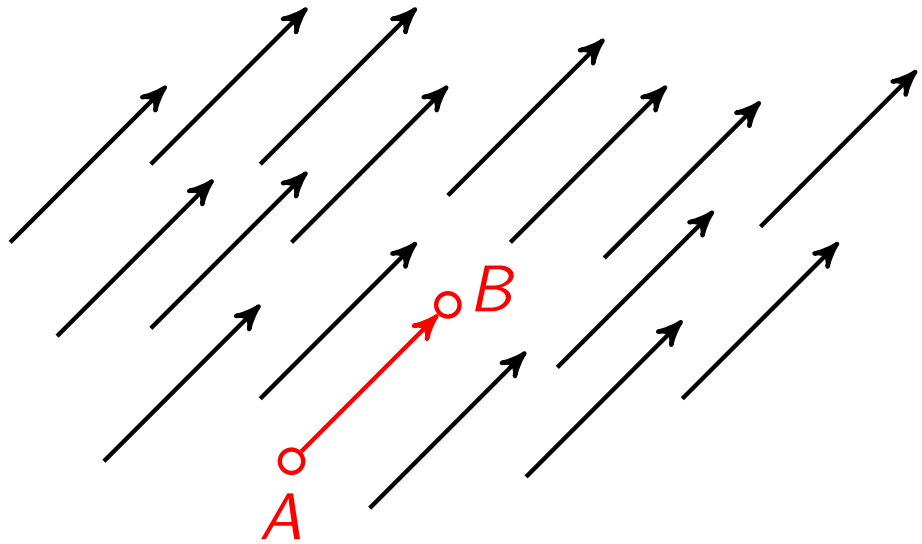
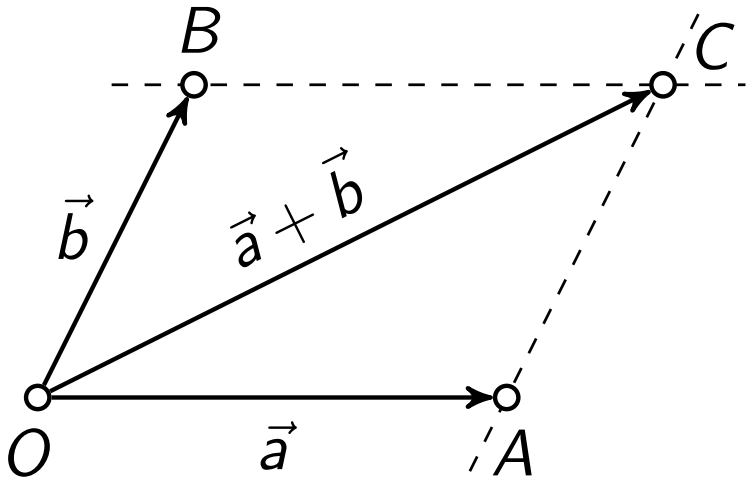
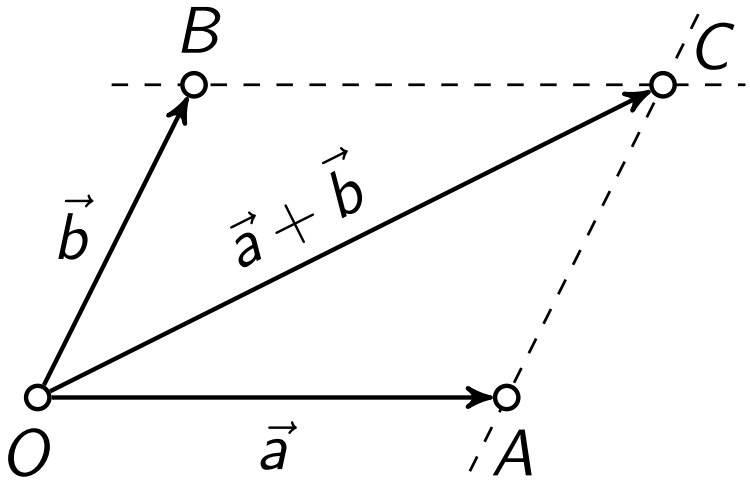


orijentirana dužina $\overrightarrow{AB}$

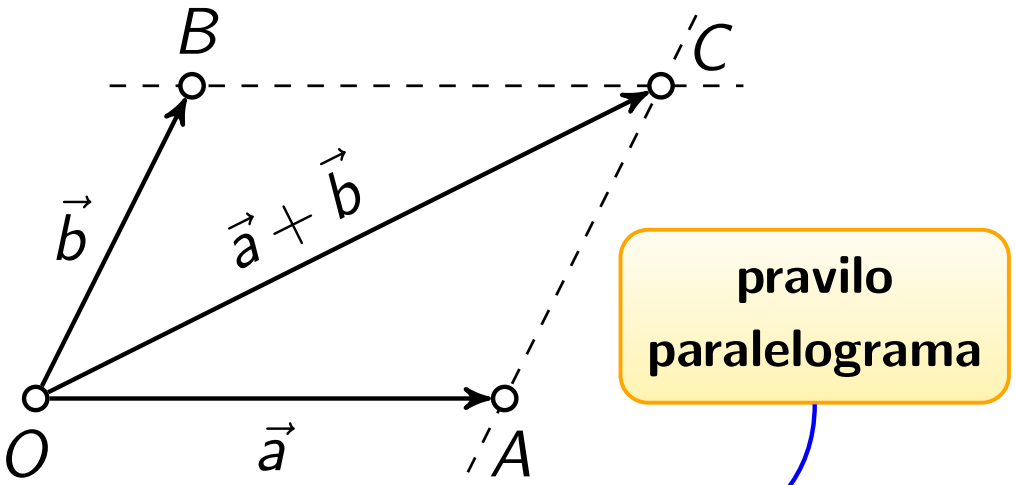


vektor $\left[\overrightarrow{AB}\right]$


B
C
$\vec{b}$
$\vec{a}+\vec{b}$
O
$\vec{a}$
A

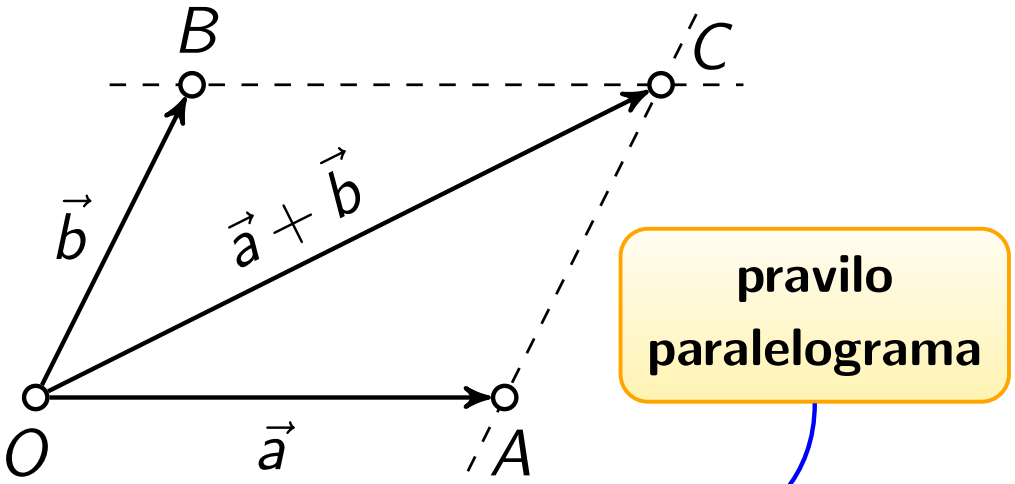


$$\overrightarrow{OA} + \overrightarrow{OB} = \overrightarrow{OC}$$



pravilo paralelograma

$$\overrightarrow{OA} + \overrightarrow{OB} = \overrightarrow{OC}$$



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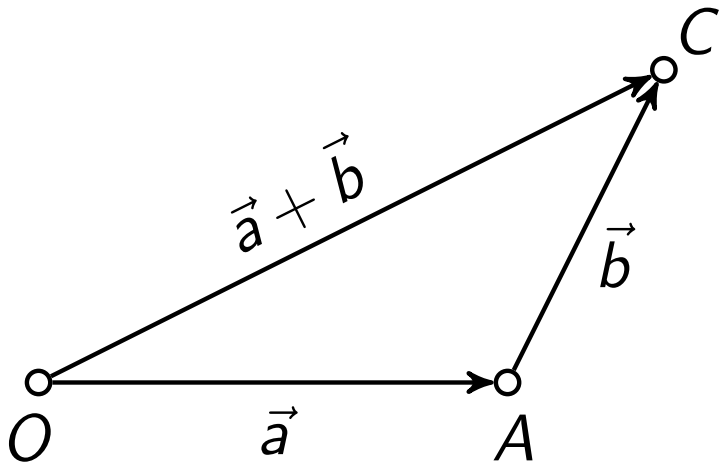

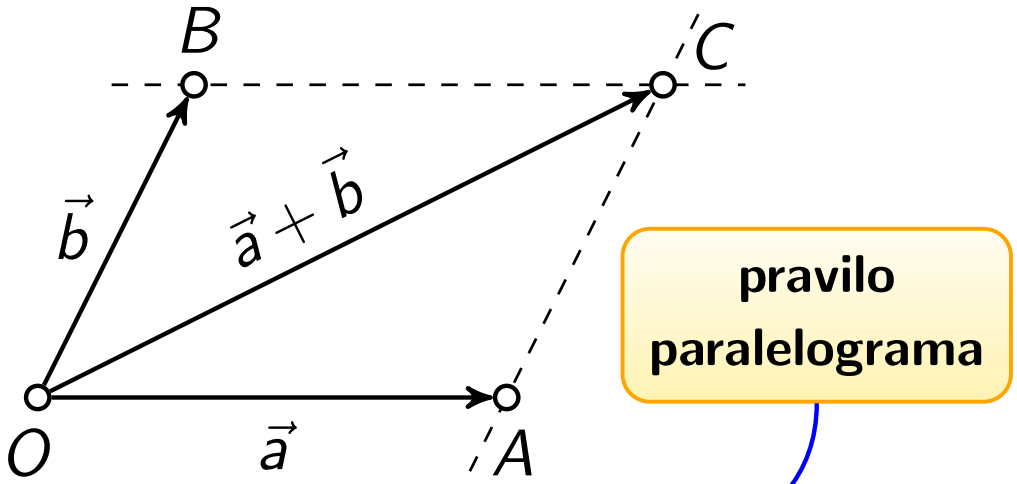

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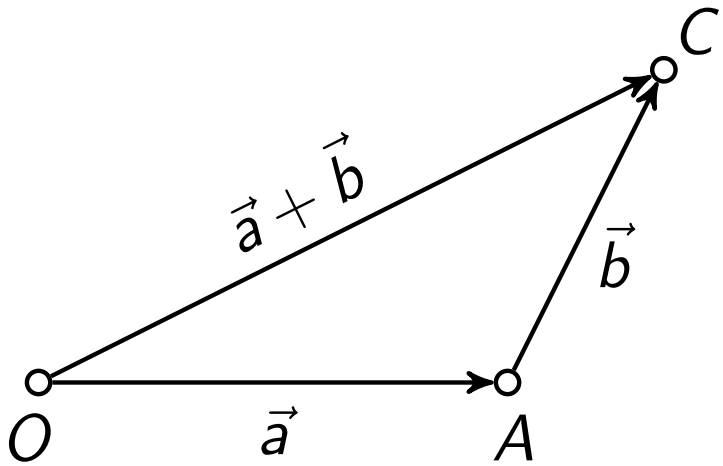

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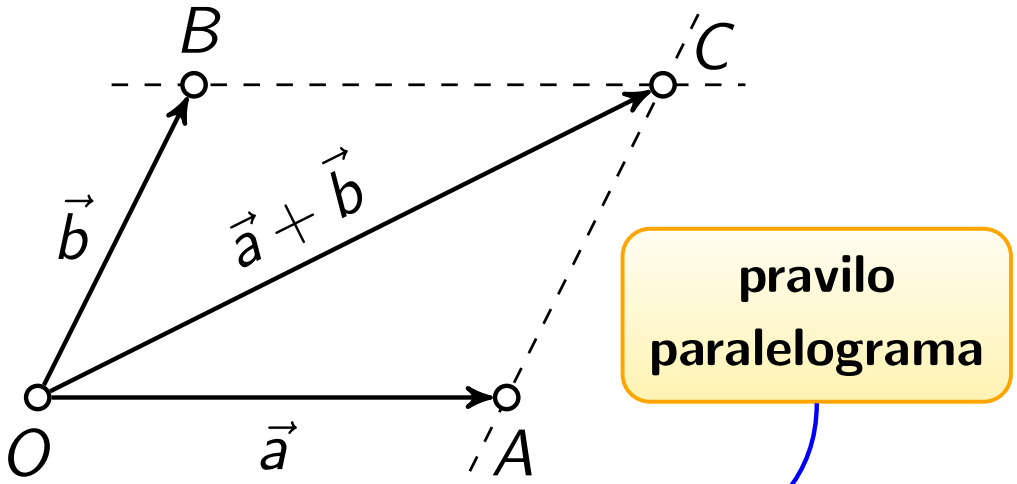

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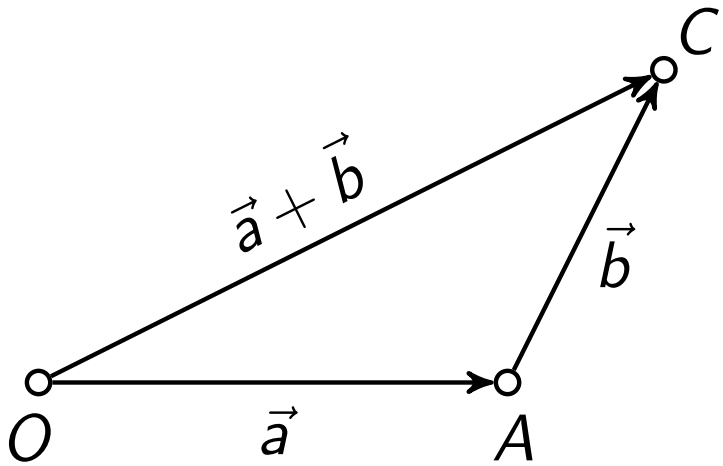

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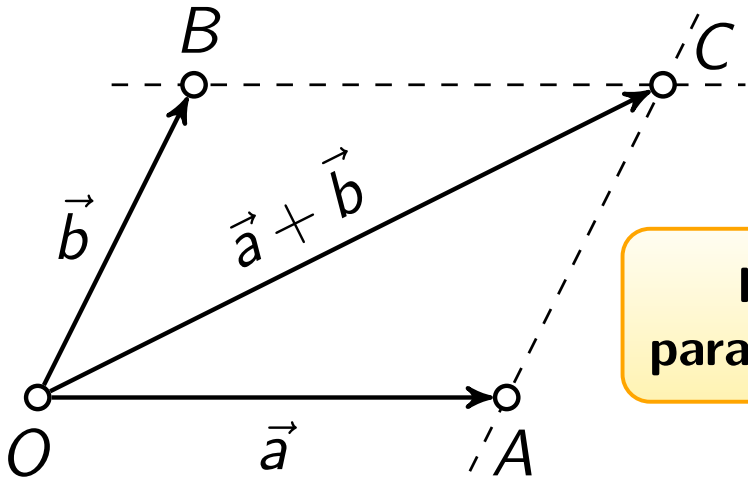
pravilo trokuta



pravilo paralelograma

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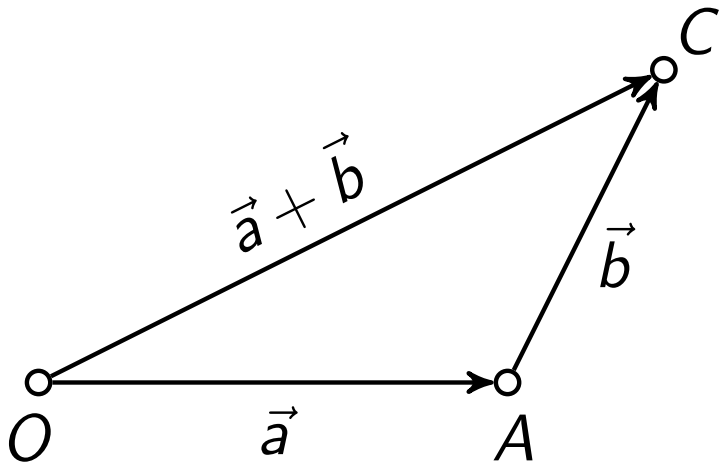
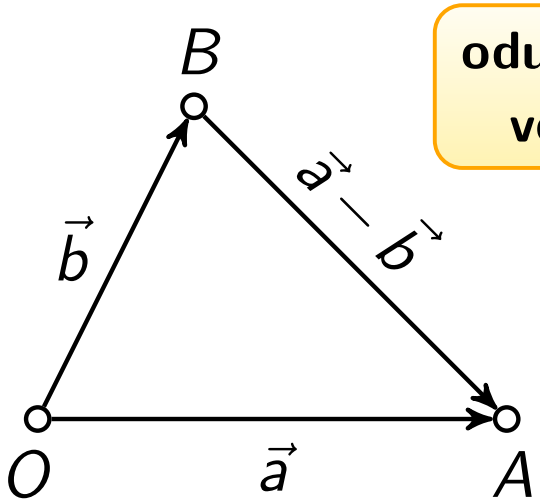
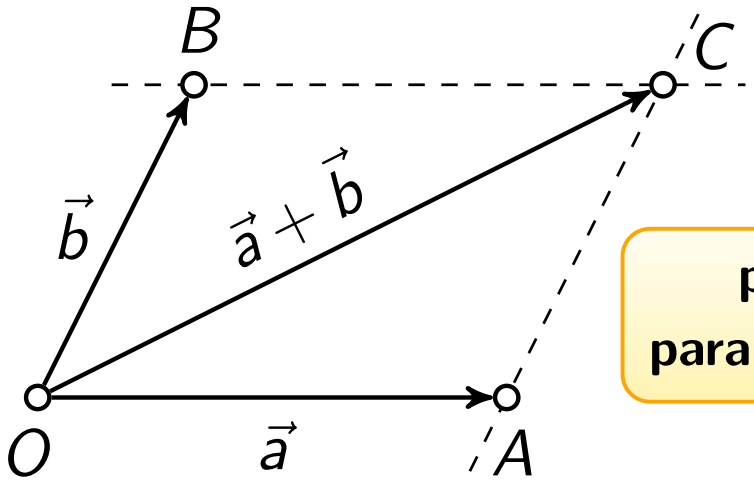


$$\overrightarrow{OA}+\overrightarrow{AC}=\overrightarrow{OC}$$

pravilo trokuta

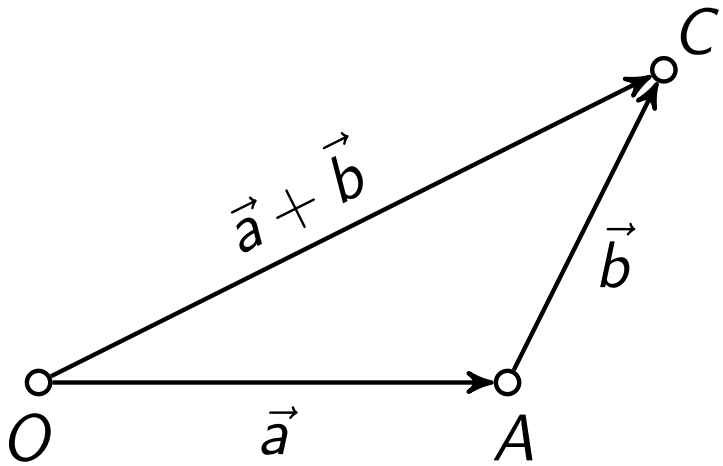
oduzimanje vektora





pravilo paralelograma

$$\overrightarrow{OA} + \overrightarrow{OB} = \overrightarrow{OC}$$



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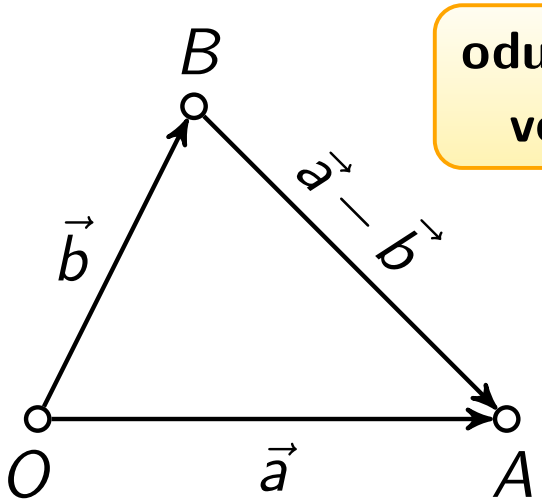
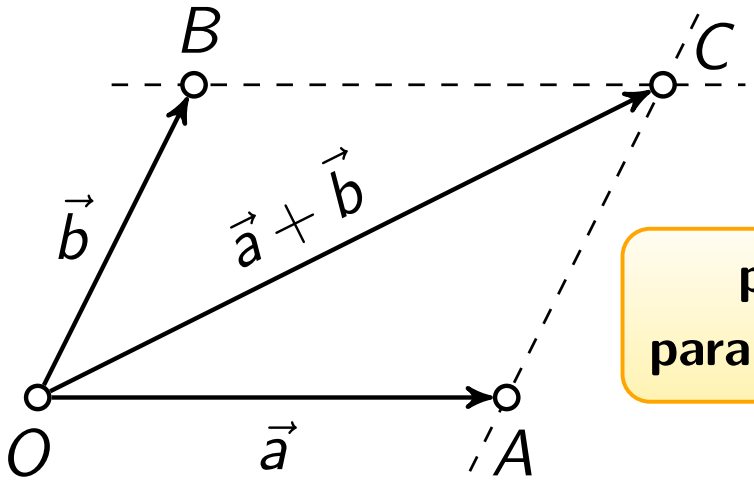
pravilo trokuta

oduzimanje vektora



$$\overrightarrow{OA} - \overrightarrow{OB} = \overrightarrow{BA}$$



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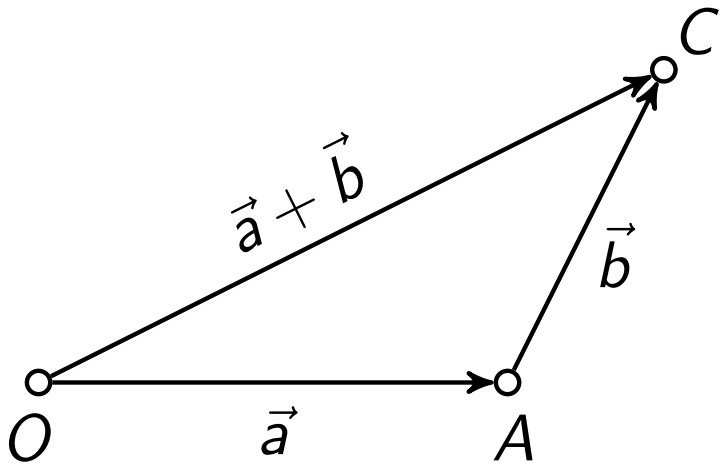

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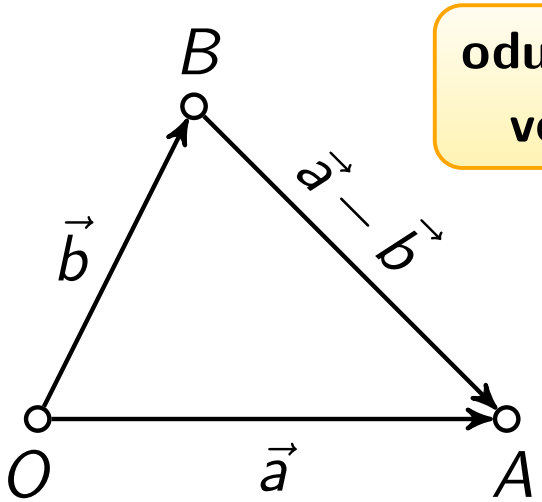
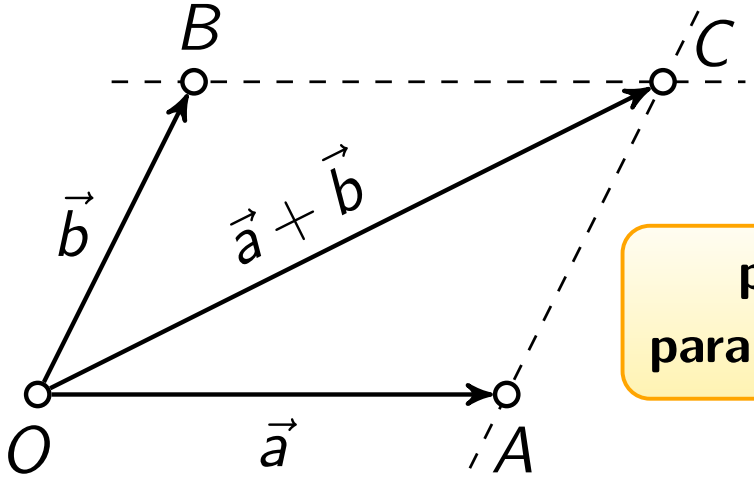
pravilo trokuta

oduzimanje vektora



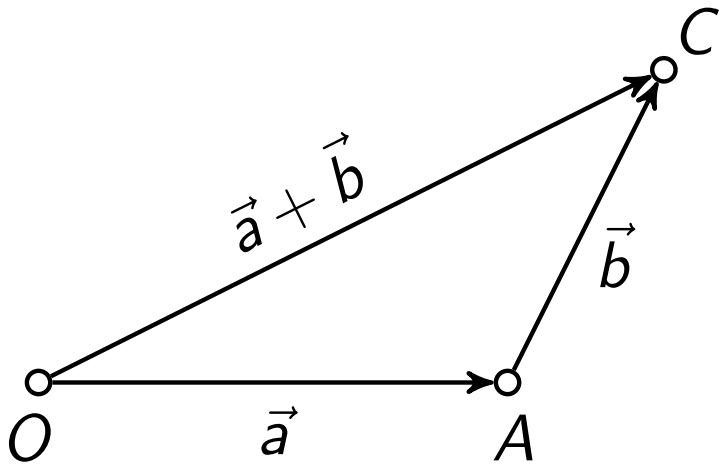
$$\overrightarrow{OA}-\overrightarrow{OB}=$$

$$\overrightarrow{OA}-\overrightarrow{OB}=\overrightarrow{BA}$$



pravilo paralelograma

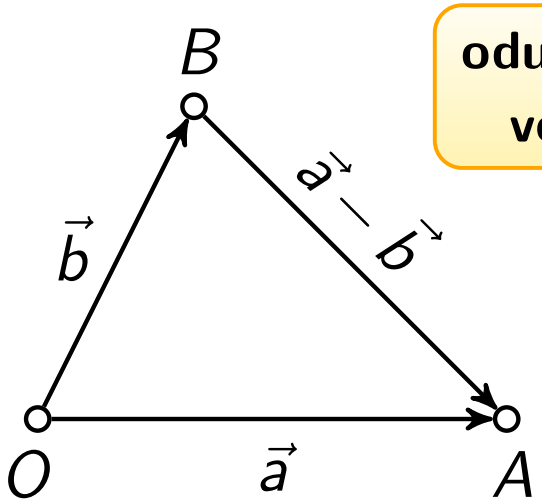
$$\overrightarrow{OA}+\overrightarrow{OB}=\overrightarrow{OC}$$



$$\overrightarrow{OA}+\overrightarrow{AC}=\overrightarrow{OC}$$

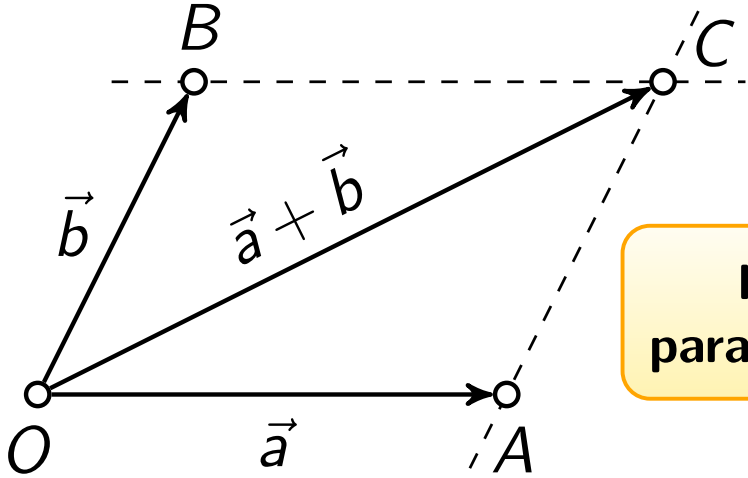
pravilo trokuta

oduzimanje vektora



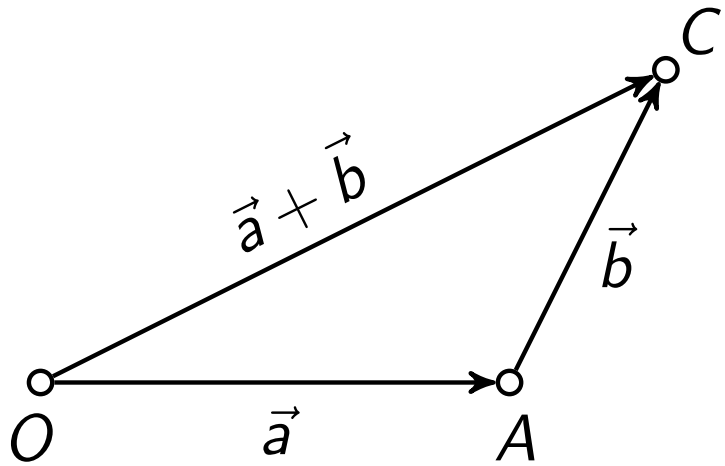
$$\overrightarrow{OA}-\overrightarrow{OB}=\overrightarrow{OA}+\overrightarrow{BO}=$$

$$\overrightarrow{OA}-\overrightarrow{OB}=\overrightarrow{BA}$$



pravilo paralelograma

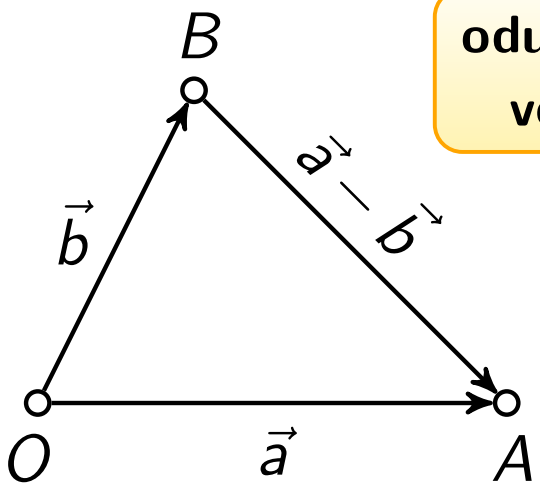
$$\overrightarrow{OA} + \overrightarrow{OB} = \overrightarrow{OC}$$



$$\overrightarrow{OA} + \overrightarrow{AC} = \overrightarrow{OC}$$

pravilo trokuta

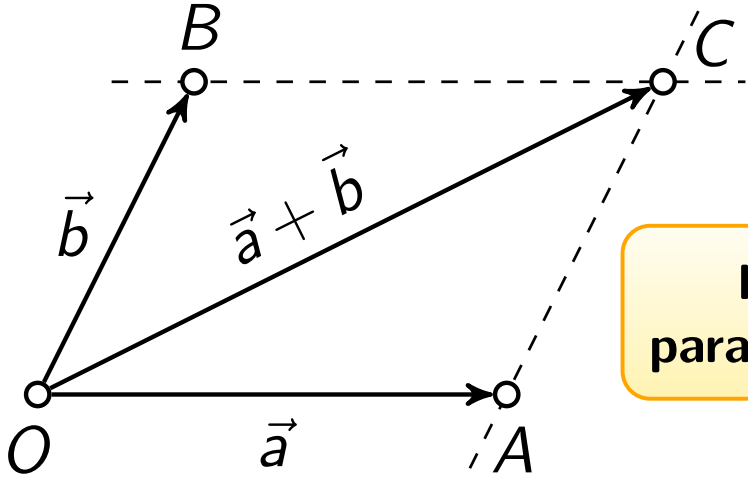
oduzimanje vektora



$$\overrightarrow{OA} - \overrightarrow{OB} = \overrightarrow{BA}$$

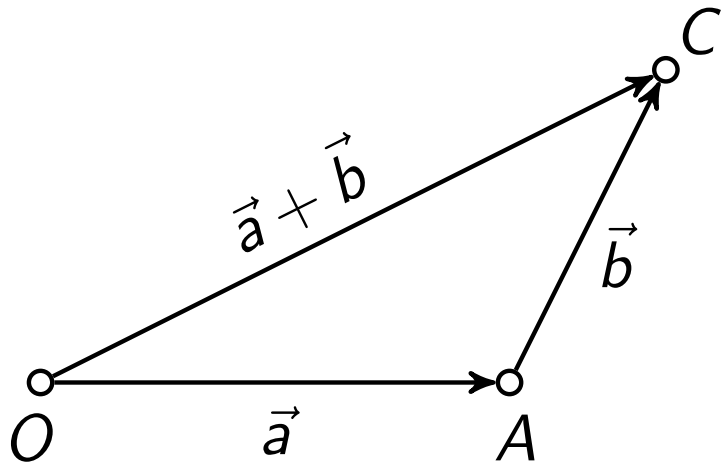
$$\overrightarrow{OA} - \overrightarrow{OB} = \overrightarrow{OA} + \overrightarrow{BO} =$$

komutativnost zbrajanja vektora



pravilo paralelograma

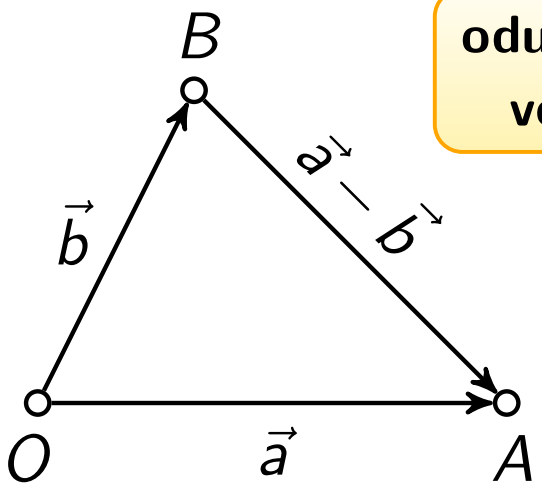
$$\overrightarrow{OA} + \overrightarrow{OB} = \overrightarrow{OC}$$



$$\overrightarrow{OA} + \overrightarrow{AC} = \overrightarrow{OC}$$

pravilo trokuta

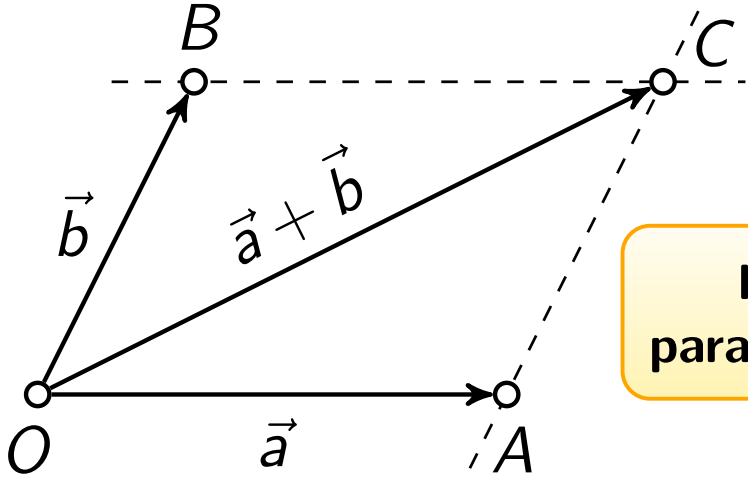
oduzimanje vektora



$$\overrightarrow{OA} - \overrightarrow{OB} = \overrightarrow{BA}$$

$$\overrightarrow{OA} - \overrightarrow{OB} = \overrightarrow{OA} + \overrightarrow{BO} = \overrightarrow{BO} + \overrightarrow{OA}$$

komutativnost zbrajanja vektora



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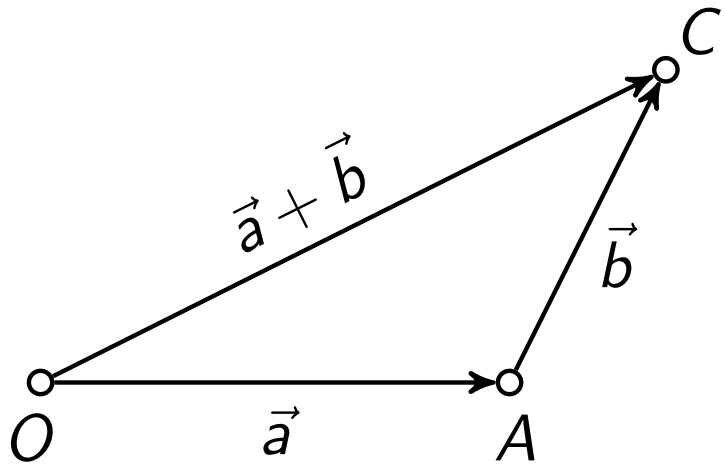
$$\overrightarrow{OA} + \overrightarrow{OB} = \overrightarrow{OC}$$



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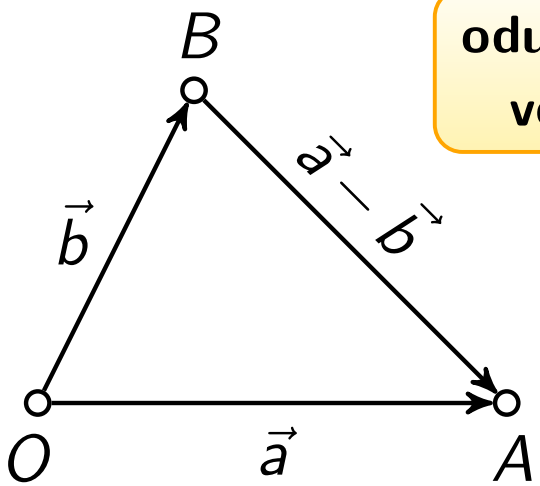
pravilo trokuta

oduzimanje vektora



$$\overrightarrow{OA} - \overrightarrow{OB} = \overrightarrow{BA}$$

$$\overrightarrow{OA} - \overrightarrow{OB} = \overrightarrow{OA} + \overrightarrow{BO} = \overrightarrow{BO} + \overrightarrow{OA} = \overrightarrow{BA}$$

komutativnost zbrajanja vektora

prvi zadatak

Zadatak 1

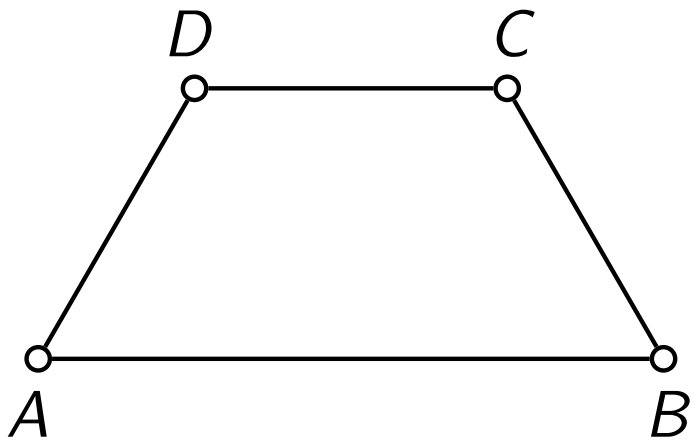
Točke A, B, C i D su redom vrhovi jednakokračnog trapeza kojemu je duljina kraka jednaka d i kojemu su duljine osnovica $|AB| = 2d$ i $|CD| = d$.

a) *Nacrtajte vektor* $\vec{v} = \frac{1}{2}\overrightarrow{AB} - \overrightarrow{CB}$.

b) *Kolika je norma (duljina) vektora* $\vec{v}$*?*

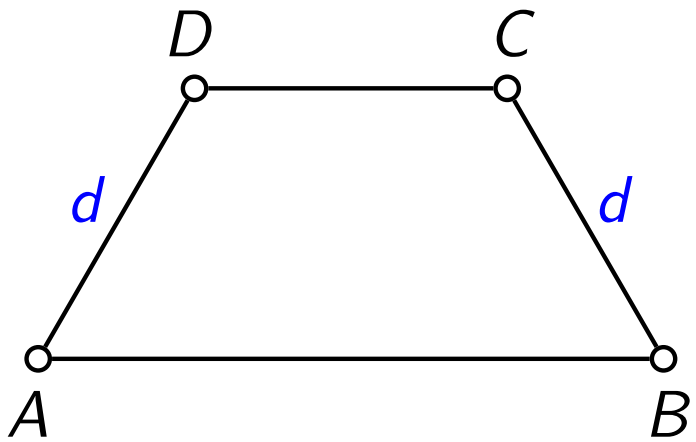
Rješenje

a)



Rješenje

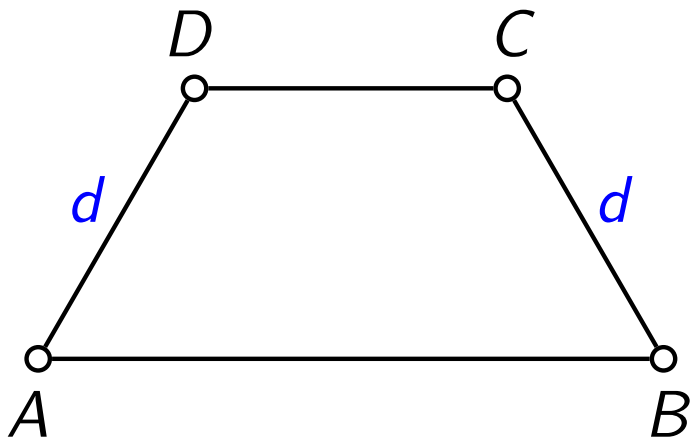
a)



$$|AD| = |BC| = d$$

Rješenje

a)

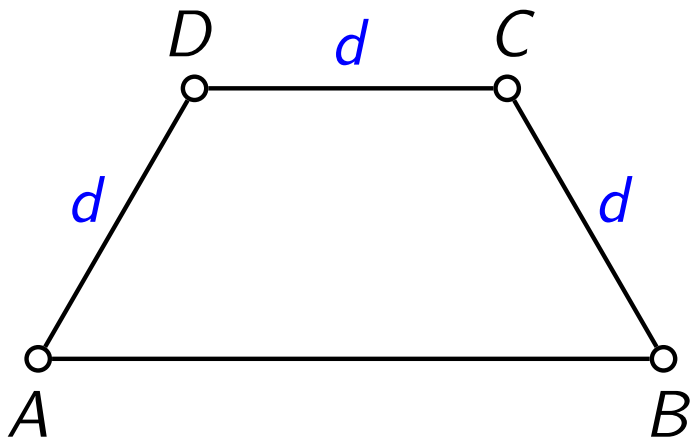


$$|AD| = |BC| = d$$

$$|AB| = 2d$$

Rješenje

a)

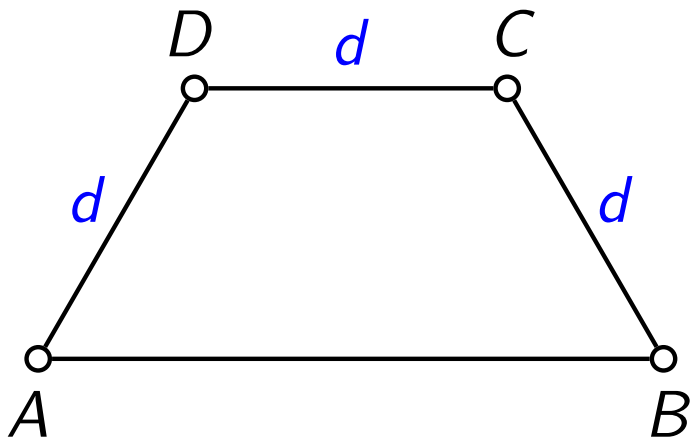


$$|AD| = |BC| = d$$

$$|AB| = 2d, \quad |CD| = d$$

Rješenje

a)



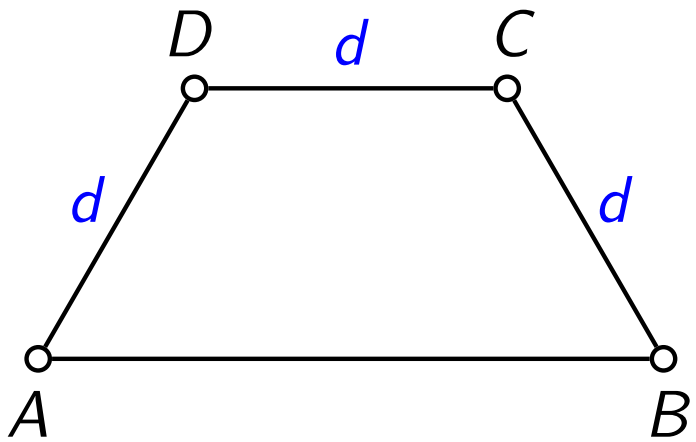
$$|AD| = |BC| = d$$

$$|AB| = 2d, \quad |CD| = d$$

$$\vec{v} = \frac{1}{2}\overrightarrow{AB} - \overrightarrow{CB}$$

Rješenje

a)



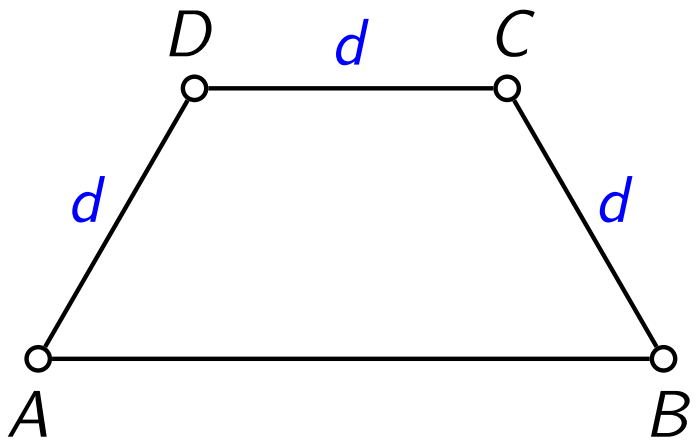
$|AD| = |BC| = d$

$|AB| = 2d, \quad |CD| = d$

$\vec{v} = \frac{1}{2}\overrightarrow{AB} - \overrightarrow{CB} =$

Rješenje

a)



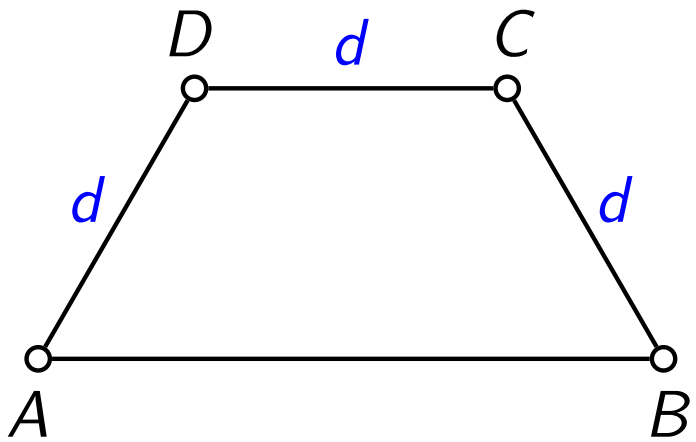
$$|AD| = |BC| = d$$

$$|AB| = 2d, \quad |CD| = d$$

$$\vec{v} = \frac{1}{2}\overrightarrow{AB} - \overrightarrow{CB} = \frac{1}{2}\overrightarrow{AB}$$

Rješenje

a)



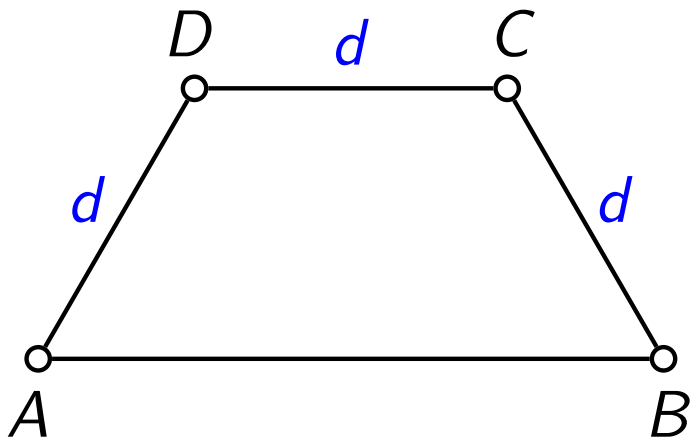
$$|AD| = |BC| = d$$

$$|AB| = 2d, \quad |CD| = d$$

$$\vec{v} = \frac{1}{2}\overrightarrow{AB} - \overrightarrow{CB} = \frac{1}{2}\overrightarrow{AB} + \overrightarrow{BC}$$

Rješenje

a)



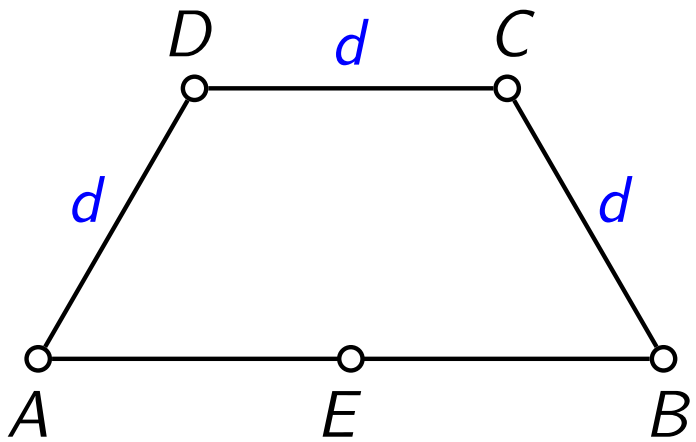
$$|AD| = |BC| = d$$

$$|AB| = 2d, \quad |CD| = d$$

$$\vec{v} = \frac{1}{2}\overrightarrow{AB} - \overrightarrow{CB} = \frac{1}{2}\overrightarrow{AB} + \overrightarrow{BC} =$$

Rješenje

a)



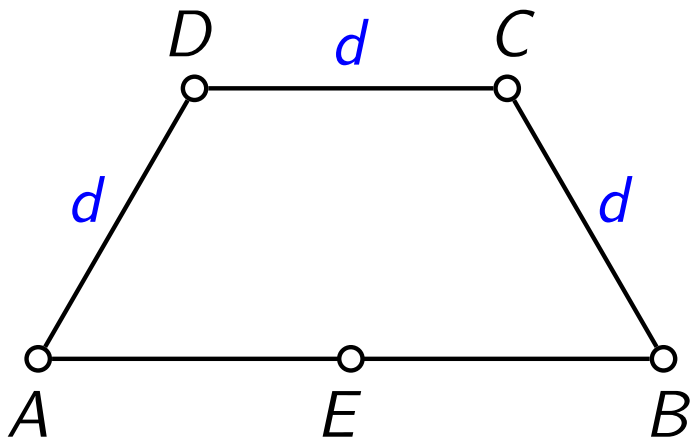
$$|AD| = |BC| = d$$

$$|AB| = 2d, \quad |CD| = d$$

$$\vec{v} = \frac{1}{2}\overrightarrow{AB} - \overrightarrow{CB} = \frac{1}{2}\overrightarrow{AB} + \overrightarrow{BC} =$$

Rješenje

a)



$$|AD| = |BC| = d$$

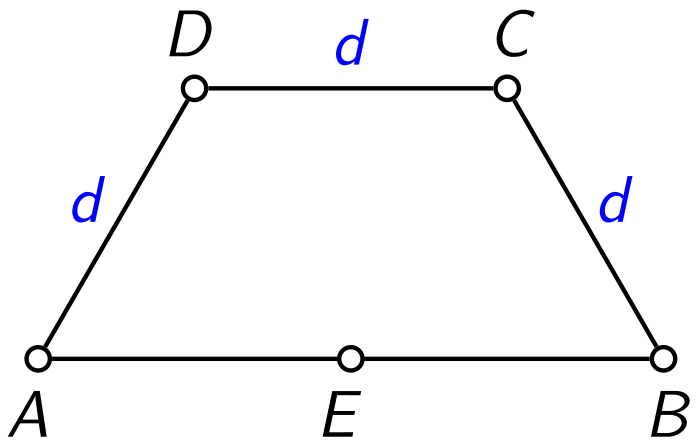
$$|AB| = 2d, \quad |CD| = d$$

$$|AE| = |BE|$$

$$\vec{v} = \frac{1}{2}\overrightarrow{AB} - \overrightarrow{CB} = \frac{1}{2}\overrightarrow{AB} + \overrightarrow{BC} =$$

Rješenje

a)



$$|AD| = |BC| = d$$

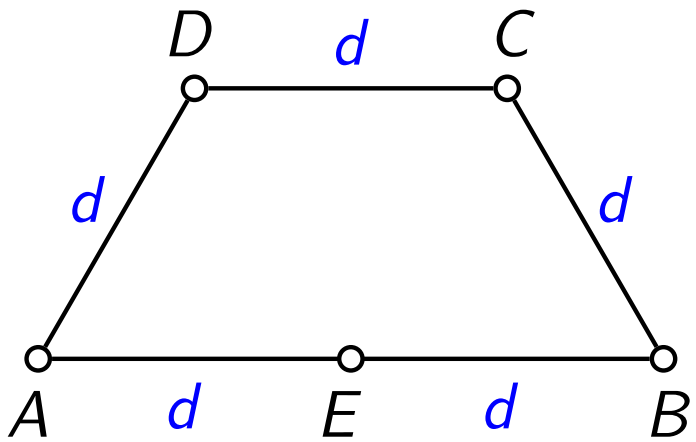
$$|AB| = 2d, \quad |CD| = d$$

$$|AE| = |BE| = d$$

$$\vec{v} = \frac{1}{2}\overrightarrow{AB} - \overrightarrow{CB} = \frac{1}{2}\overrightarrow{AB} + \overrightarrow{BC} =$$

Rješenje

a)



$$|AD| = |BC| = d$$

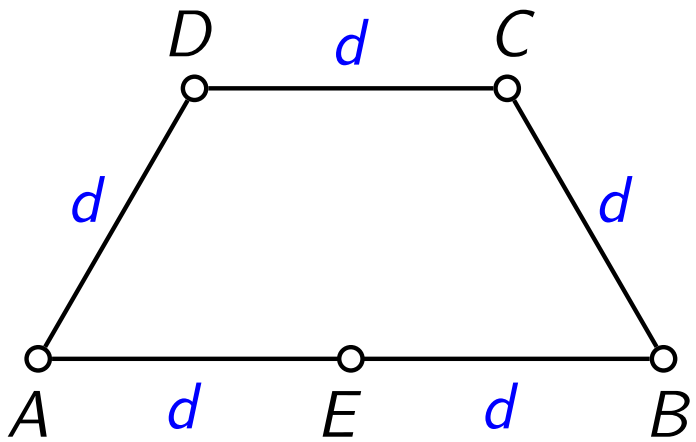
$$|AB| = 2d, \quad |CD| = d$$

$$|AE| = |BE| = d$$

$$\vec{v} = \frac{1}{2}\overrightarrow{AB} - \overrightarrow{CB} = \frac{1}{2}\overrightarrow{AB} + \overrightarrow{BC} =$$

Rješenje

a)



$$|AD| = |BC| = d$$

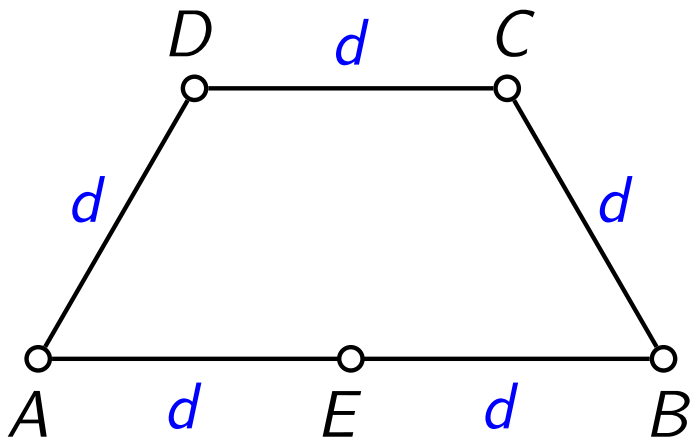
$$|AB| = 2d, \quad |CD| = d$$

$$|AE| = |BE| = d$$

$$\vec{v} = \frac{1}{2}\overrightarrow{AB} - \overrightarrow{CB} = \frac{1}{2}\overrightarrow{AB} + \overrightarrow{BC} = \overrightarrow{AE}$$

Rješenje

a)



$$|AD| = |BC| = d$$

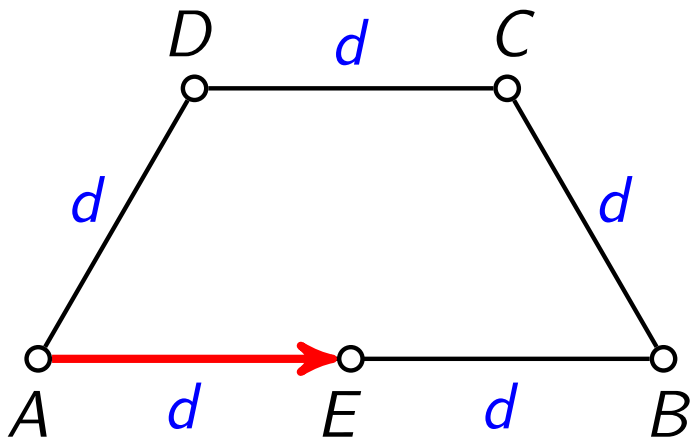
$$|AB| = 2d, \quad |CD| = d$$

$$|AE| = |BE| = d$$

$$\vec{v} = \frac{1}{2}\overrightarrow{AB} - \overrightarrow{CB} = \frac{1}{2}\overrightarrow{AB} + \overrightarrow{BC} = \overrightarrow{AE} + \overrightarrow{BC}$$

Rješenje

a)



$$|AD| = |BC| = d$$

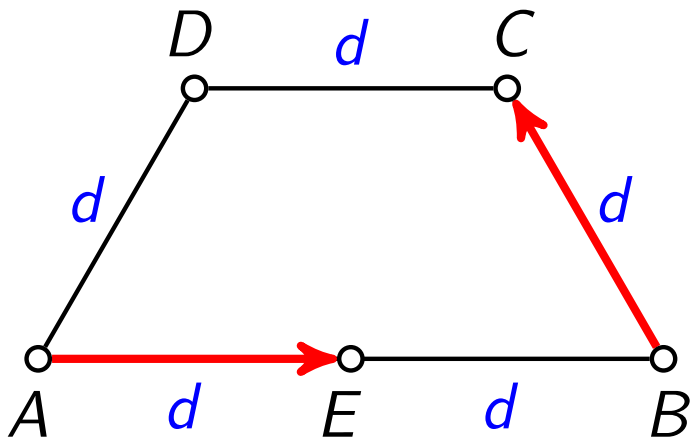
$$|AB| = 2d, \quad |CD| = d$$

$$|AE| = |BE| = d$$

$$\vec{v} = \frac{1}{2}\overrightarrow{AB} - \overrightarrow{CB} = \frac{1}{2}\overrightarrow{AB} + \overrightarrow{BC} = \overrightarrow{AE} + \overrightarrow{BC}$$

Rješenje

a)



$$|AD| = |BC| = d$$

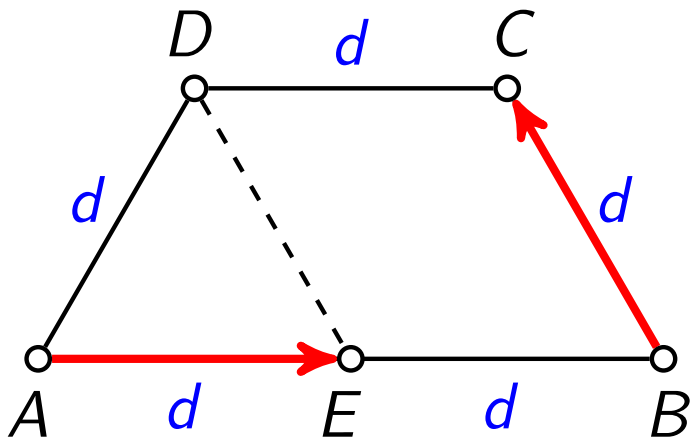
$$|AB| = 2d, \quad |CD| = d$$

$$|AE| = |BE| = d$$

$$\vec{v} = \frac{1}{2}\overrightarrow{AB} - \overrightarrow{CB} = \frac{1}{2}\overrightarrow{AB} + \overrightarrow{BC} = \overrightarrow{AE} + \overrightarrow{BC}$$

Rješenje

a)



$$|AD| = |BC| = d$$

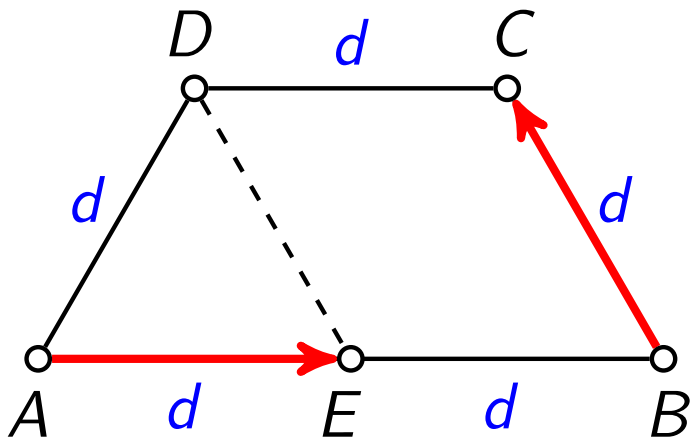
$$|AB| = 2d, \quad |CD| = d$$

$$|AE| = |BE| = d$$

$$\vec{v} = \frac{1}{2}\overrightarrow{AB} - \overrightarrow{CB} = \frac{1}{2}\overrightarrow{AB} + \overrightarrow{BC} = \overrightarrow{AE} + \overrightarrow{BC}$$

Rješenje $EB \parallel DC,$

a)



$$|AD| = |BC| = d$$

$$|AB| = 2d, \quad |CD| = d$$

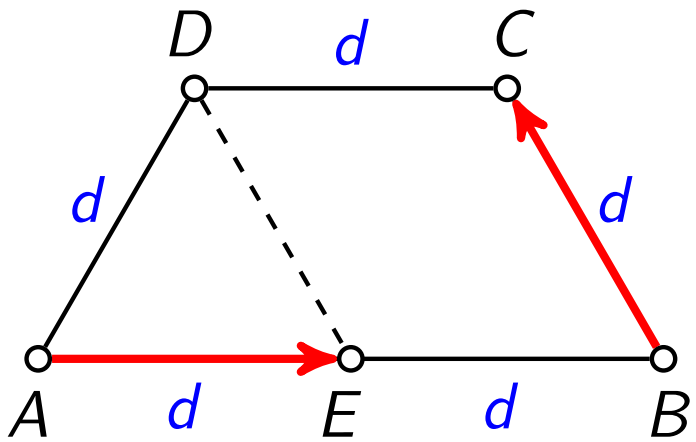
$$|AE| = |BE| = d$$

$$\vec{v} = \frac{1}{2}\overrightarrow{AB} - \overrightarrow{CB} = \frac{1}{2}\overrightarrow{AB} + \overrightarrow{BC} = \overrightarrow{AE} + \overrightarrow{BC}$$

Rješenje

$EB \parallel DC, \quad |EB| = |DC|$

a)



$|AD| = |BC| = d$

$|AB| = 2d, \quad |CD| = d$

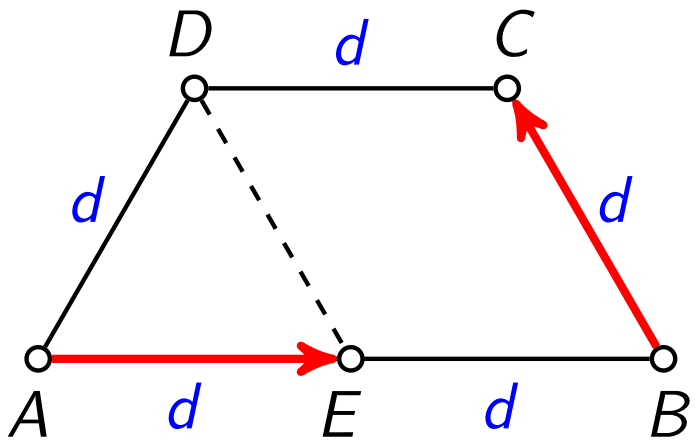
$|AE| = |BE| = d$

$$\vec{v} = \frac{1}{2}\overrightarrow{AB} - \overrightarrow{CB} = \frac{1}{2}\overrightarrow{AB} + \overrightarrow{BC} = \overrightarrow{AE} + \overrightarrow{BC}$$

Rješenje

$EB \parallel DC, \quad |EB| = |DC| \quad \Longrightarrow \quad EBCD$ je paralelogram

a)



$$|AD| = |BC| = d$$

$$|AB| = 2d, \quad |CD| = d$$

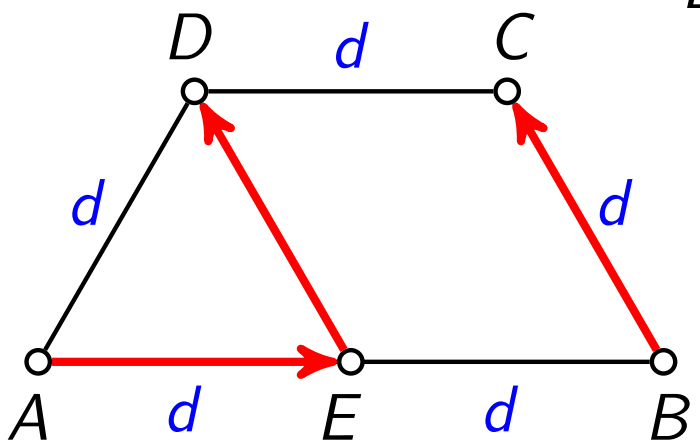
$$|AE| = |BE| = d$$

$$\vec{v} = \frac{1}{2}\overrightarrow{AB} - \overrightarrow{CB} = \frac{1}{2}\overrightarrow{AB} + \overrightarrow{BC} = \overrightarrow{AE} + \overrightarrow{BC}$$

Rješenje

$EB \parallel DC, \quad |EB| = |DC| \quad \Longrightarrow \quad EBCD$ je paralelogram

a)



$$\overrightarrow{BC} = \overrightarrow{ED}$$

$$|AD| = |BC| = d$$

$$|AB| = 2d, \quad |CD| = d$$

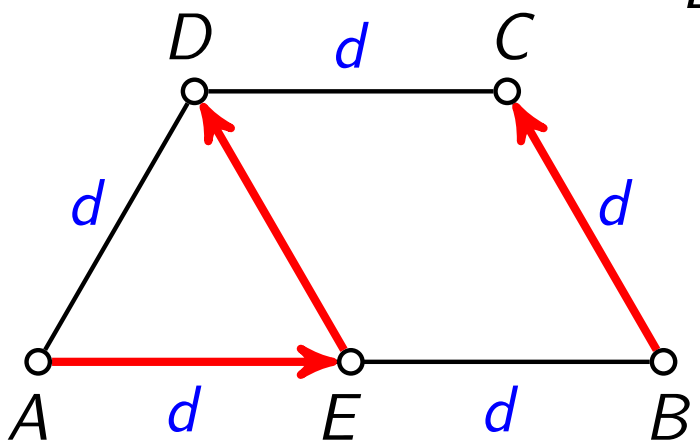
$$|AE| = |BE| = d$$

$$\vec{v} = \frac{1}{2}\overrightarrow{AB} - \overrightarrow{CB} = \frac{1}{2}\overrightarrow{AB} + \overrightarrow{BC} = \overrightarrow{AE} + \overrightarrow{BC}$$

Rješenje

$EB \parallel DC, \quad |EB| = |DC| \quad \Longrightarrow \quad EBCD$ je paralelogram

a)



$$\overrightarrow{BC} = \overrightarrow{ED}$$

$$|AD| = |BC| = d$$

$$|AB| = 2d, \quad |CD| = d$$

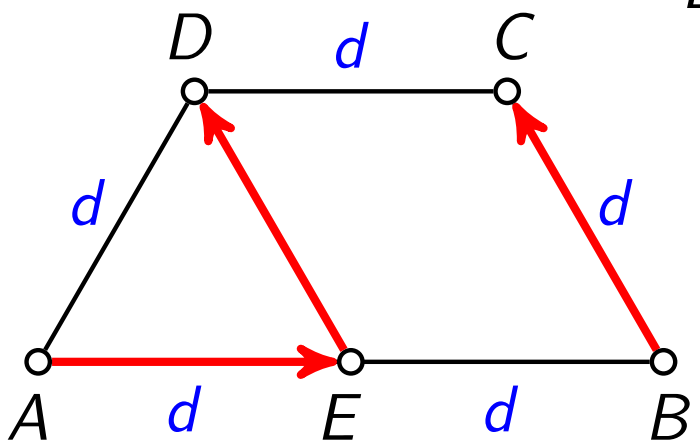
$$|AE| = |BE| = d$$

$$\vec{v} = \frac{1}{2}\overrightarrow{AB} - \overrightarrow{CB} = \frac{1}{2}\overrightarrow{AB} + \overrightarrow{BC} = \overrightarrow{AE} + \overrightarrow{BC} =$$

Rješenje

$EB \parallel DC, \quad |EB| = |DC| \quad \Longrightarrow \quad EBCD$ je paralelogram

a)



$$\overrightarrow{BC} = \overrightarrow{ED}$$

$$|AD| = |BC| = d$$

$$|AB| = 2d, \quad |CD| = d$$

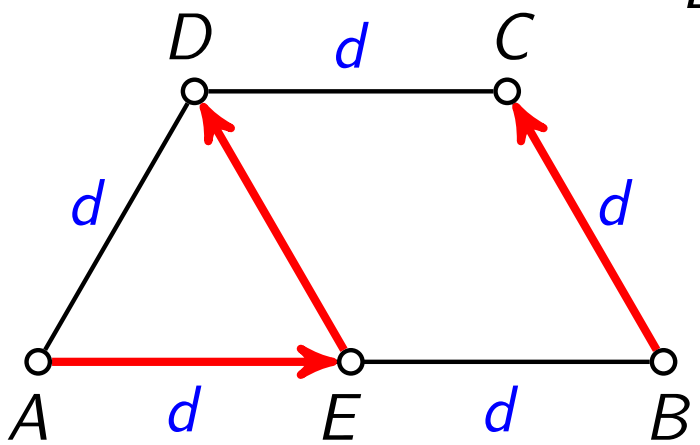
$$|AE| = |BE| = d$$

$$\vec{v} = \frac{1}{2}\overrightarrow{AB} - \overrightarrow{CB} = \frac{1}{2}\overrightarrow{AB} + \overrightarrow{BC} = \overrightarrow{AE} + \overrightarrow{BC} = \overrightarrow{AE}$$

Rješenje

$EB \parallel DC, \quad |EB| = |DC| \quad \Longrightarrow \quad EBCD$ je paralelogram

a)



$$\overrightarrow{BC} = \overrightarrow{ED}$$

$$|AD| = |BC| = d$$

$$|AB| = 2d, \quad |CD| = d$$

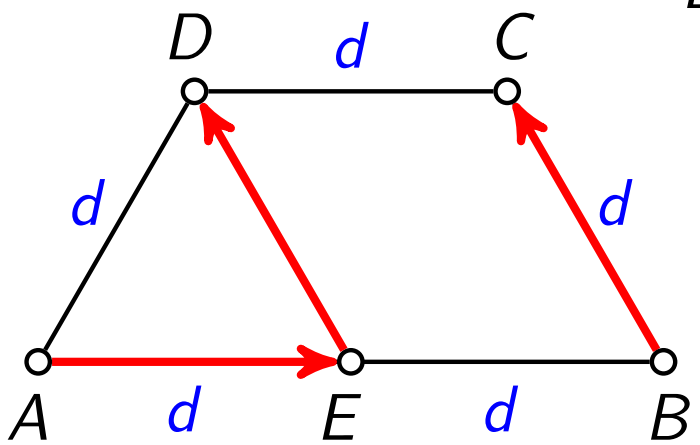
$$|AE| = |BE| = d$$

$$\vec{v} = \frac{1}{2}\overrightarrow{AB} - \overrightarrow{CB} = \frac{1}{2}\overrightarrow{AB} + \overrightarrow{BC} = \overrightarrow{AE} + \overrightarrow{BC} = \overrightarrow{AE} + \overrightarrow{ED}$$

Rješenje

$EB \parallel DC, \quad |EB| = |DC| \quad \Longrightarrow \quad EBCD$ je paralelogram

a)



$$\overrightarrow{BC} = \overrightarrow{ED}$$

$$|AD| = |BC| = d$$

$$|AB| = 2d, \quad |CD| = d$$

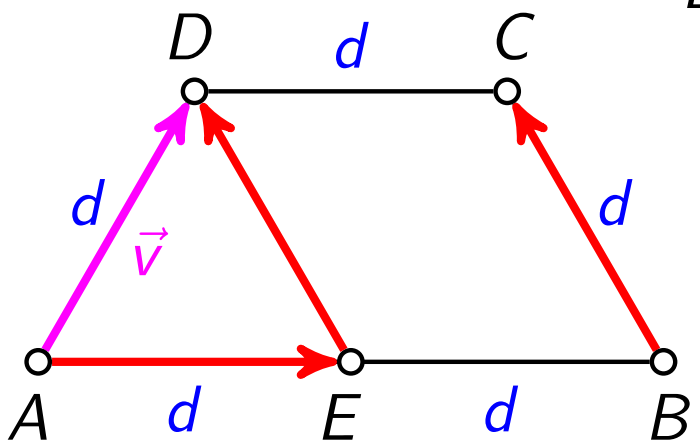
$$|AE| = |BE| = d$$

$$\vec{v} = \frac{1}{2}\overrightarrow{AB} - \overrightarrow{CB} = \frac{1}{2}\overrightarrow{AB} + \overrightarrow{BC} = \overrightarrow{AE} + \overrightarrow{BC} = \overrightarrow{AE} + \overrightarrow{ED} = \overrightarrow{AD}$$

Rješenje

$EB \parallel DC, \quad |EB| = |DC| \quad \Longrightarrow \quad EBCD$ je paralelogram

a)



$$\overrightarrow{BC} = \overrightarrow{ED}$$

$$|AD| = |BC| = d$$

$$|AB| = 2d, \quad |CD| = d$$

$$|AE| = |BE| = d$$

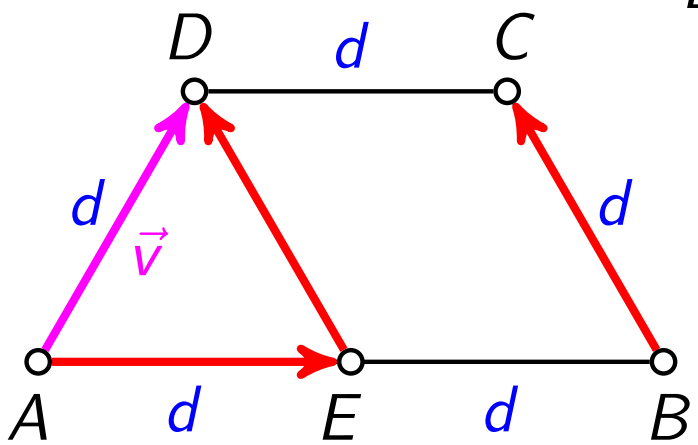
$$\vec{v} = \frac{1}{2}\overrightarrow{AB} - \overrightarrow{CB} = \frac{1}{2}\overrightarrow{AB} + \overrightarrow{BC} = \overrightarrow{AE} + \overrightarrow{BC} = \overrightarrow{AE} + \overrightarrow{ED} = \overrightarrow{AD}$$

Rješenje

$EB \parallel DC, \quad |EB| = |DC| \quad \Longrightarrow \quad EBCD$ je paralelogram

a)

$$\overrightarrow{BC} = \overrightarrow{ED}$$



$$|AD| = |BC| = d$$

$$|AB| = 2d, \quad |CD| = d$$

$$|AE| = |BE| = d$$

$$\vec{v} = \frac{1}{2}\overrightarrow{AB} - \overrightarrow{CB} = \frac{1}{2}\overrightarrow{AB} + \overrightarrow{BC} = \overrightarrow{AE} + \overrightarrow{BC} = \overrightarrow{AE} + \overrightarrow{ED} = \overrightarrow{AD}$$

b) $|\vec{v}| = d$

drugi zadatak

Zadatak 2

Točke A, B, C i D su redom vrhovi pravokutnika kojemu su duljine susjednih stranica $|AB| = a$ i $|AD| = b$.

a) *Nacrtajte vektor* $\overrightarrow{AE} = \overrightarrow{AB} - \overrightarrow{BC}$.

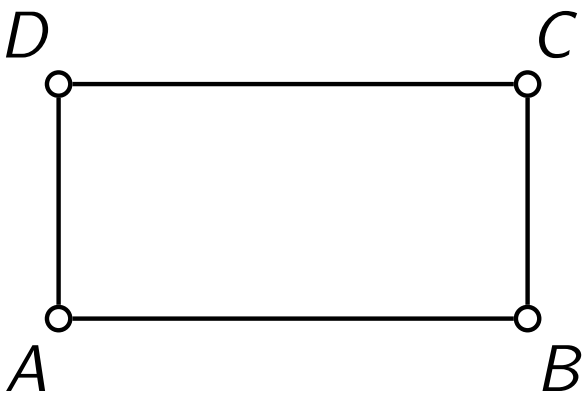
b) *Kolika je norma vektora* $\overrightarrow{AE}$*?*

c) *Nacrtajte vektor* $\overrightarrow{AF} = \overrightarrow{AB} - \overrightarrow{AC}$.

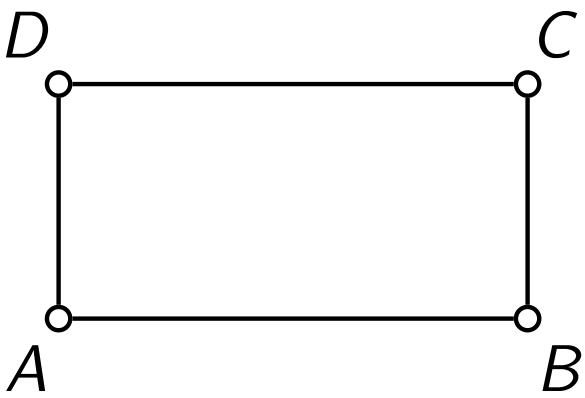
d) *Kolika je norma vektora* $\overrightarrow{AF}$*?*

Rješenje

a)



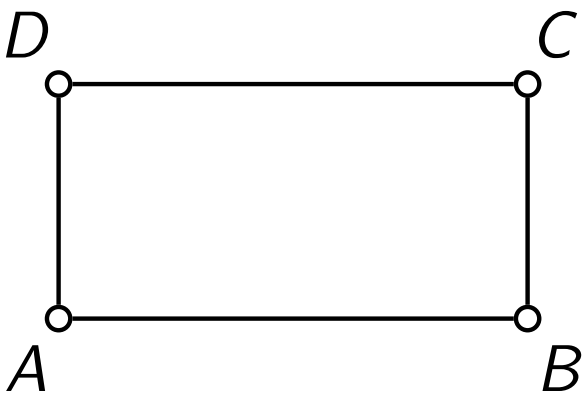
Rješenje

a) 

$|AB| = a$

Rješenje

a)

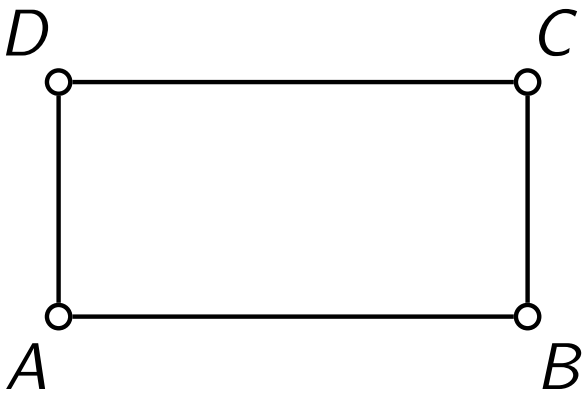


$|AB| = a$

$|AD| = b$

Rješenje

a)



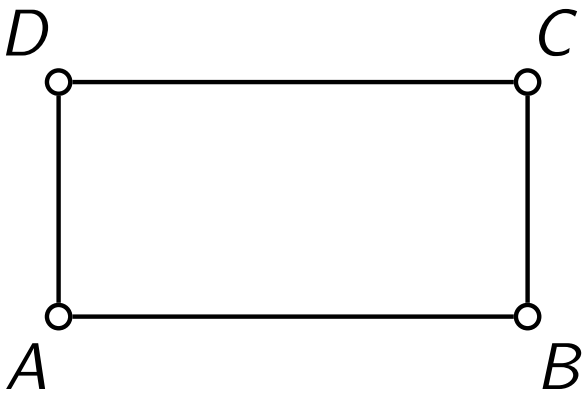
$|AB| = a$

$|AD| = b$

$$\overrightarrow{AE} = \overrightarrow{AB} - \overrightarrow{BC}$$

Rješenje

a)



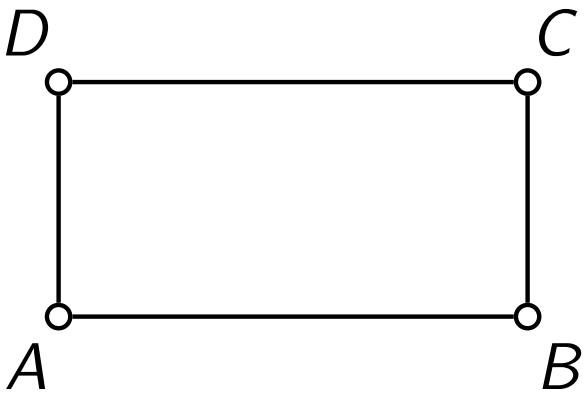
$|AB| = a$

$|AD| = b$

$$\overrightarrow{AE} = \overrightarrow{AB} - \overrightarrow{BC} = \overrightarrow{AB}$$

Rješenje

a)



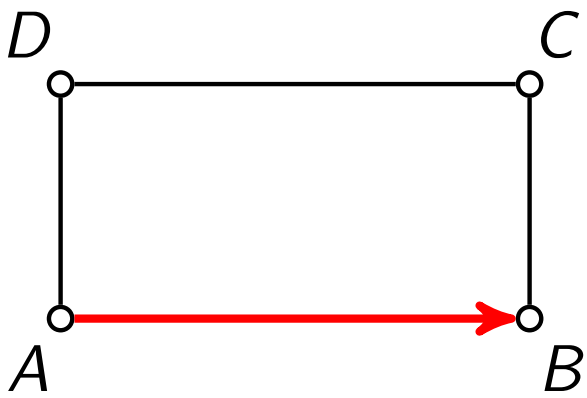
$|AB| = a$

$|AD| = b$

$$\overrightarrow{AE} = \overrightarrow{AB} - \overrightarrow{BC} = \overrightarrow{AB} + \overrightarrow{CB}$$

Rješenje

a)



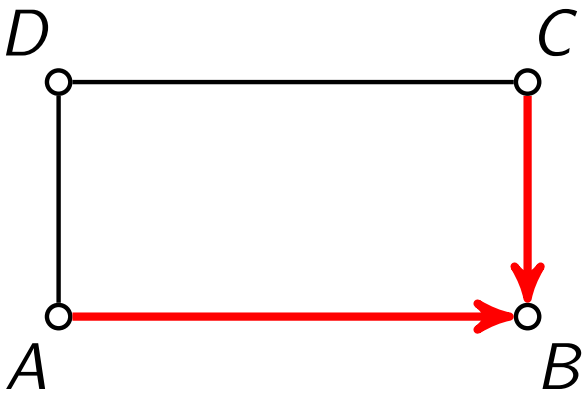
$|AB| = a$

$|AD| = b$

$$\overrightarrow{AE} = \overrightarrow{AB} - \overrightarrow{BC} = \overrightarrow{AB} + \overrightarrow{CB}$$

Rješenje

a)



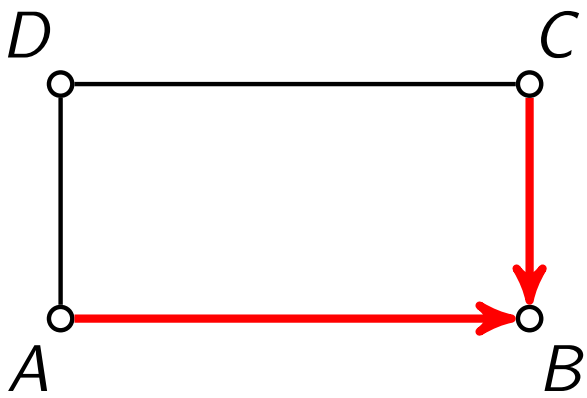
$|AB| = a$

$|AD| = b$

$$\overrightarrow{AE} = \overrightarrow{AB} - \overrightarrow{BC} = \overrightarrow{AB} + \overrightarrow{CB}$$

Rješenje

a)



$|AB| = a$

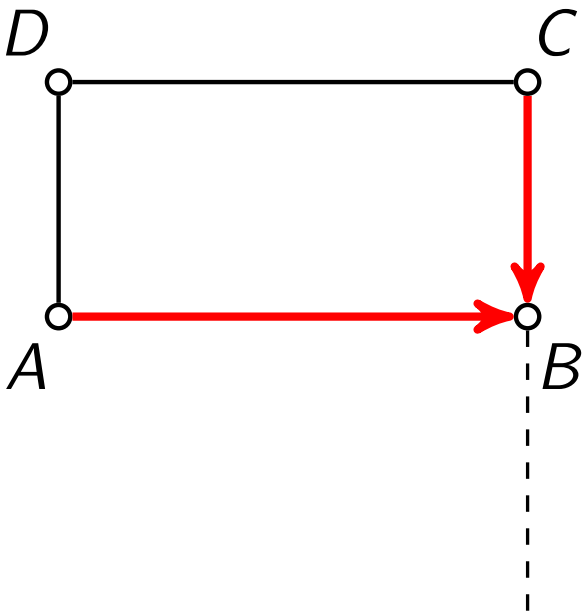
$|AD| = b$

$$\overrightarrow{AE} = \overrightarrow{AB} - \overrightarrow{BC} = \overrightarrow{AB} + \overrightarrow{CB} =$$

$$= \overrightarrow{AB} +$$

Rješenje

a)



$|AB| = a$

$|AD| = b$

$$\overrightarrow{AE} = \overrightarrow{AB} - \overrightarrow{BC} = \overrightarrow{AB} + \overrightarrow{CB} =$$

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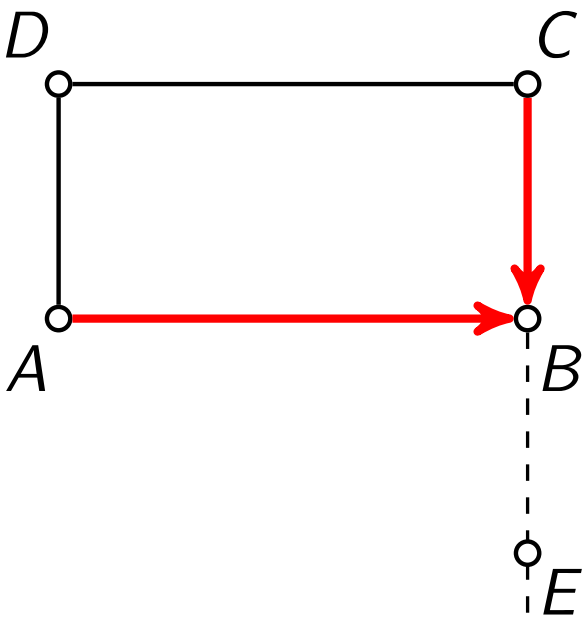
Rješenje

a)



$$|AB| = a$$

$$|AD| = b$$

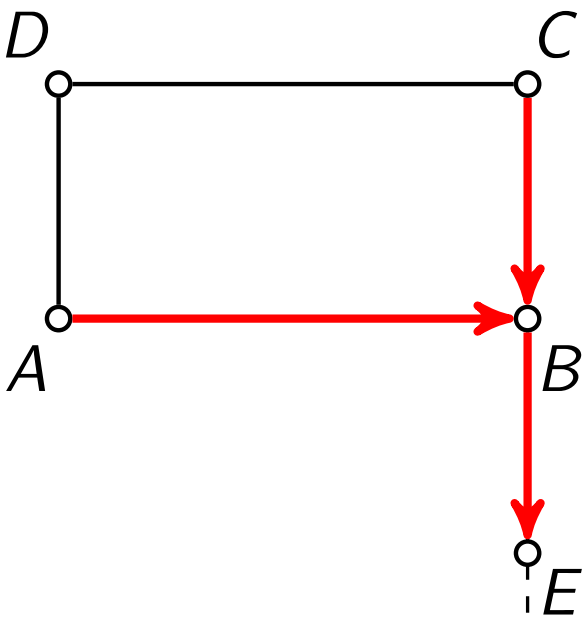
$$|BE| = b$$

$$\overrightarrow{AE} = \overrightarrow{AB} - \overrightarrow{BC} = \overrightarrow{AB} + \overrightarrow{CB} =$$

$$= \overrightarrow{AB} +$$

Rješenje

a)



$|AB| = a$

$|AD| = b$

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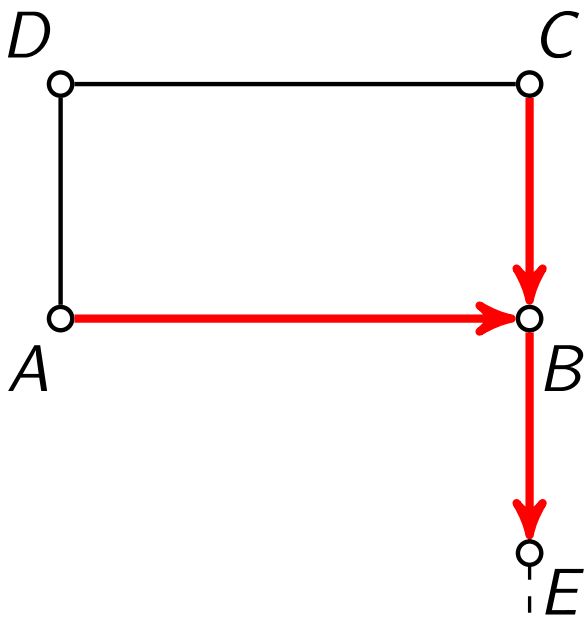
Rješenje

a)



$$|AB| = a$$

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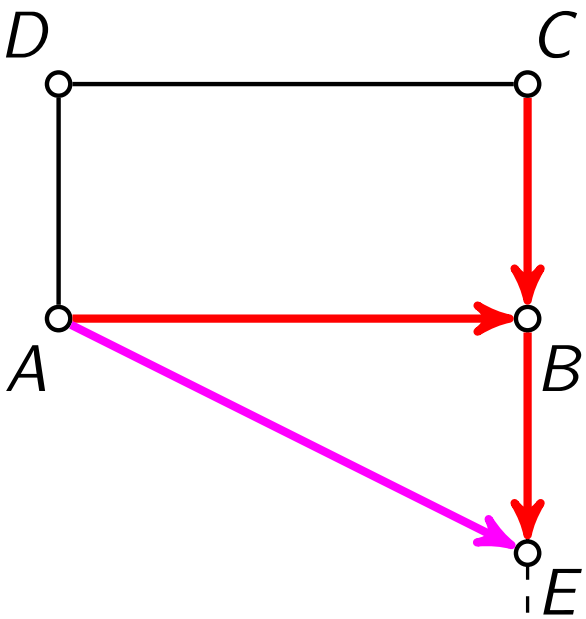
Rješenje

a)



$|AB| = a$

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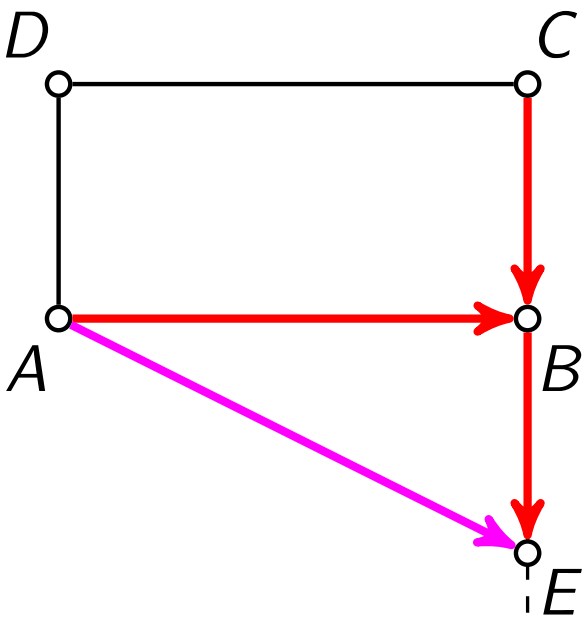
$$= \overrightarrow{AB} + \overrightarrow{BE}$$

Rješenje

a)



$|AB| = a$

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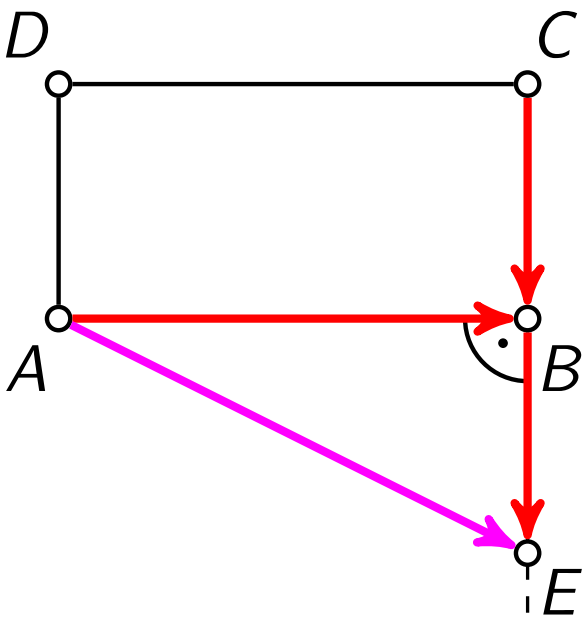
$$= \overrightarrow{AB} + \overrightarrow{BE}$$

b) $\left|\overrightarrow{AE}\right| =$

Rješenje

a)



$$|AB| = a$$

$$|AD| = b$$

$$|BE| = b$$

$$\overrightarrow{CB} = \overrightarrow{BE}$$

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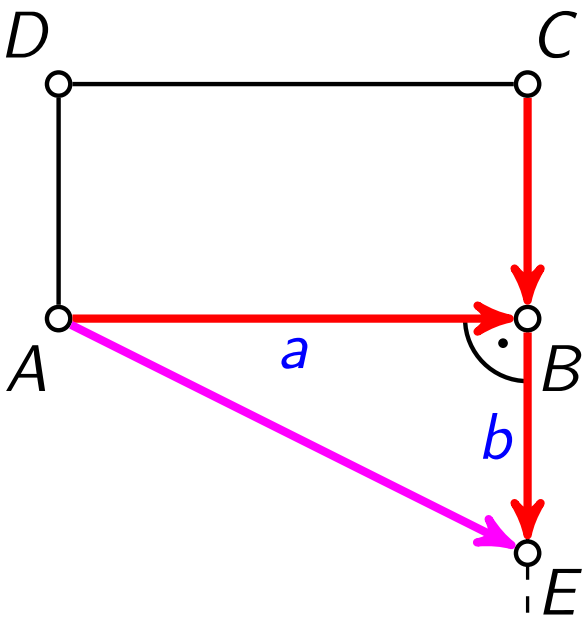
Rješenje

a)



$|AB| = a$

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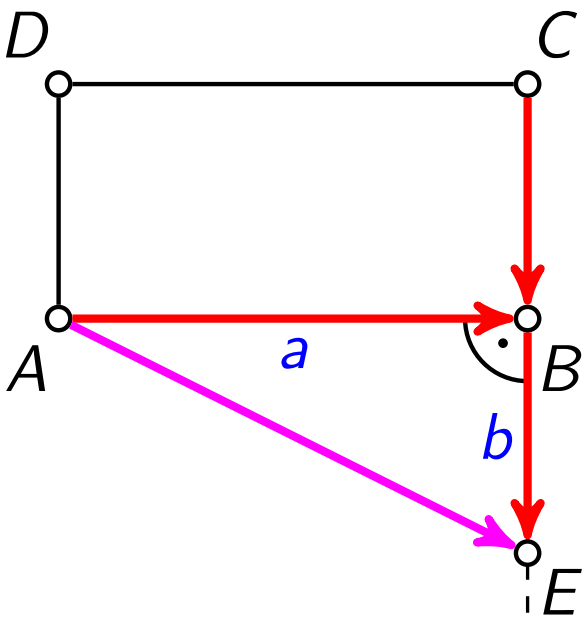
b) $\left|\overrightarrow{AE}\right| =$

Rješenje

a)



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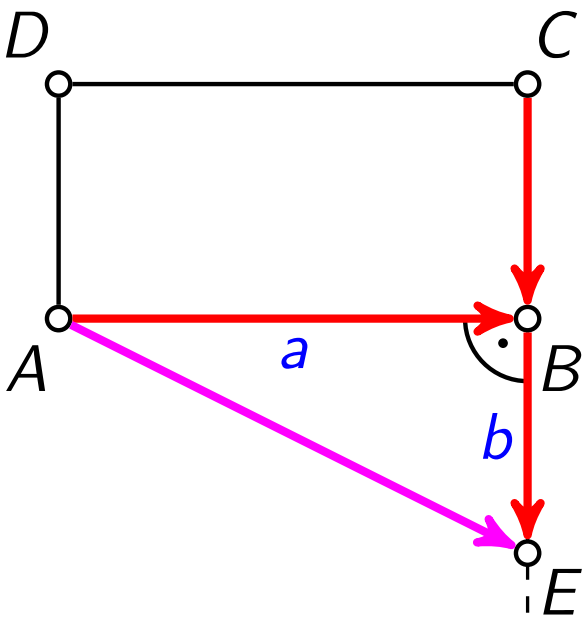
$$= \overrightarrow{AB} + \overrightarrow{BE}$$

b) $\left|\overrightarrow{AE}\right| = \sqrt{a^2 + b^2}$

Rješenje

a)



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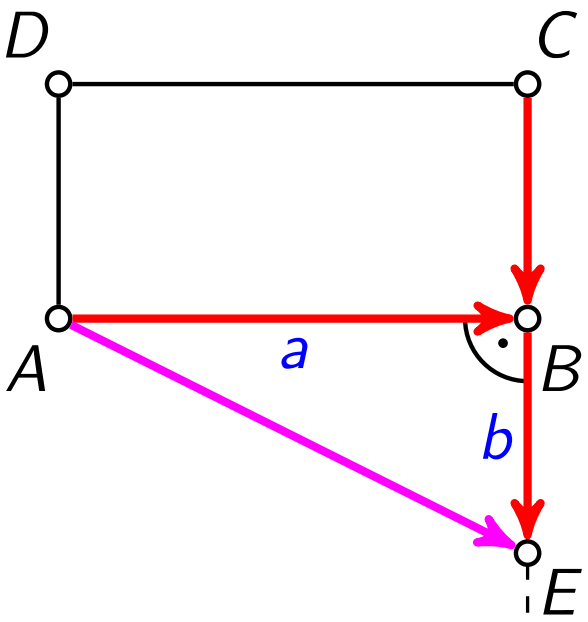

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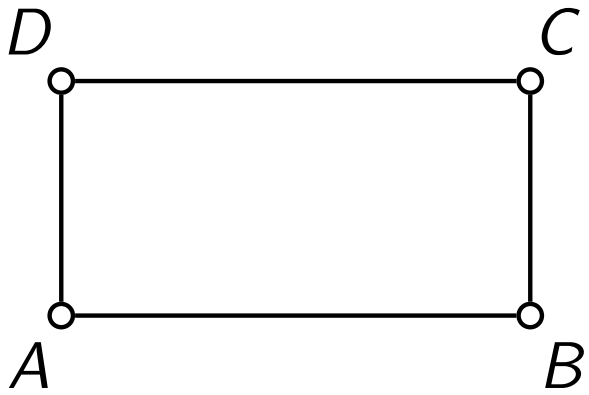
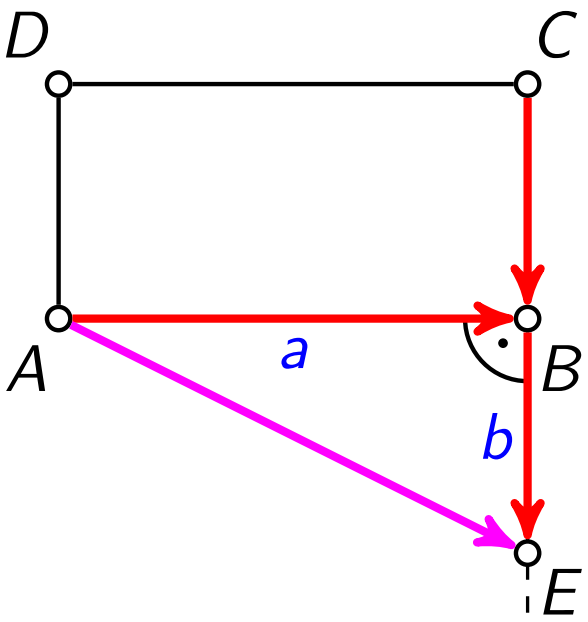
b) $\left|\overrightarrow{AE}\right| = \sqrt{a^2 + b^2}$

c)



Rješenje

a)



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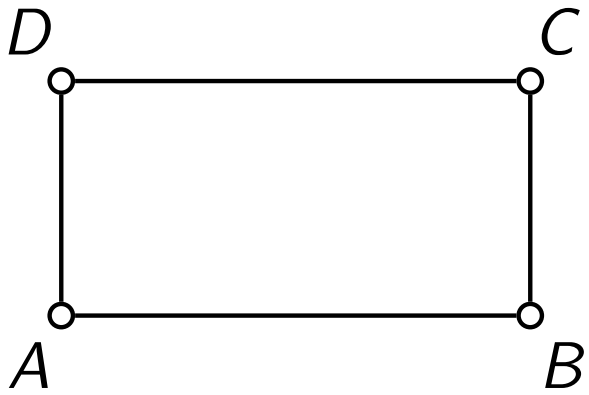
$$\overrightarrow{AE} = \overrightarrow{AB} - \overrightarrow{BC} = \overrightarrow{AB} + \overrightarrow{CB} = \\ = \overrightarrow{AB} + \overrightarrow{BE}$$

b) $\left|\overrightarrow{AE}\right| = \sqrt{a^2 + b^2}$

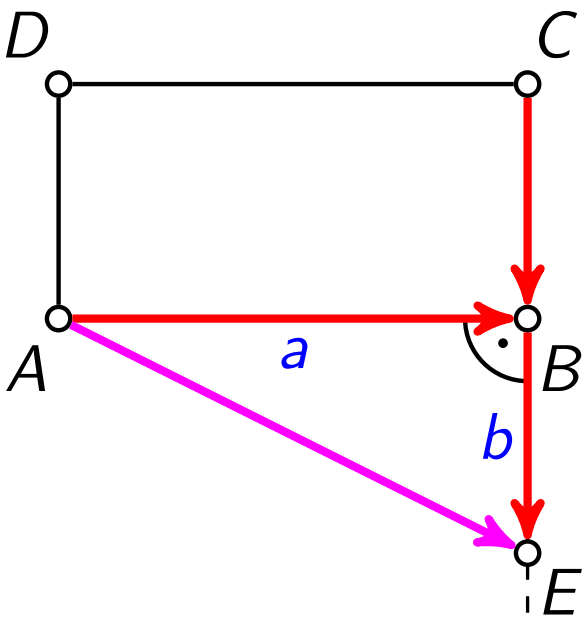
c)



$\overrightarrow{AF} = \overrightarrow{AB} - \overrightarrow{AC}$

Rješenje

a)



$|AB| = a$

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$|BE| = b$

$\overrightarrow{CB} = \overrightarrow{BE}$

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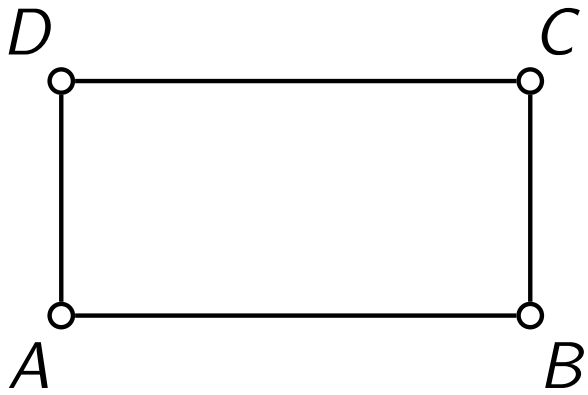
b) $\left|\overrightarrow{AE}\right| = \sqrt{a^2 + b^2}$

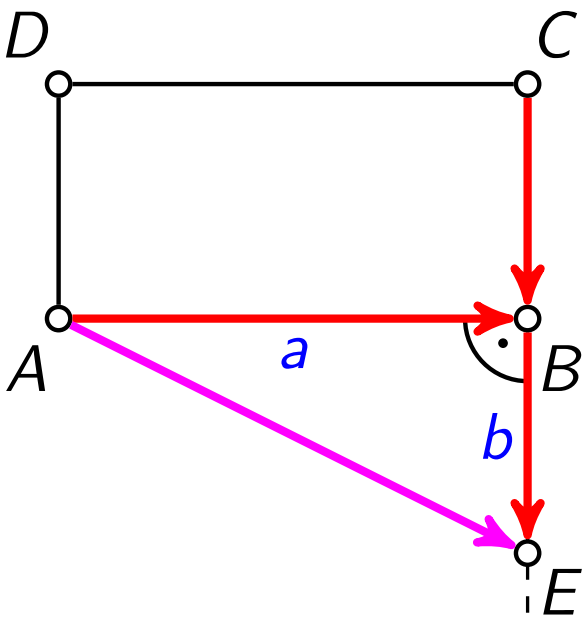
c)



$$\overrightarrow{AF} = \overrightarrow{AB} - \overrightarrow{AC} = \overrightarrow{CB}$$

Rješenje

a)



$|AB| = a$

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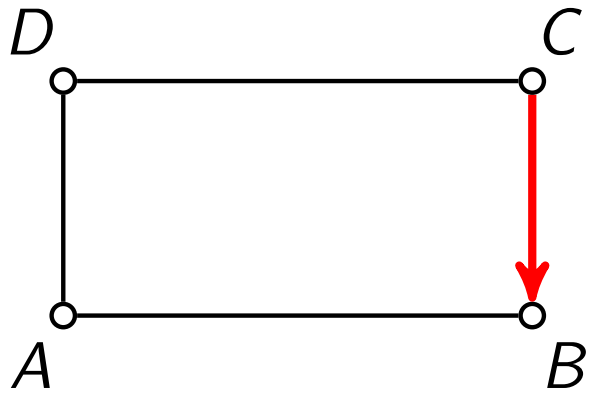
b) $\left|\overrightarrow{AE}\right| = \sqrt{a^2 + b^2}$

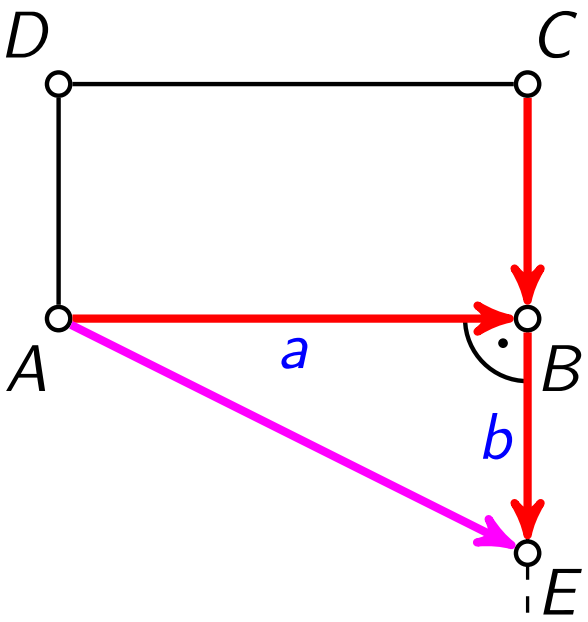
c)



$$\overrightarrow{AF} = \overrightarrow{AB} - \overrightarrow{AC} = \overrightarrow{CB}$$

Rješenje

a)



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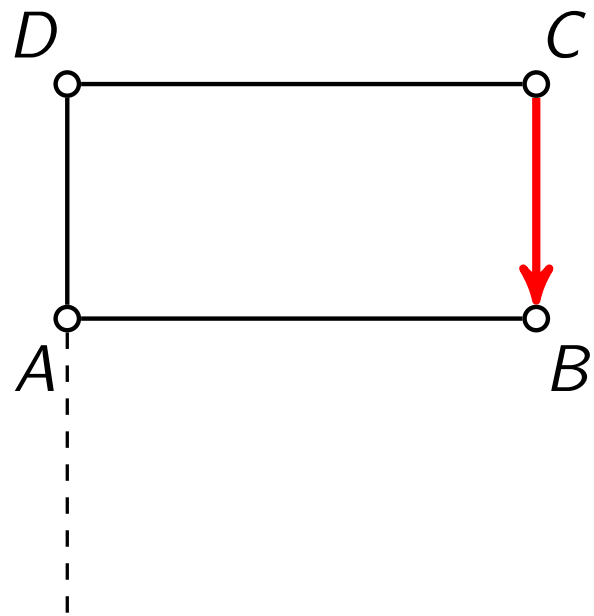
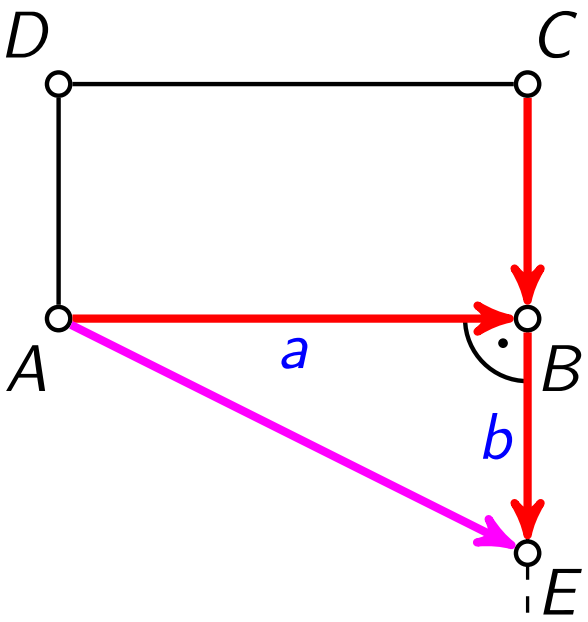


$$\overrightarrow{AF} = \overrightarrow{AB} - \overrightarrow{AC} = \overrightarrow{CB}$$

Rješenje

a)



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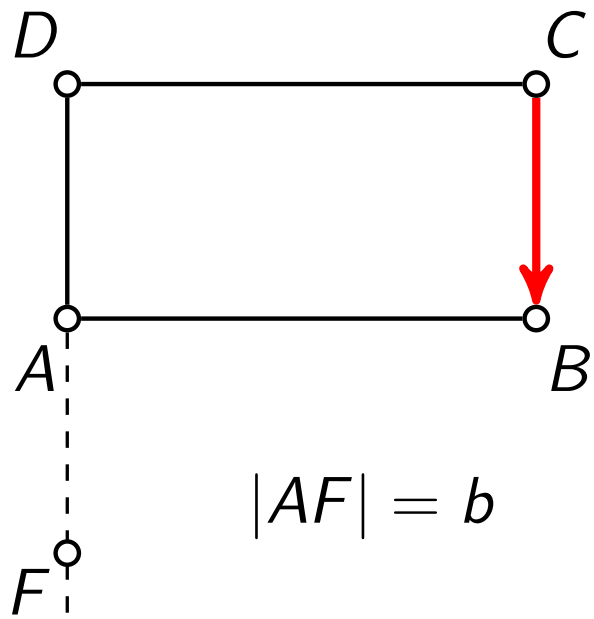
b) $\left|\overrightarrow{AE}\right| = \sqrt{a^2 + b^2}$

c)



$|AF| = b$

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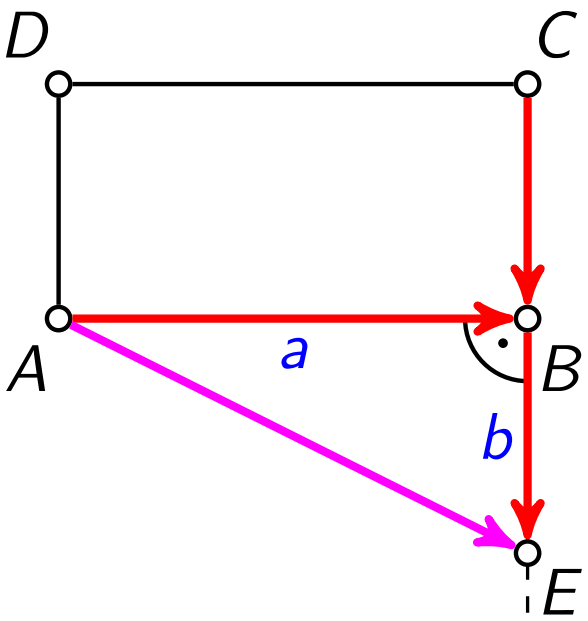
Rješenje

a)



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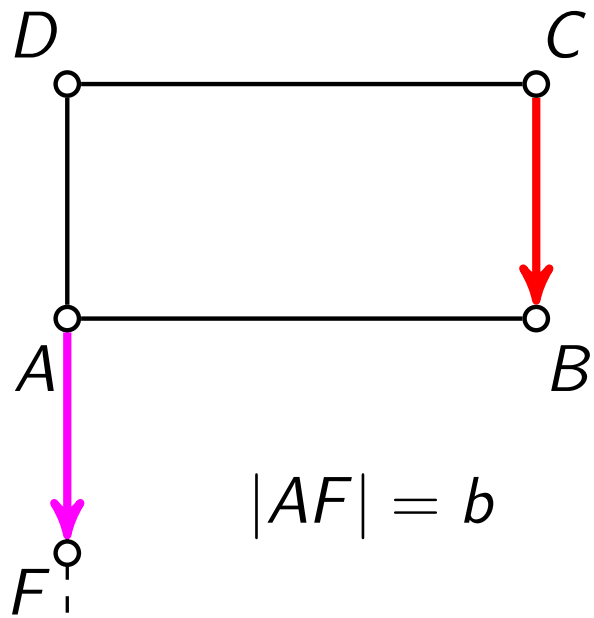

$|AF| = b$

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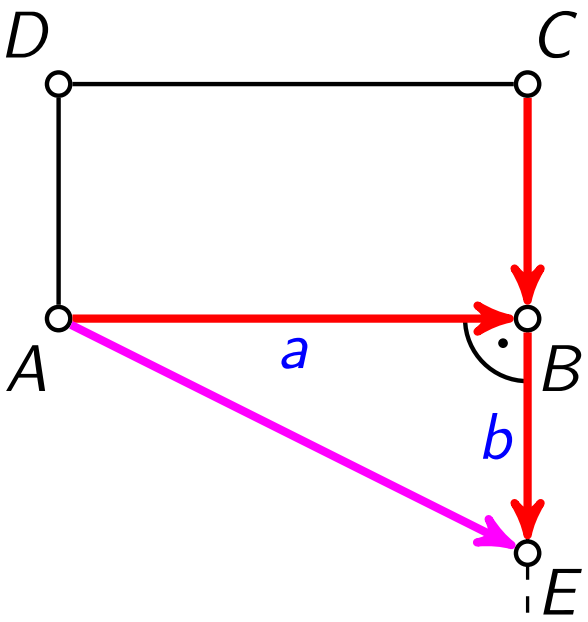
Rješenje

a)



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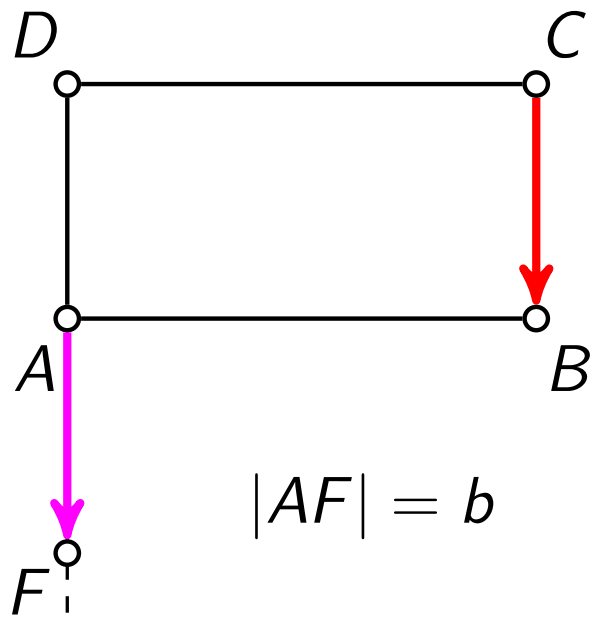
c)



$|AF| = b$

$$\overrightarrow{AF} = \overrightarrow{AB} - \overrightarrow{AC} = \overrightarrow{CB}$$

d) $\left|\overrightarrow{AF}\right| = b$

treći zadatak

Definicija kolinearnih vektora

Za dva vektora iz V^3 kažemo da su kolinearni ako imaju isti smjer. Po dogovoru je nulvektor kolinearan sa svakim vektorom iz V^3.

Definicija kolinearnih vektora

Za dva vektora iz V^3 kažemo da su kolinearni ako imaju isti smjer. Po dogovoru je nulvektor kolinearan sa svakim vektorom iz V^3.

Iznimno važna propozicija

Neka su $\vec{a}, \vec{b} \in V^3$ različiti od nulvektora. Tada vrijedi:

$$\vec{a} \text{ i } \vec{b} \text{ imaju isti smjer } \Leftrightarrow \exists \lambda \in \mathbb{R},\ \vec{b} = \lambda \vec{a}.$$

U tom je slučaju $\lambda \neq 0$ i vrijedi $\vec{a} = \frac{1}{\lambda}\vec{b}$. Nadalje, takav λ je jedinstven.

Zadatak 3

Dokažite da je srednjica trokuta paralelna s nasuprotnom stranicom trokuta i da je njezina duljina jednaka polovici duljine te stranice.

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Rješenje

Srednjica trokuta je dužina koja spaja polovišta dviju stranica trokuta.

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Rješenje

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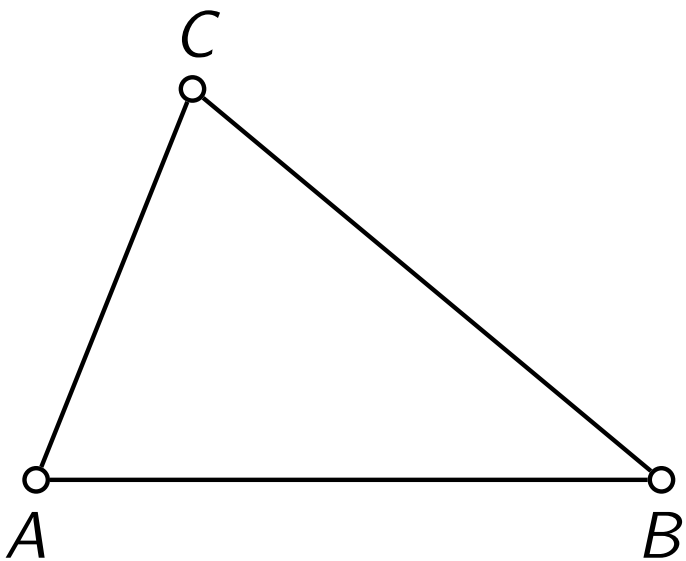

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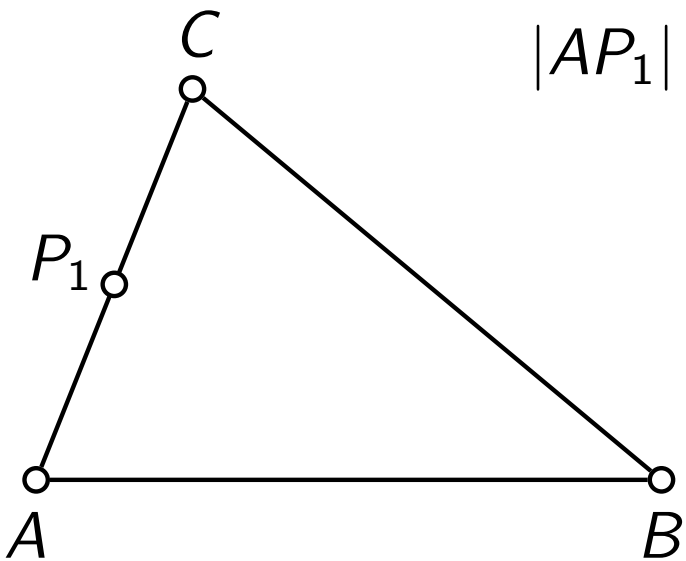

$$|AP_1| = |CP_1|$$

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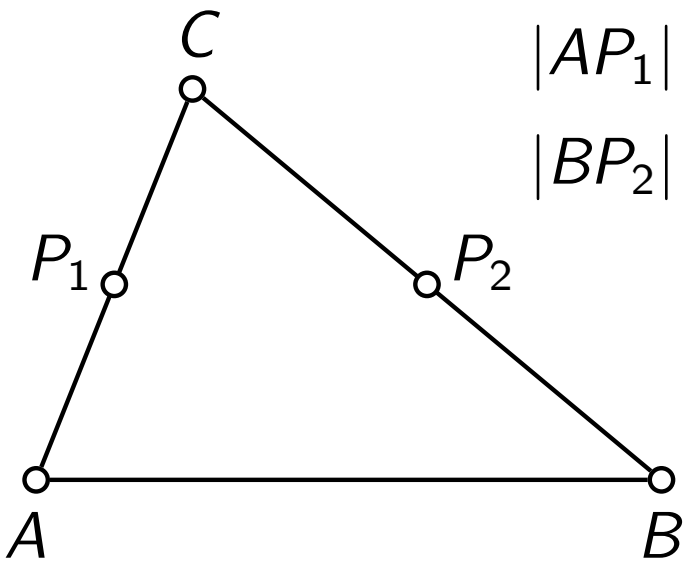


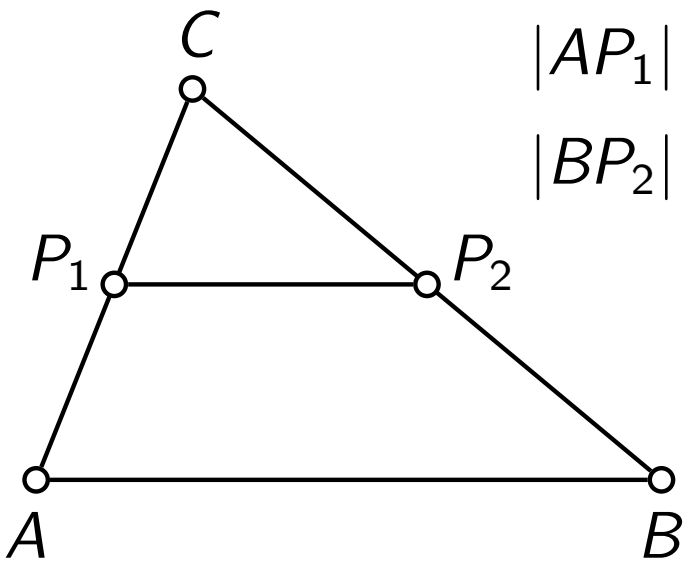
$$|AP_1| = |CP_1|$$
$$|BP_2| = |CP_2|$$

Zadatak 3

Dokažite da je srednjica trokuta paralelna s nasuprotnom stranicom trokuta i da je njezina duljina jednaka polovici duljine te stranice.

Rješenje

Srednjica trokuta je dužina koja spaja polovišta dviju stranica trokuta.



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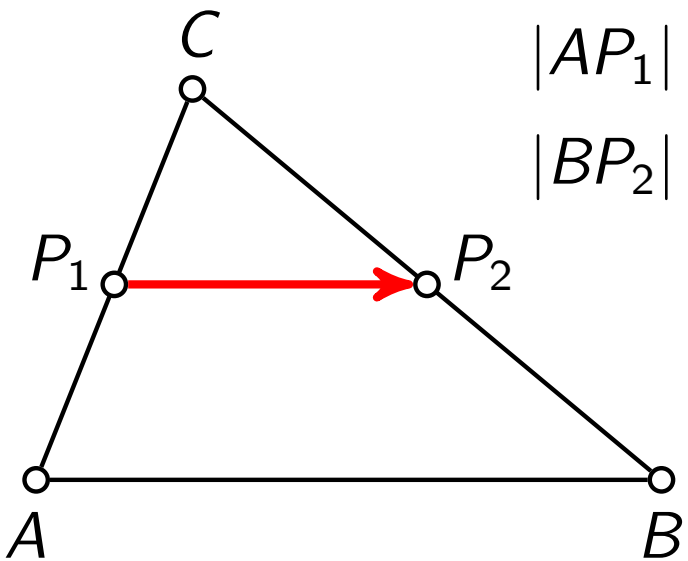

$$|AP_1| = |CP_1|$$
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Zadatak 3

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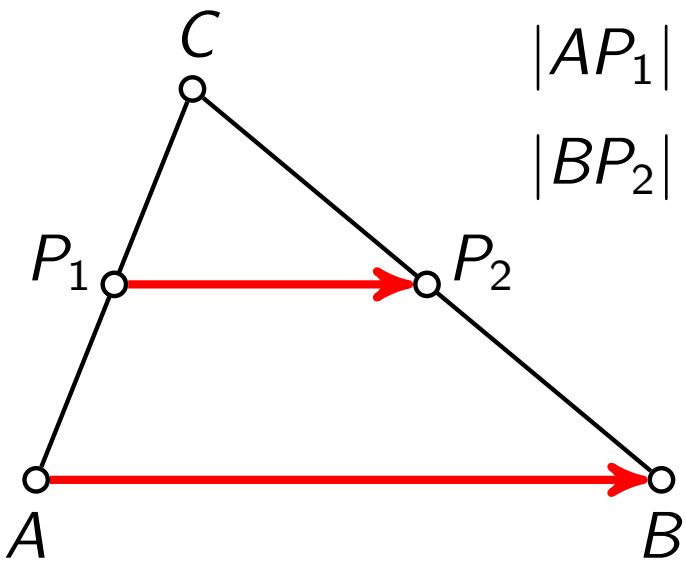

$$|AP_1| = |CP_1|$$
$$|BP_2| = |CP_2|$$

Zadatak 3

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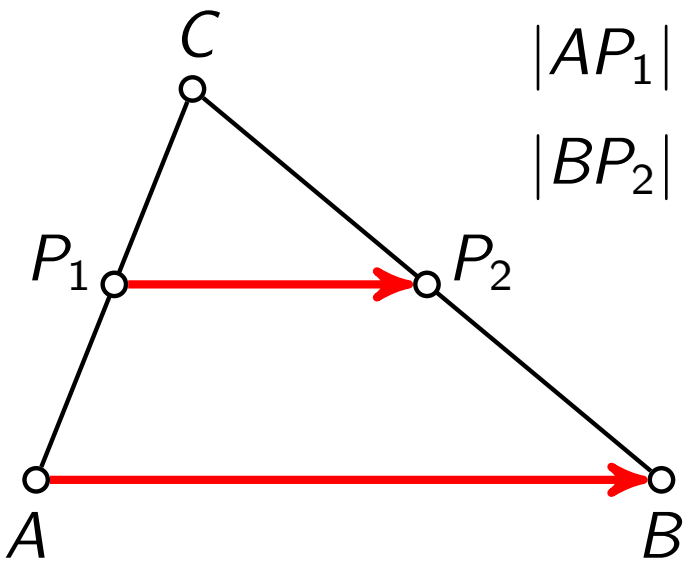

$$|AP_1| = |CP_1|$$
$$|BP_2| = |CP_2|$$

$$\overrightarrow{P_1P_2} =$$

Zadatak 3

Dokažite da je srednjica trokuta paralelna s nasuprotnom stranicom trokuta i da je njezina duljina jednaka polovici duljine te stranice.

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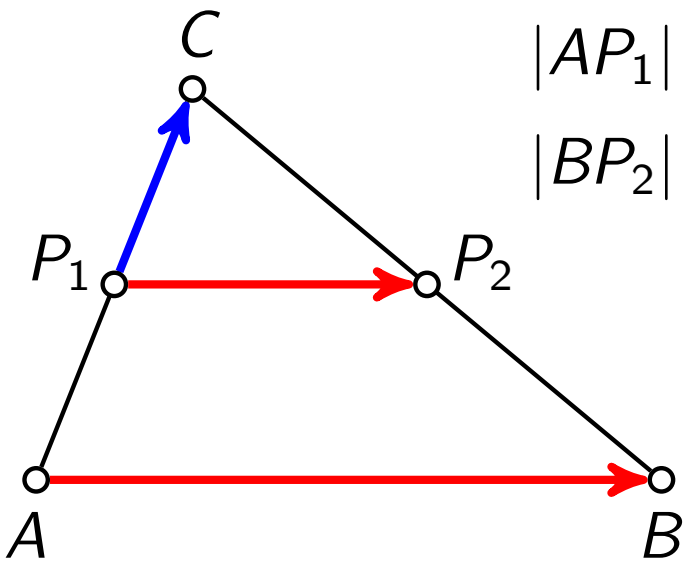


$$|AP_1| = |CP_1|$$

$$|BP_2| = |CP_2|$$

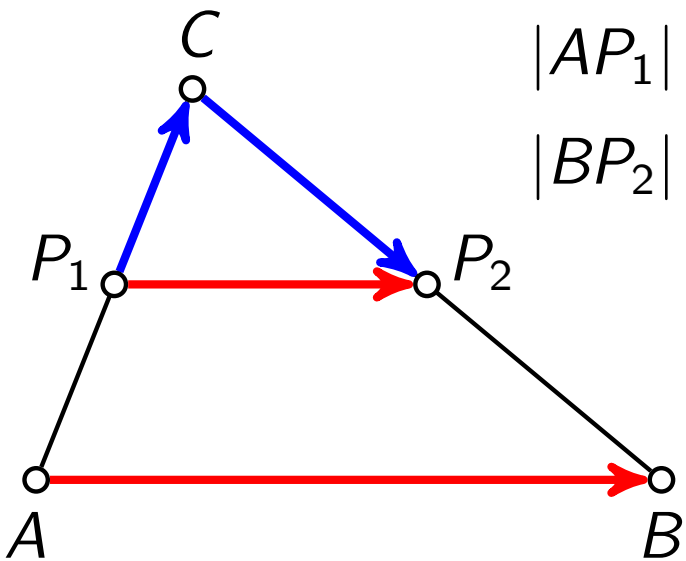
$$\overrightarrow{P_1P_2} = \overrightarrow{P_1C} +$$

Zadatak 3

Dokažite da je srednjica trokuta paralelna s nasuprotnom stranicom trokuta i da je njezina duljina jednaka polovici duljine te stranice.

Rješenje

Srednjica trokuta je dužina koja spaja polovišta dviju stranica trokuta.



$$|AP_1| = |CP_1|$$
$$|BP_2| = |CP_2|$$

$$\overrightarrow{P_1P_2} = \overrightarrow{P_1C} + \overrightarrow{CP_2}$$

Zadatak 3

Dokažite da je srednjica trokuta paralelna s nasuprotnom stranicom trokuta i da je njezina duljina jednaka polovici duljine te stranice.

Rješenje

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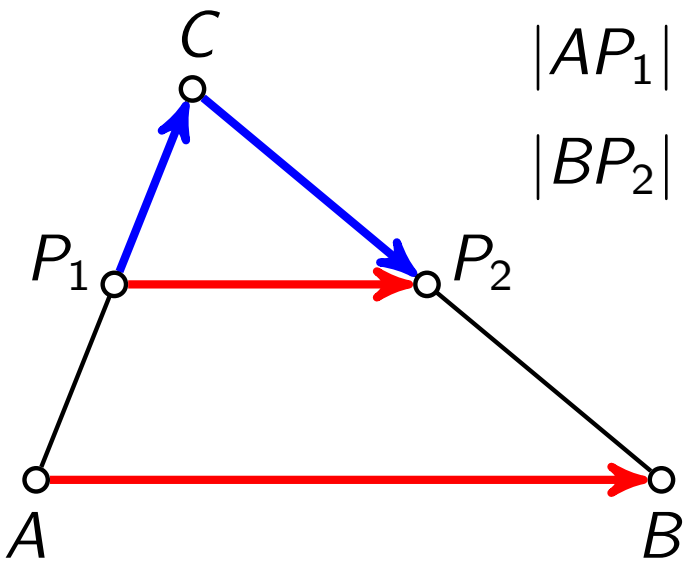

$$|AP_1| = |CP_1|$$
$$|BP_2| = |CP_2|$$

$$\overrightarrow{P_1P_2} = \overrightarrow{P_1C} + \overrightarrow{CP_2} = \frac{1}{2}\overrightarrow{AC}$$

Zadatak 3

Dokažite da je srednjica trokuta paralelna s nasuprotnom stranicom trokuta i da je njezina duljina jednaka polovici duljine te stranice.

Rješenje

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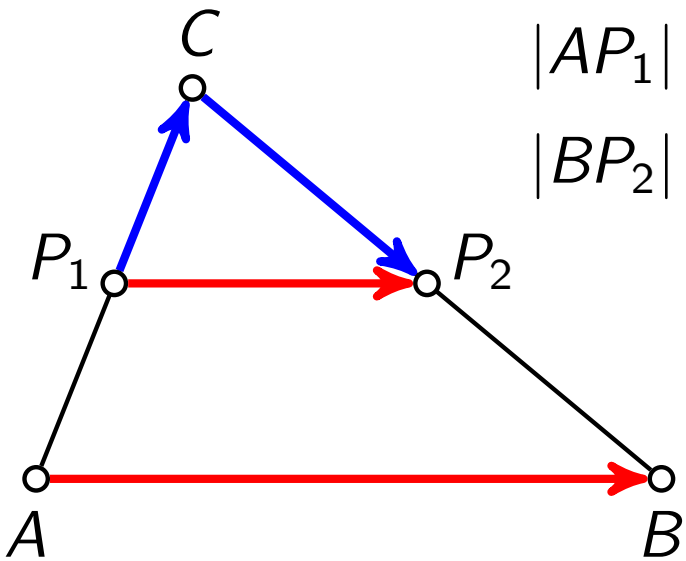

$$|AP_1| = |CP_1|$$
$$|BP_2| = |CP_2|$$

$$\overrightarrow{P_1P_2} = \overrightarrow{P_1C} + \overrightarrow{CP_2} = \frac{1}{2}\overrightarrow{AC} +$$

Zadatak 3

Dokažite da je srednjica trokuta paralelna s nasuprotnom stranicom trokuta i da je njezina duljina jednaka polovici duljine te stranice.

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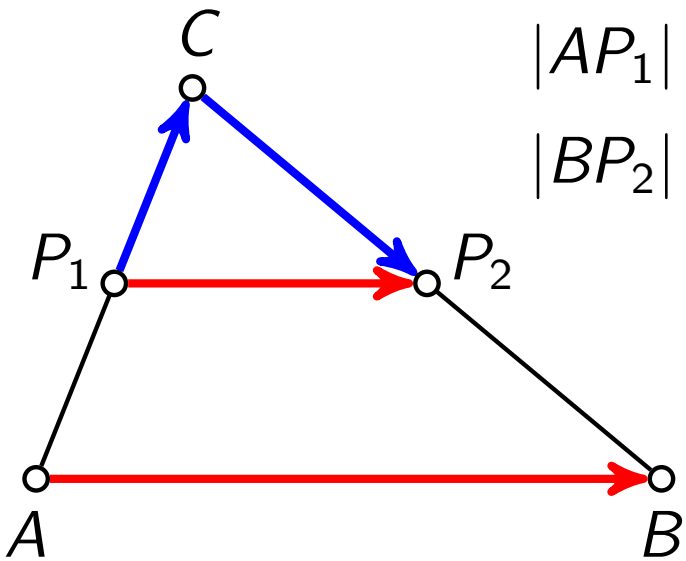

$$|AP_1| = |CP_1|$$
$$|BP_2| = |CP_2|$$

$$\overrightarrow{P_1P_2} = \overrightarrow{P_1C} + \overrightarrow{CP_2} = \frac{1}{2}\overrightarrow{AC} + \frac{1}{2}\overrightarrow{CB}$$

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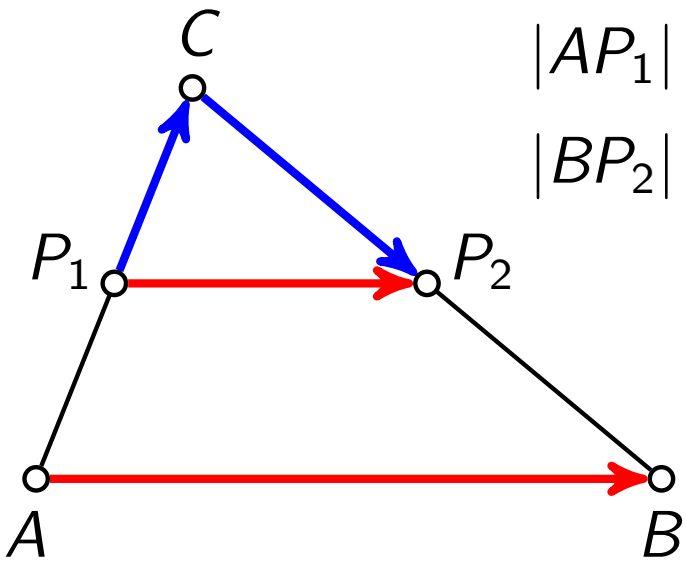

$$|AP_1| = |CP_1|$$
$$|BP_2| = |CP_2|$$

$$\overrightarrow{P_1P_2} = \overrightarrow{P_1C} + \overrightarrow{CP_2} = \frac{1}{2}\overrightarrow{AC} + \frac{1}{2}\overrightarrow{CB} = \frac{1}{2}\left(\overrightarrow{AC} + \overrightarrow{CB}\right)$$

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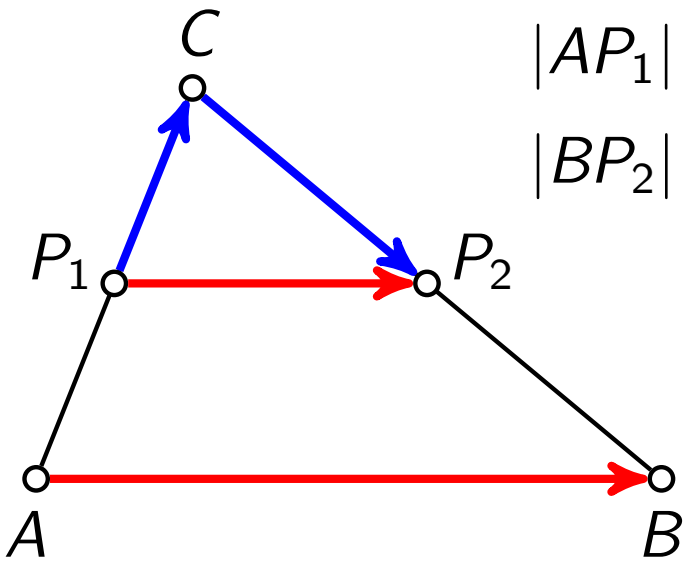

$$|AP_1| = |CP_1|$$
$$|BP_2| = |CP_2|$$

$$\overrightarrow{P_1P_2} = \overrightarrow{P_1C} + \overrightarrow{CP_2} = \frac{1}{2}\overrightarrow{AC} + \frac{1}{2}\overrightarrow{CB} = \frac{1}{2}\left(\overrightarrow{AC} + \overrightarrow{CB}\right) = \frac{1}{2}\overrightarrow{AB}$$

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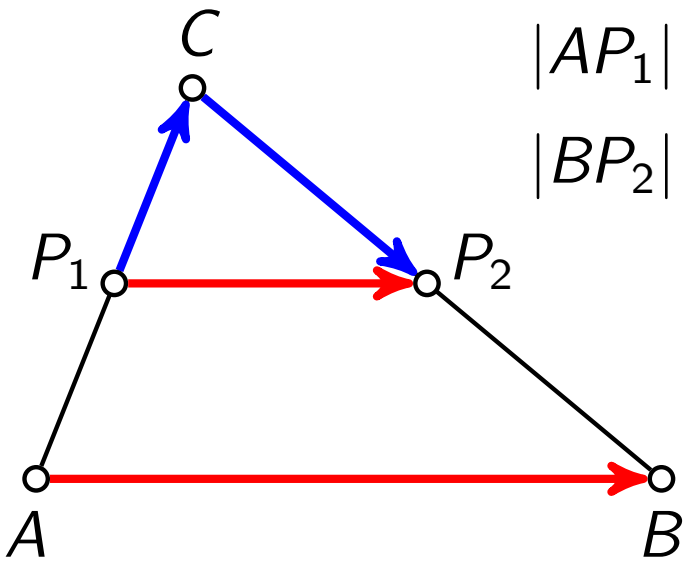

$$|AP_1| = |CP_1|$$

$$|BP_2| = |CP_2|$$

$$\overrightarrow{P_1P_2} = \frac{1}{2}\overrightarrow{AB}$$

$$\overrightarrow{P_1P_2} = \overrightarrow{P_1C} + \overrightarrow{CP_2} = \frac{1}{2}\overrightarrow{AC} + \frac{1}{2}\overrightarrow{CB} = \frac{1}{2}\left(\overrightarrow{AC} + \overrightarrow{CB}\right) = \frac{1}{2}\overrightarrow{AB}$$

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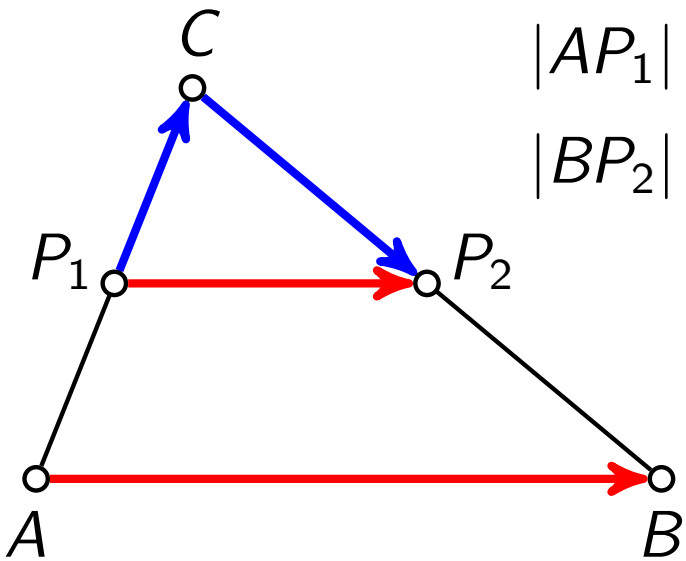

$$|AP_1| = |CP_1|$$
$$|BP_2| = |CP_2|$$
$$\overrightarrow{P_1P_2} = \frac{1}{2}\overrightarrow{AB} \rightsquigarrow P_1P_2 \parallel AB$$

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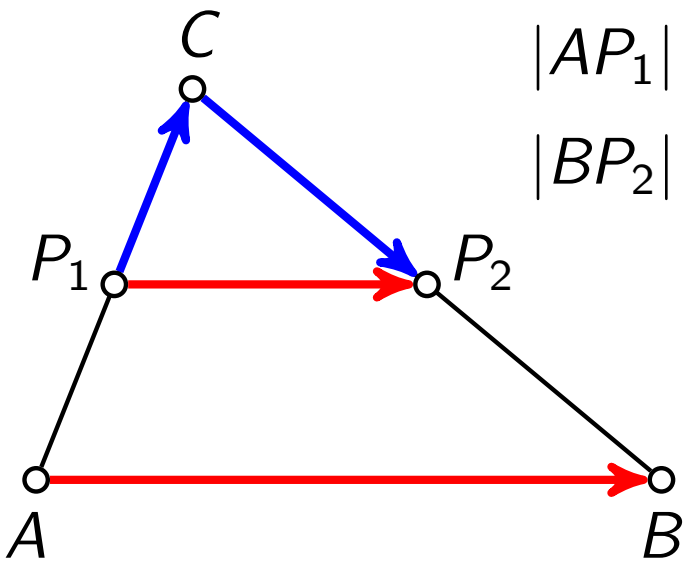

$$|AP_1| = |CP_1|$$

$$|BP_2| = |CP_2|$$

$$\overrightarrow{P_1P_2} = \frac{1}{2}\overrightarrow{AB}$$

$$P_1P_2 \parallel AB$$

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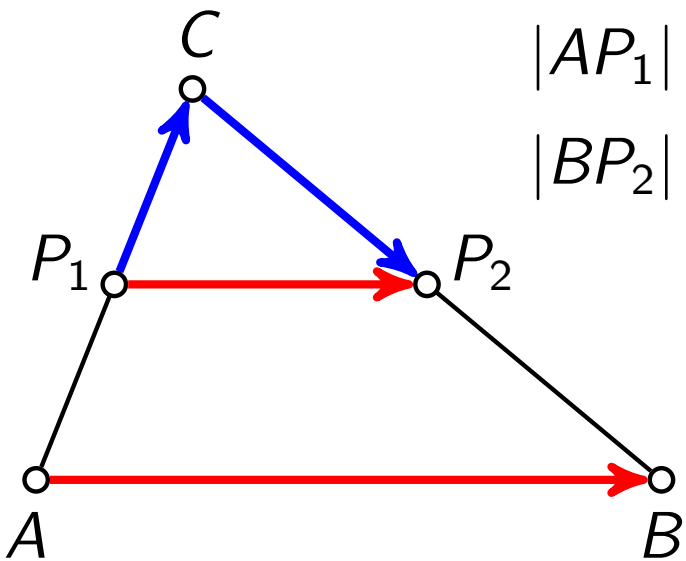

$$|AP_1| = |CP_1|$$

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$$\overrightarrow{P_1P_2} = \frac{1}{2}\overrightarrow{AB}$$

$$P_1P_2 \parallel AB$$

$$\left|\overrightarrow{P_1P_2}\right| =$$

$$|\lambda\vec{a}| = |\lambda|\,|\vec{a}|$$

$$\overrightarrow{P_1P_2} = \overrightarrow{P_1C} + \overrightarrow{CP_2} = \frac{1}{2}\overrightarrow{AC} + \frac{1}{2}\overrightarrow{CB} = \frac{1}{2}\left(\overrightarrow{AC} + \overrightarrow{CB}\right) = \frac{1}{2}\overrightarrow{AB}$$

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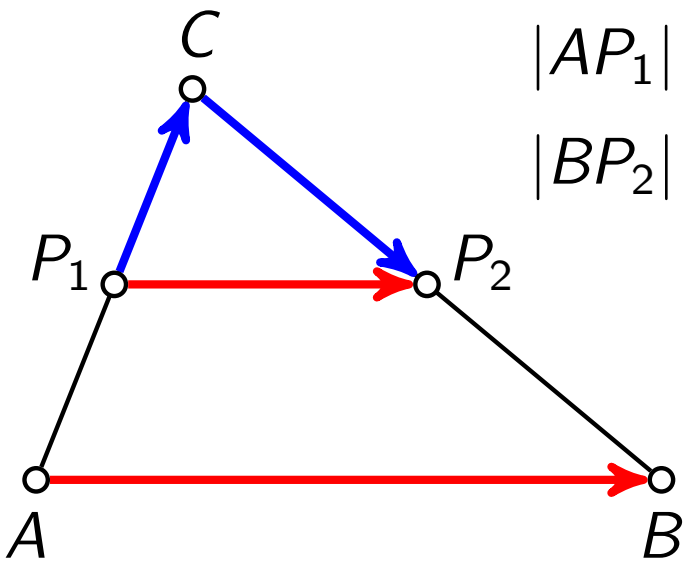

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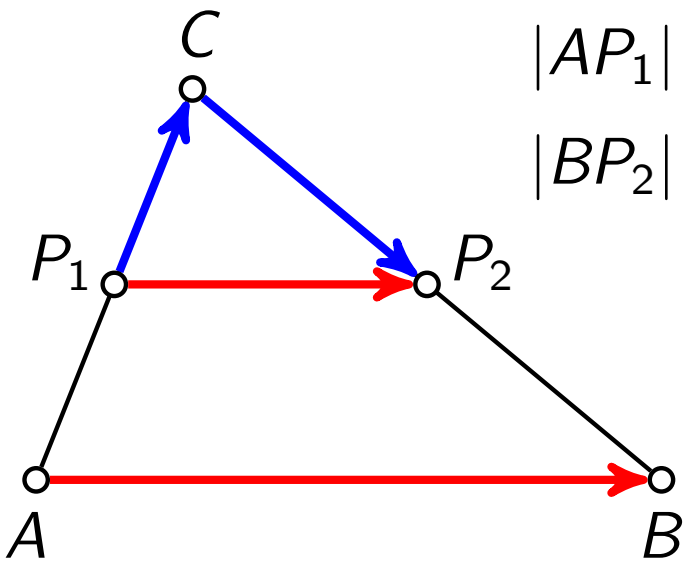

$$|AP_1| = |CP_1|$$

$$|BP_2| = |CP_2|$$

$$\overrightarrow{P_1P_2} = \frac{1}{2}\overrightarrow{AB}$$

$P_1P_2 \parallel AB$

$$\left|\overrightarrow{P_1P_2}\right| = \frac{1}{2}\left|\overrightarrow{AB}\right|$$

$$|P_1P_2| = \frac{1}{2}|AB|$$

$$|\lambda\vec{a}| = |\lambda|\,|\vec{a}|$$

$$\overrightarrow{P_1P_2} = \overrightarrow{P_1C} + \overrightarrow{CP_2} = \frac{1}{2}\overrightarrow{AC} + \frac{1}{2}\overrightarrow{CB} = \frac{1}{2}\left(\overrightarrow{AC} + \overrightarrow{CB}\right) = \frac{1}{2}\overrightarrow{AB}$$

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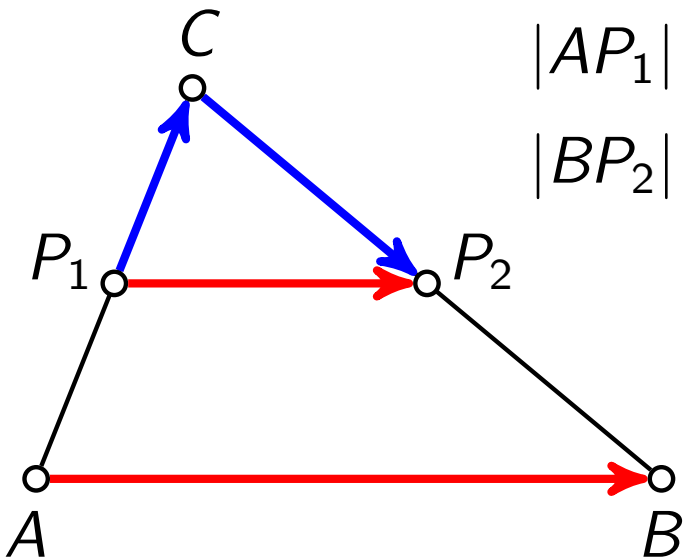


$$|AP_1| = |CP_1|$$

$$|BP_2| = |CP_2|$$

$$\overrightarrow{P_1P_2} = \frac{1}{2}\overrightarrow{AB}$$

$P_1P_2 \parallel AB$

$$\left|\overrightarrow{P_1P_2}\right| = \frac{1}{2}\left|\overrightarrow{AB}\right|$$

$$|\lambda\vec{a}| = |\lambda|\,|\vec{a}|$$

$$|P_1P_2| = \frac{1}{2}|AB|$$

$$\overrightarrow{P_1P_2} = \overrightarrow{P_1C} + \overrightarrow{CP_2} = \frac{1}{2}\overrightarrow{AC} + \frac{1}{2}\overrightarrow{CB} = \frac{1}{2}\left(\overrightarrow{AC} + \overrightarrow{CB}\right) = \frac{1}{2}\overrightarrow{AB}$$

četvrti zadatak

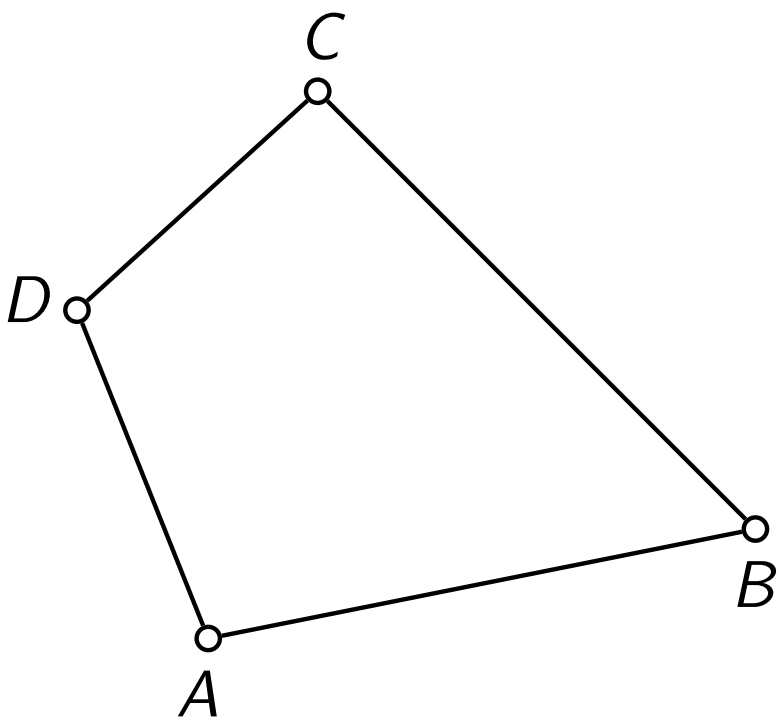
Zadatak 4

Dokažite da su polovišta stranica bilo kojeg četverokuta vrhovi paralelograma.

Zadatak 4

Dokažite da su polovišta stranica bilo kojeg četverokuta vrhovi paralelograma.

Rješenje

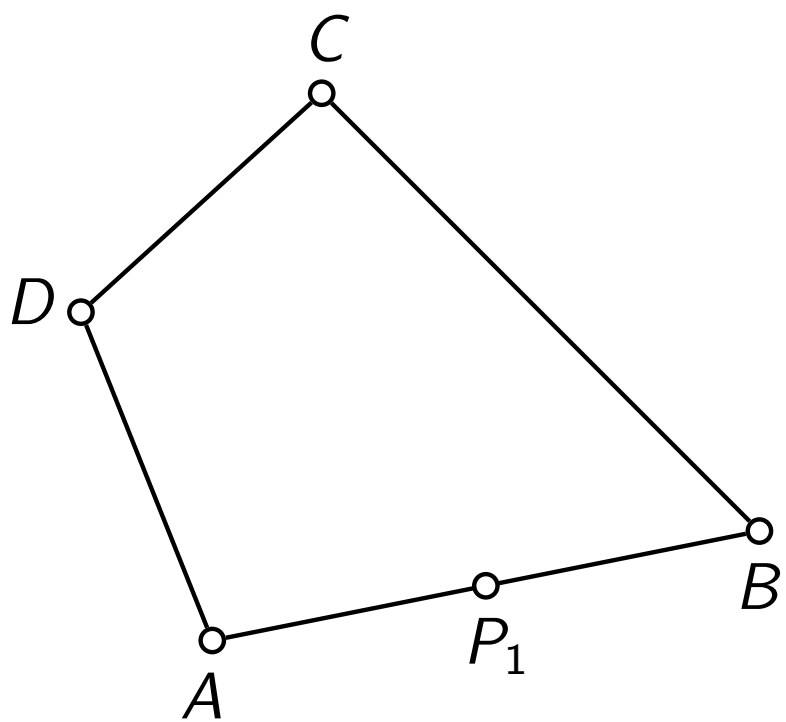


Zadatak 4

Dokažite da su polovišta stranica bilo kojeg četverokuta vrhovi paralelograma.

Rješenje

$|AP_1| = |BP_1|$



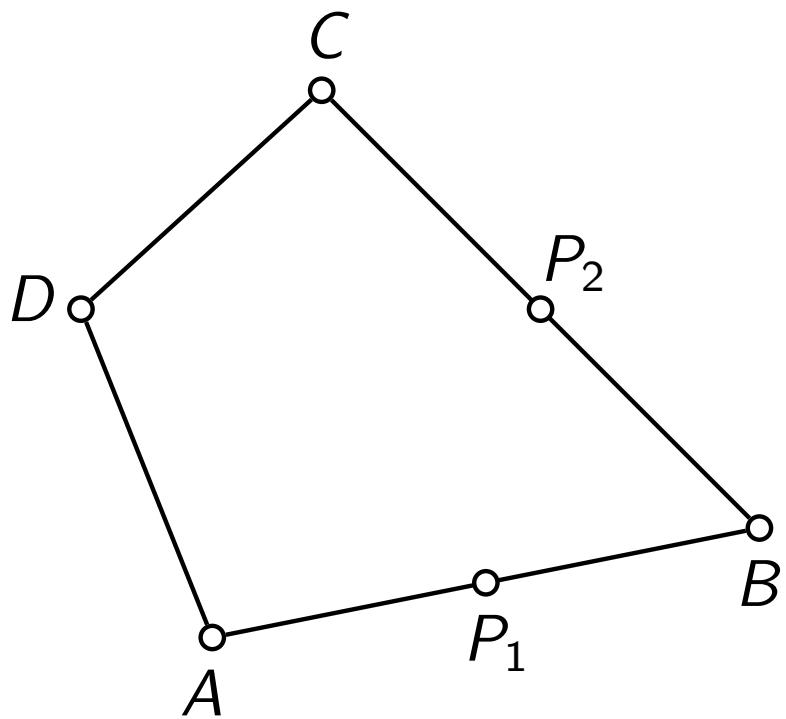
Zadatak 4

Dokažite da su polovišta stranica bilo kojeg četverokuta vrhovi paralelograma.

Rješenje

$|AP_1| = |BP_1|$

$|BP_2| = |CP_2|$



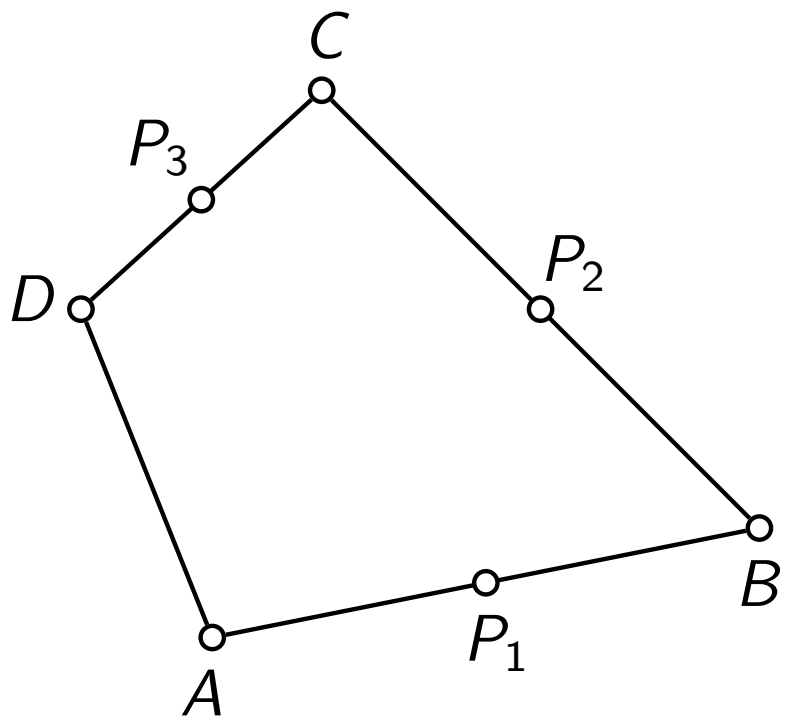
Zadatak 4

Dokažite da su polovišta stranica bilo kojeg četverokuta vrhovi paralelograma.

Rješenje

$|AP_1| = |BP_1| \qquad |CP_3| = |DP_3|$

$|BP_2| = |CP_2|$

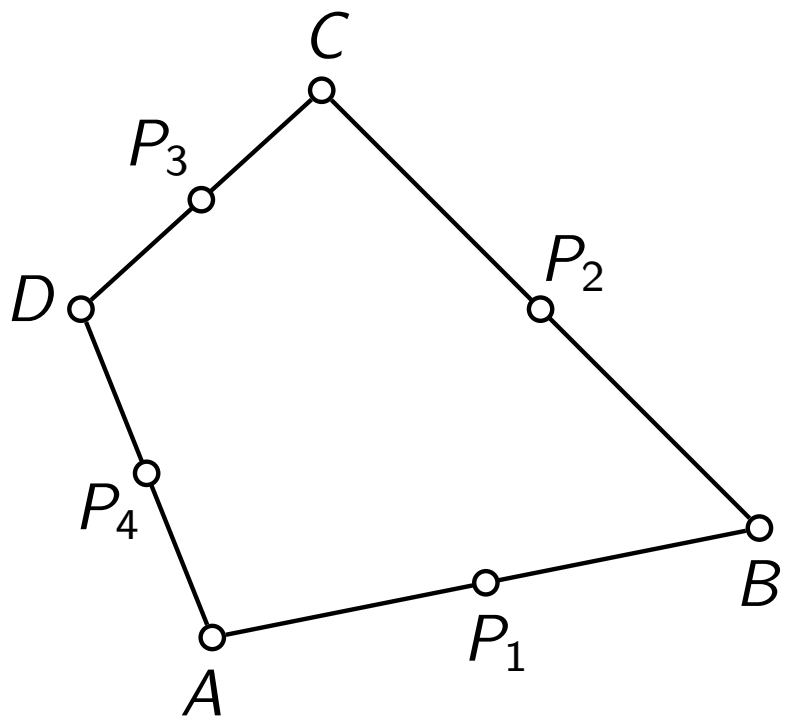


Zadatak 4

Dokažite da su polovišta stranica bilo kojeg četverokuta vrhovi paralelograma.

Rješenje

$$|AP_1| = |BP_1| \qquad |CP_3| = |DP_3|$$
$$|BP_2| = |CP_2| \qquad |AP_4| = |DP_4|$$



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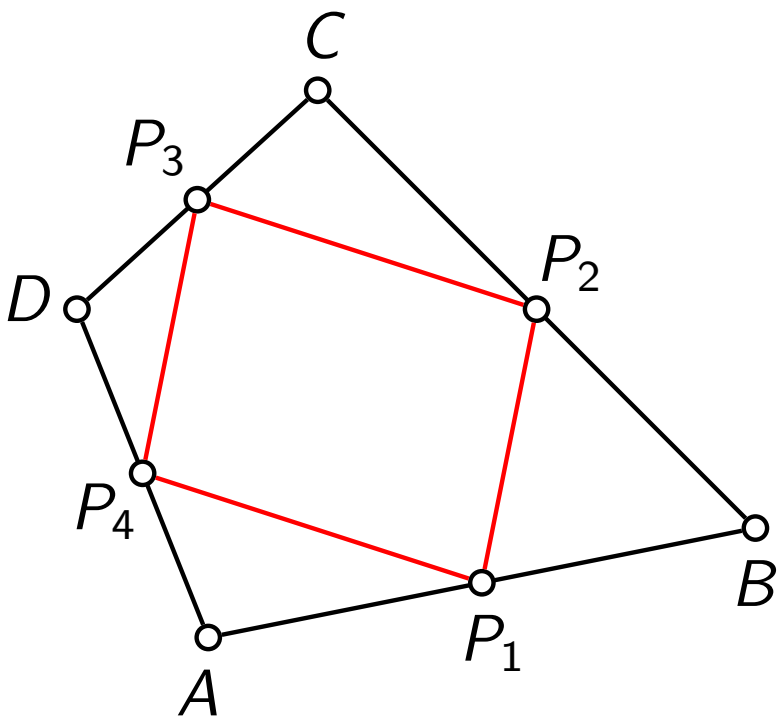
Dokažite da su polovišta stranica bilo kojeg četverokuta vrhovi paralelograma.

Rješenje

$$|AP_1| = |BP_1| \qquad |CP_3| = |DP_3|$$
$$|BP_2| = |CP_2| \qquad |AP_4| = |DP_4|$$

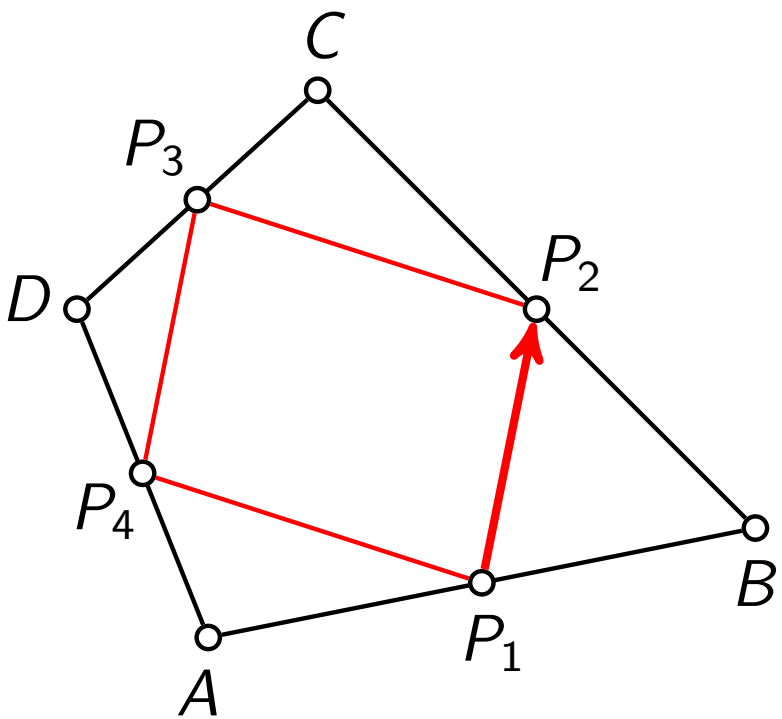


Zadatak 4

Dokažite da su polovišta stranica bilo kojeg četverokuta vrhovi paralelograma.

Rješenje

$$|AP_1| = |BP_1| \qquad |CP_3| = |DP_3|$$
$$|BP_2| = |CP_2| \qquad |AP_4| = |DP_4|$$



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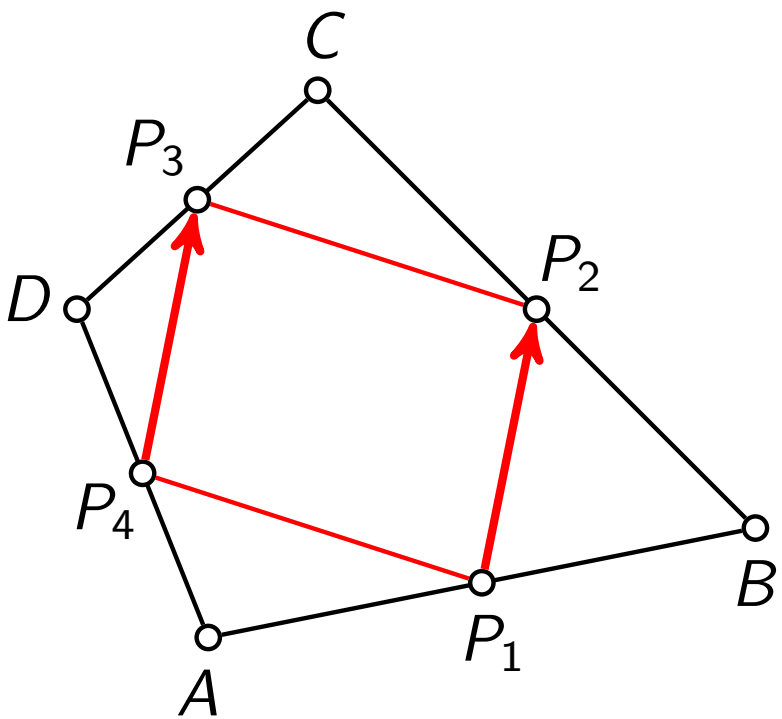
Dokažite da su polovišta stranica bilo kojeg četverokuta vrhovi paralelograma.

Rješenje

$$|AP_1| = |BP_1| \qquad |CP_3| = |DP_3|$$
$$|BP_2| = |CP_2| \qquad |AP_4| = |DP_4|$$



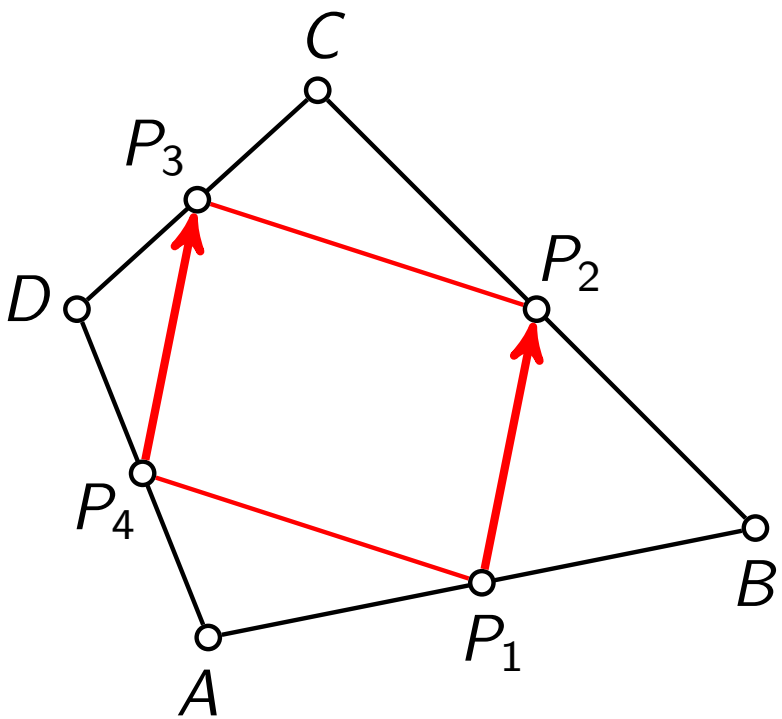
Zadatak 4

Dokažite da su polovišta stranica bilo kojeg četverokuta vrhovi paralelograma.

Rješenje

$|AP_1| = |BP_1|$ $\quad$ $|CP_3| = |DP_3|$ $\quad$ $\overrightarrow{P_1P_2} =$

$|BP_2| = |CP_2|$ $\quad$ $|AP_4| = |DP_4|$

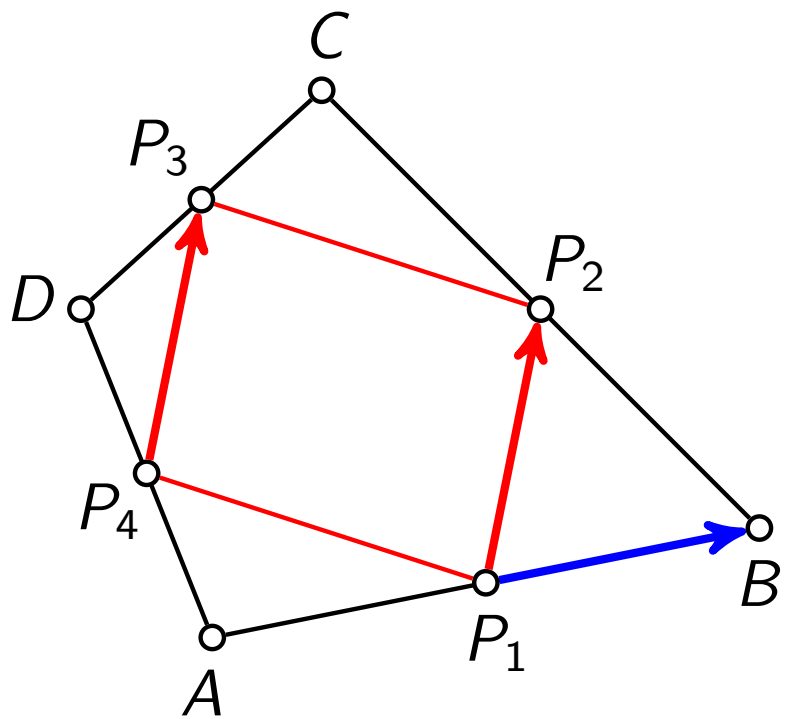


Zadatak 4

Dokažite da su polovišta stranica bilo kojeg četverokuta vrhovi paralelograma.

Rješenje

$|AP_1| = |BP_1|$ $|CP_3| = |DP_3|$ $\overrightarrow{P_1P_2} = \overrightarrow{P_1B} +$
$|BP_2| = |CP_2|$ $|AP_4| = |DP_4|$



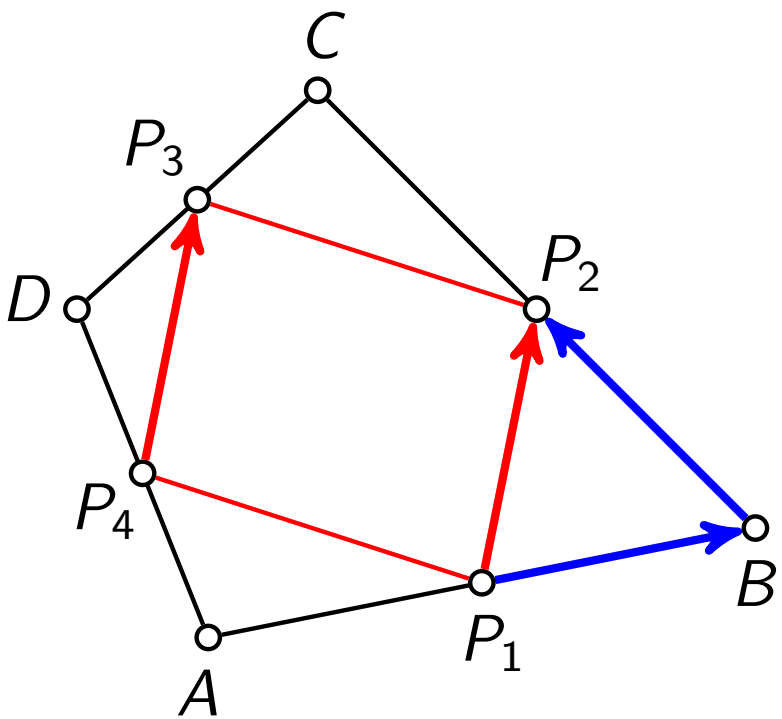
Zadatak 4

Dokažite da su polovišta stranica bilo kojeg četverokuta vrhovi paralelograma.

Rješenje

$|AP_1| = |BP_1|$ $\quad$ $|CP_3| = |DP_3|$ $\quad$ $\overrightarrow{P_1P_2} = \overrightarrow{P_1B} + \overrightarrow{BP_2}$

$|BP_2| = |CP_2|$ $\quad$ $|AP_4| = |DP_4|$



Zadatak 4

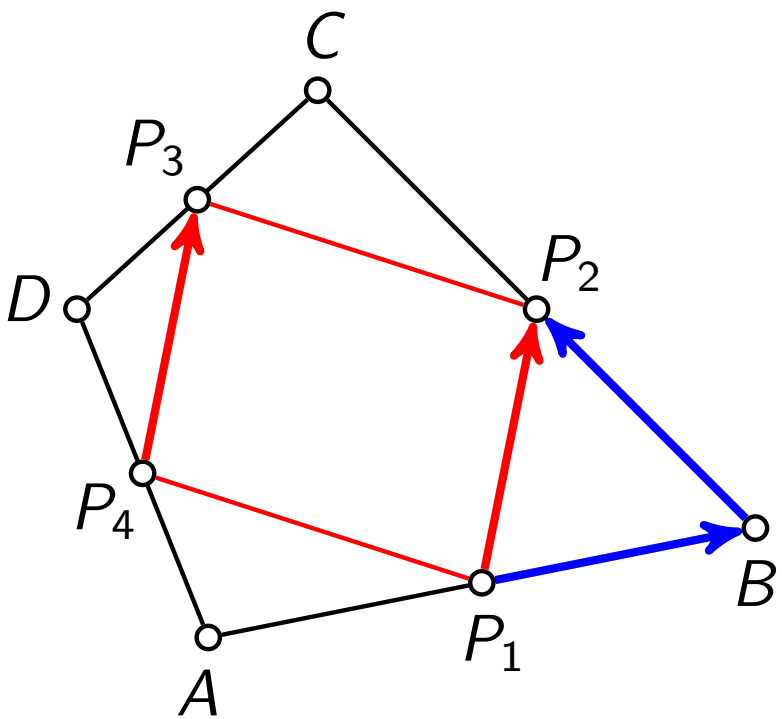
Dokažite da su polovišta stranica bilo kojeg četverokuta vrhovi paralelograma.

Rješenje

$|AP_1| = |BP_1| \qquad |CP_3| = |DP_3|$

$|BP_2| = |CP_2| \qquad |AP_4| = |DP_4|$

$$\overrightarrow{P_1P_2} = \overrightarrow{P_1B} + \overrightarrow{BP_2} = \frac{1}{2}\overrightarrow{AB}$$



Zadatak 4

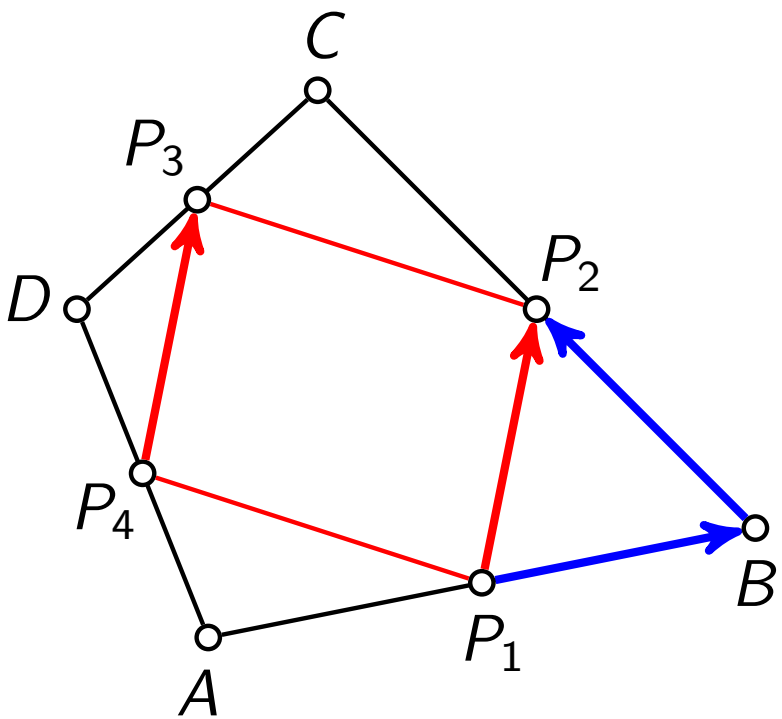
Dokažite da su polovišta stranica bilo kojeg četverokuta vrhovi paralelograma.

Rješenje

$|AP_1| = |BP_1| \qquad |CP_3| = |DP_3|$

$|BP_2| = |CP_2| \qquad |AP_4| = |DP_4|$

$$\overrightarrow{P_1P_2} = \overrightarrow{P_1B} + \overrightarrow{BP_2} = \frac{1}{2}\overrightarrow{AB} +$$



Zadatak 4

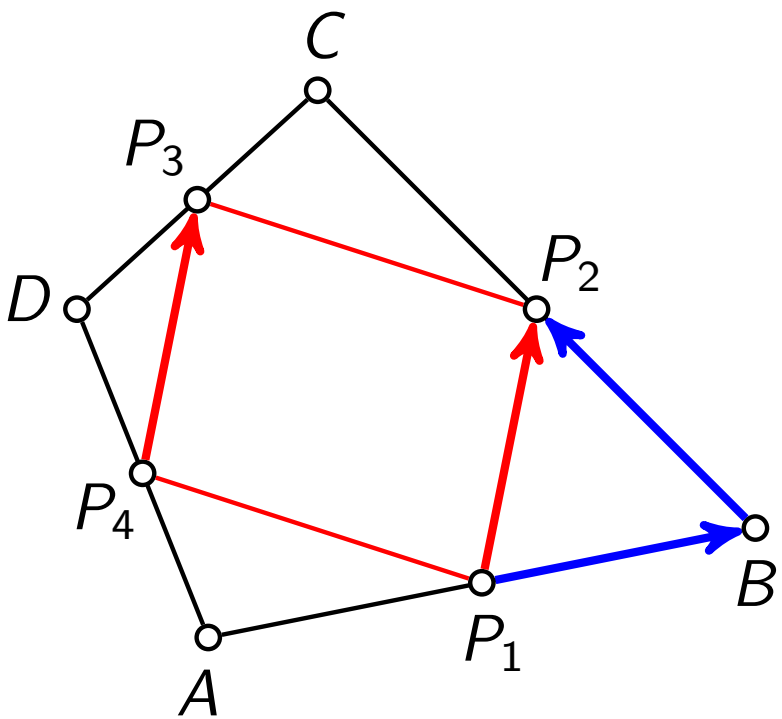
Dokažite da su polovišta stranica bilo kojeg četverokuta vrhovi paralelograma.

Rješenje

$|AP_1| = |BP_1| \qquad |CP_3| = |DP_3|$

$|BP_2| = |CP_2| \qquad |AP_4| = |DP_4|$

$$\overrightarrow{P_1P_2} = \overrightarrow{P_1B} + \overrightarrow{BP_2} = \frac{1}{2}\overrightarrow{AB} + \frac{1}{2}\overrightarrow{BC}$$

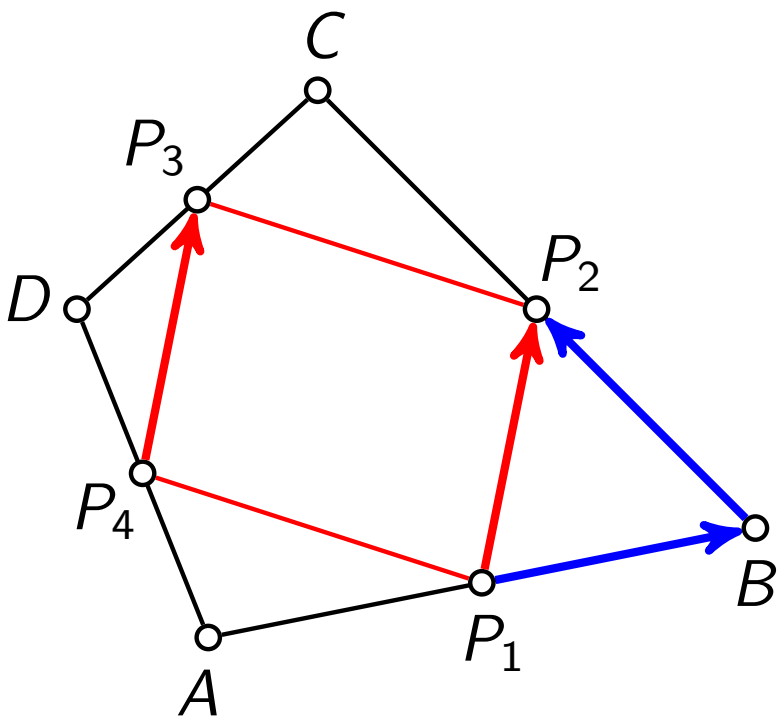


Zadatak 4

Dokažite da su polovišta stranica bilo kojeg četverokuta vrhovi paralelograma.

Rješenje

$$|AP_1| = |BP_1| \qquad |CP_3| = |DP_3|$$
$$|BP_2| = |CP_2| \qquad |AP_4| = |DP_4|$$



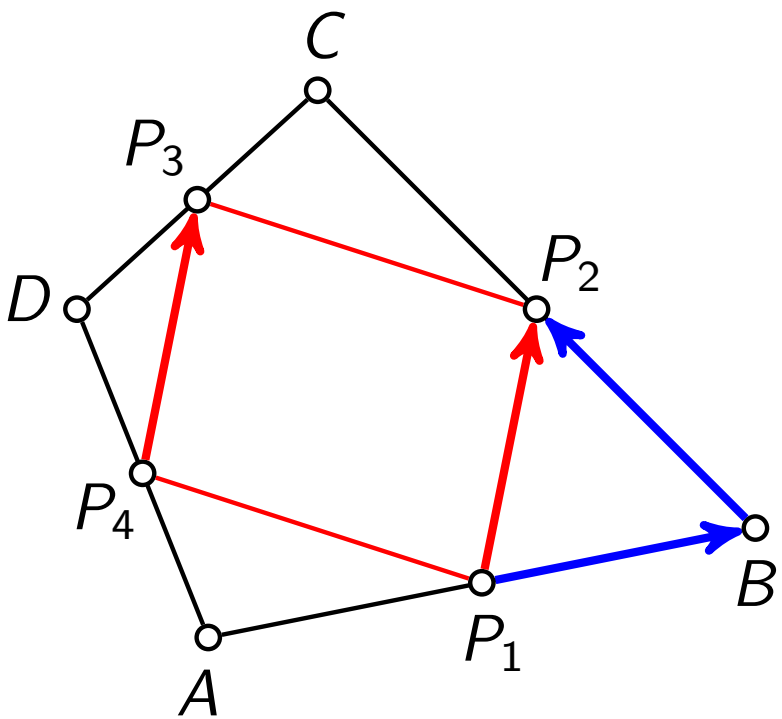
$$\begin{aligned}\overrightarrow{P_1P_2} &= \overrightarrow{P_1B} + \overrightarrow{BP_2} = \\ &= \frac{1}{2}\overrightarrow{AB} + \frac{1}{2}\overrightarrow{BC} = \\ &= \frac{1}{2}\left(\overrightarrow{AB} + \overrightarrow{BC}\right)\end{aligned}$$

Zadatak 4

Dokažite da su polovišta stranica bilo kojeg četverokuta vrhovi paralelograma.

Rješenje

$$|AP_1| = |BP_1| \qquad |CP_3| = |DP_3|$$
$$|BP_2| = |CP_2| \qquad |AP_4| = |DP_4|$$



$$\overrightarrow{P_1P_2} = \overrightarrow{P_1B} + \overrightarrow{BP_2} =$$
$$= \frac{1}{2}\overrightarrow{AB} + \frac{1}{2}\overrightarrow{BC} =$$
$$= \frac{1}{2}\left(\overrightarrow{AB} + \overrightarrow{BC}\right) = \frac{1}{2}\overrightarrow{AC}$$

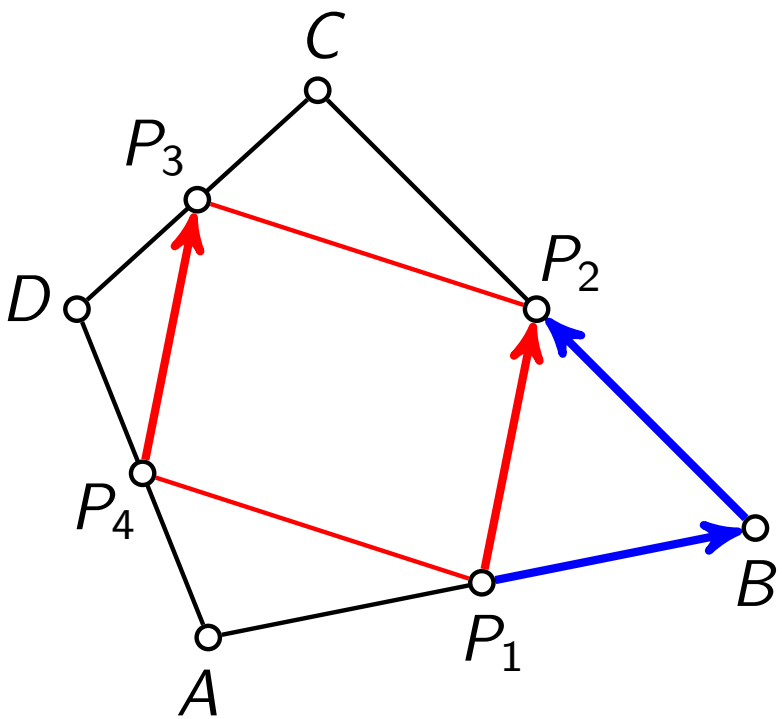
Zadatak 4

Dokažite da su polovišta stranica bilo kojeg četverokuta vrhovi paralelograma.

Rješenje

$|AP_1| = |BP_1| \qquad |CP_3| = |DP_3|$

$|BP_2| = |CP_2| \qquad |AP_4| = |DP_4|$



$$\overrightarrow{P_1P_2} = \overrightarrow{P_1B} + \overrightarrow{BP_2} =$$

$$= \frac{1}{2}\overrightarrow{AB} + \frac{1}{2}\overrightarrow{BC} =$$

$$= \frac{1}{2}\left(\overrightarrow{AB} + \overrightarrow{BC}\right) = \frac{1}{2}\overrightarrow{AC}$$

$$\overrightarrow{P_4P_3} =$$

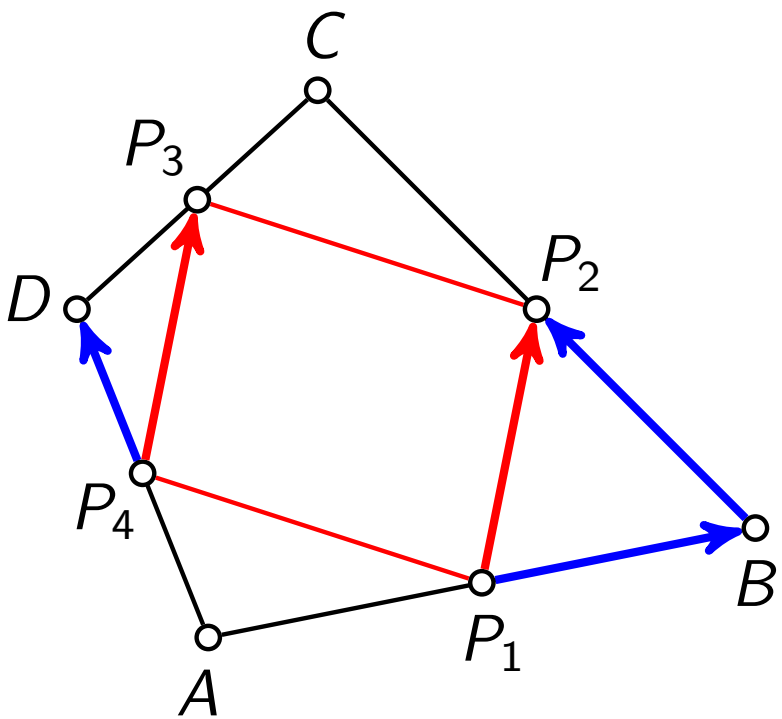
Zadatak 4

Dokažite da su polovišta stranica bilo kojeg četverokuta vrhovi paralelograma.

Rješenje

$|AP_1| = |BP_1| \qquad |CP_3| = |DP_3|$

$|BP_2| = |CP_2| \qquad |AP_4| = |DP_4|$



$$\overrightarrow{P_1P_2} = \overrightarrow{P_1B} + \overrightarrow{BP_2} =$$

$$= \frac{1}{2}\overrightarrow{AB} + \frac{1}{2}\overrightarrow{BC} =$$

$$= \frac{1}{2}\left(\overrightarrow{AB} + \overrightarrow{BC}\right) = \frac{1}{2}\overrightarrow{AC}$$

$$\overrightarrow{P_4P_3} = \overrightarrow{P_4D} +$$

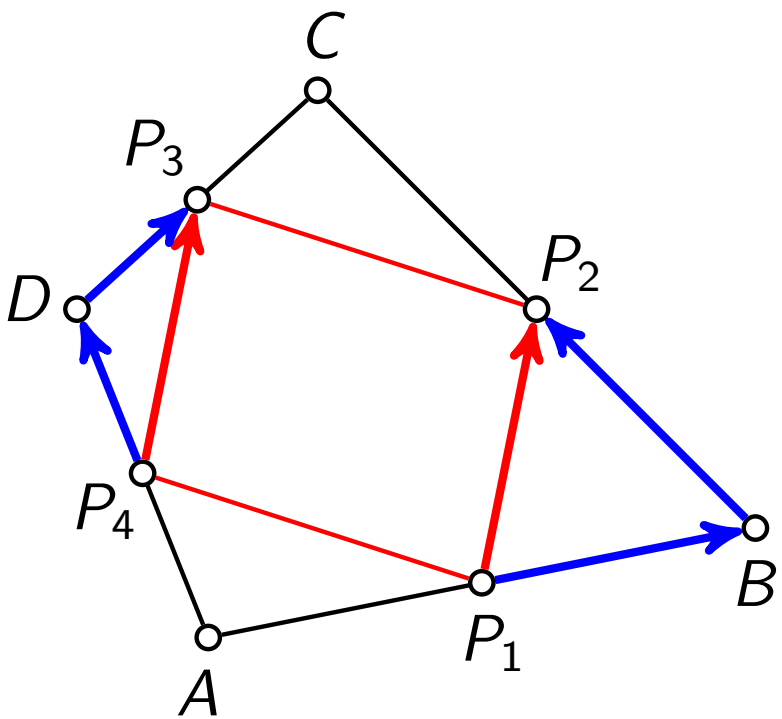
Zadatak 4

Dokažite da su polovišta stranica bilo kojeg četverokuta vrhovi paralelograma.

Rješenje

$|AP_1| = |BP_1| \qquad |CP_3| = |DP_3|$

$|BP_2| = |CP_2| \qquad |AP_4| = |DP_4|$



$$\overrightarrow{P_1P_2} = \overrightarrow{P_1B} + \overrightarrow{BP_2} =$$

$$= \frac{1}{2}\overrightarrow{AB} + \frac{1}{2}\overrightarrow{BC} =$$

$$= \frac{1}{2}\left(\overrightarrow{AB} + \overrightarrow{BC}\right) = \frac{1}{2}\overrightarrow{AC}$$

$$\overrightarrow{P_4P_3} = \overrightarrow{P_4D} + \overrightarrow{DP_3}$$

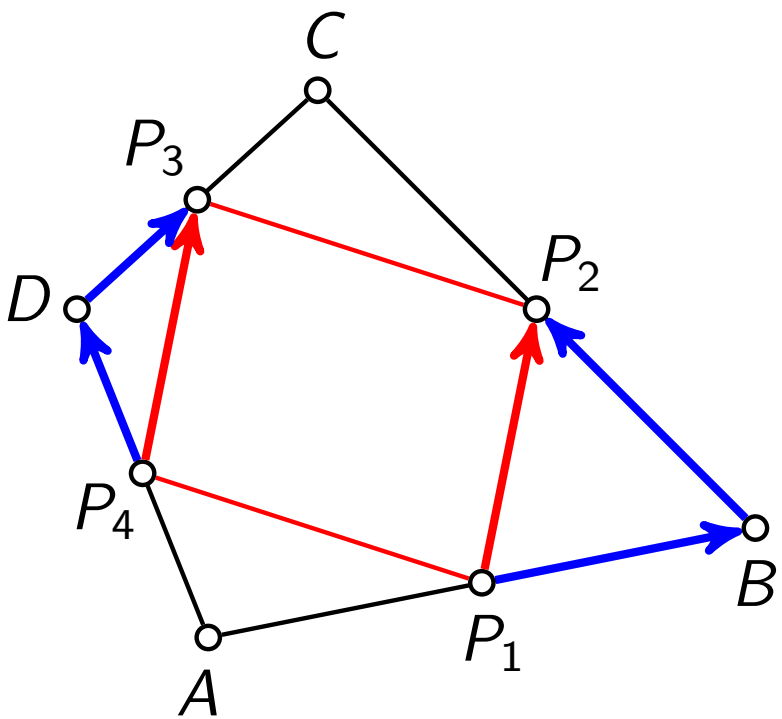
Zadatak 4

Dokažite da su polovišta stranica bilo kojeg četverokuta vrhovi paralelograma.

Rješenje

$|AP_1| = |BP_1| \qquad |CP_3| = |DP_3|$

$|BP_2| = |CP_2| \qquad |AP_4| = |DP_4|$



$$\overrightarrow{P_1P_2} = \overrightarrow{P_1B} + \overrightarrow{BP_2} = \frac{1}{2}\overrightarrow{AB} + \frac{1}{2}\overrightarrow{BC} = \frac{1}{2}\left(\overrightarrow{AB} + \overrightarrow{BC}\right) = \frac{1}{2}\overrightarrow{AC}$$

$$\overrightarrow{P_4P_3} = \overrightarrow{P_4D} + \overrightarrow{DP_3} = \frac{1}{2}\overrightarrow{AD}$$

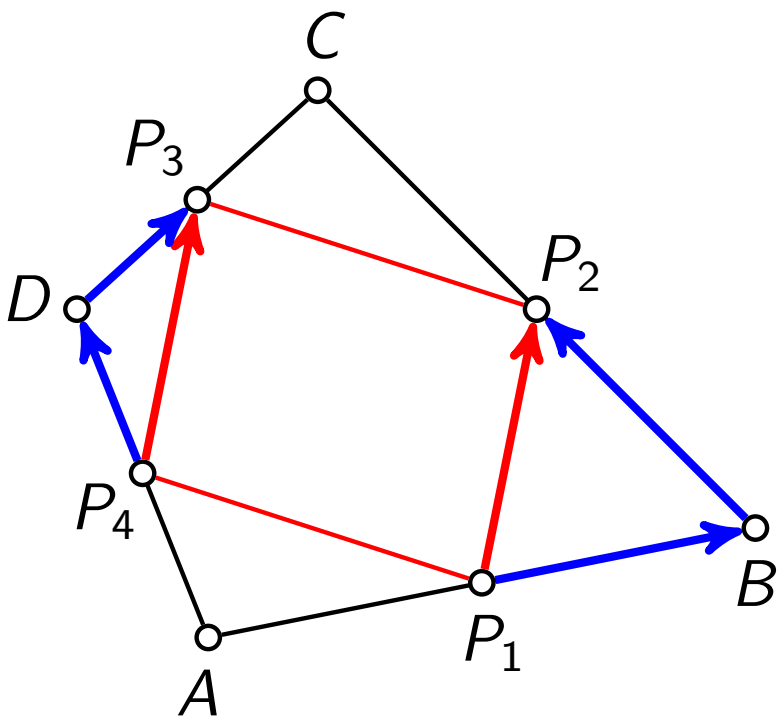
Zadatak 4

Dokažite da su polovišta stranica bilo kojeg četverokuta vrhovi paralelograma.

Rješenje

$|AP_1| = |BP_1| \qquad |CP_3| = |DP_3|$

$|BP_2| = |CP_2| \qquad |AP_4| = |DP_4|$



$$\overrightarrow{P_1P_2} = \overrightarrow{P_1B} + \overrightarrow{BP_2} =$$

$$= \frac{1}{2}\overrightarrow{AB} + \frac{1}{2}\overrightarrow{BC} =$$

$$= \frac{1}{2}\left(\overrightarrow{AB} + \overrightarrow{BC}\right) = \frac{1}{2}\overrightarrow{AC}$$

$$\overrightarrow{P_4P_3} = \overrightarrow{P_4D} + \overrightarrow{DP_3} =$$

$$= \frac{1}{2}\overrightarrow{AD} +$$

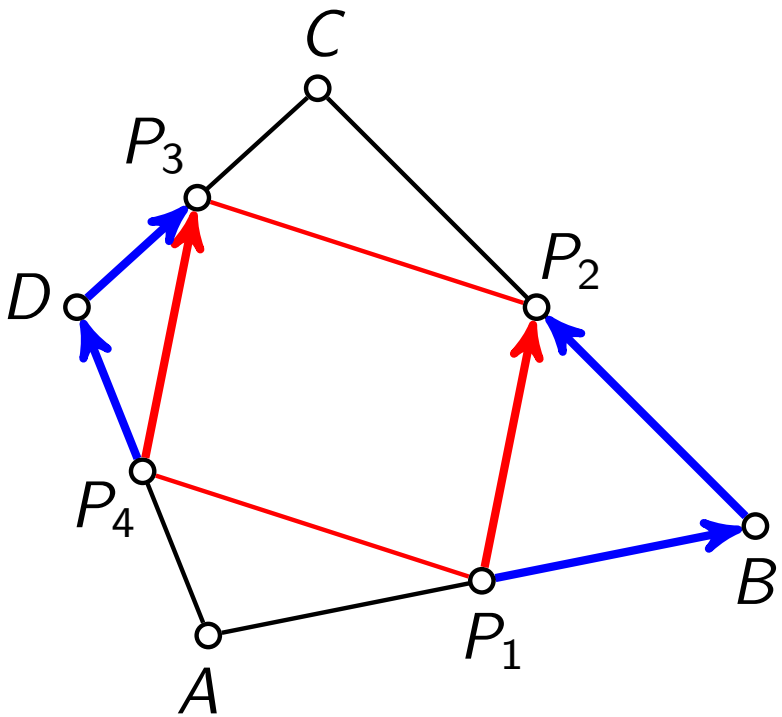
Zadatak 4

Dokažite da su polovišta stranica bilo kojeg četverokuta vrhovi paralelograma.

Rješenje

$|AP_1| = |BP_1| \qquad |CP_3| = |DP_3|$

$|BP_2| = |CP_2| \qquad |AP_4| = |DP_4|$



$$\overrightarrow{P_1P_2} = \overrightarrow{P_1B} + \overrightarrow{BP_2} = \frac{1}{2}\overrightarrow{AB} + \frac{1}{2}\overrightarrow{BC} = \frac{1}{2}\left(\overrightarrow{AB} + \overrightarrow{BC}\right) = \frac{1}{2}\overrightarrow{AC}$$

$$\overrightarrow{P_4P_3} = \overrightarrow{P_4D} + \overrightarrow{DP_3} = \frac{1}{2}\overrightarrow{AD} + \frac{1}{2}\overrightarrow{DC}$$

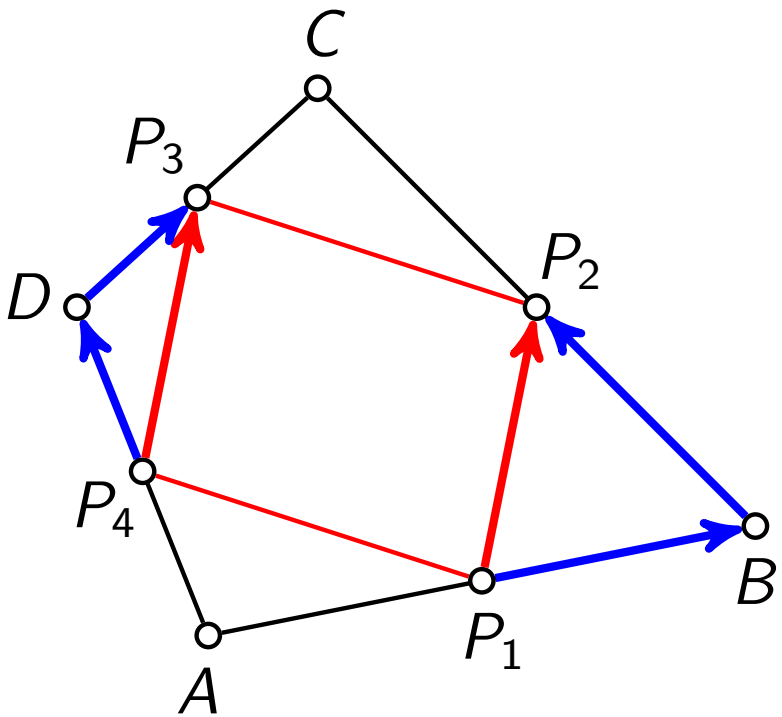
Zadatak 4

Dokažite da su polovišta stranica bilo kojeg četverokuta vrhovi paralelograma.

Rješenje

$|AP_1| = |BP_1| \qquad |CP_3| = |DP_3|$

$|BP_2| = |CP_2| \qquad |AP_4| = |DP_4|$



$$\overrightarrow{P_1P_2} = \overrightarrow{P_1B} + \overrightarrow{BP_2} = \frac{1}{2}\overrightarrow{AB} + \frac{1}{2}\overrightarrow{BC} = \frac{1}{2}\left(\overrightarrow{AB} + \overrightarrow{BC}\right) = \frac{1}{2}\overrightarrow{AC}$$

$$\overrightarrow{P_4P_3} = \overrightarrow{P_4D} + \overrightarrow{DP_3} = \frac{1}{2}\overrightarrow{AD} + \frac{1}{2}\overrightarrow{DC} = \frac{1}{2}\left(\overrightarrow{AD} + \overrightarrow{DC}\right)$$

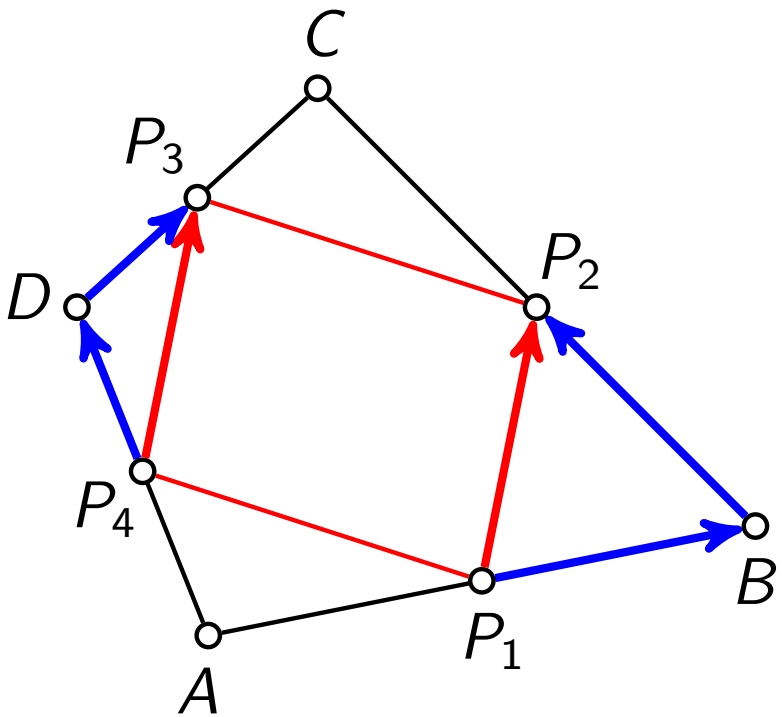
Zadatak 4

Dokažite da su polovišta stranica bilo kojeg četverokuta vrhovi paralelograma.

Rješenje

$|AP_1| = |BP_1| \qquad |CP_3| = |DP_3|$

$|BP_2| = |CP_2| \qquad |AP_4| = |DP_4|$



$$\overrightarrow{P_1P_2} = \overrightarrow{P_1B} + \overrightarrow{BP_2} = \frac{1}{2}\overrightarrow{AB} + \frac{1}{2}\overrightarrow{BC} = \frac{1}{2}\left(\overrightarrow{AB} + \overrightarrow{BC}\right) = \frac{1}{2}\overrightarrow{AC}$$

$$\overrightarrow{P_4P_3} = \overrightarrow{P_4D} + \overrightarrow{DP_3} = \frac{1}{2}\overrightarrow{AD} + \frac{1}{2}\overrightarrow{DC} = \frac{1}{2}\left(\overrightarrow{AD} + \overrightarrow{DC}\right) = \frac{1}{2}\overrightarrow{AC}$$

Zadatak 4

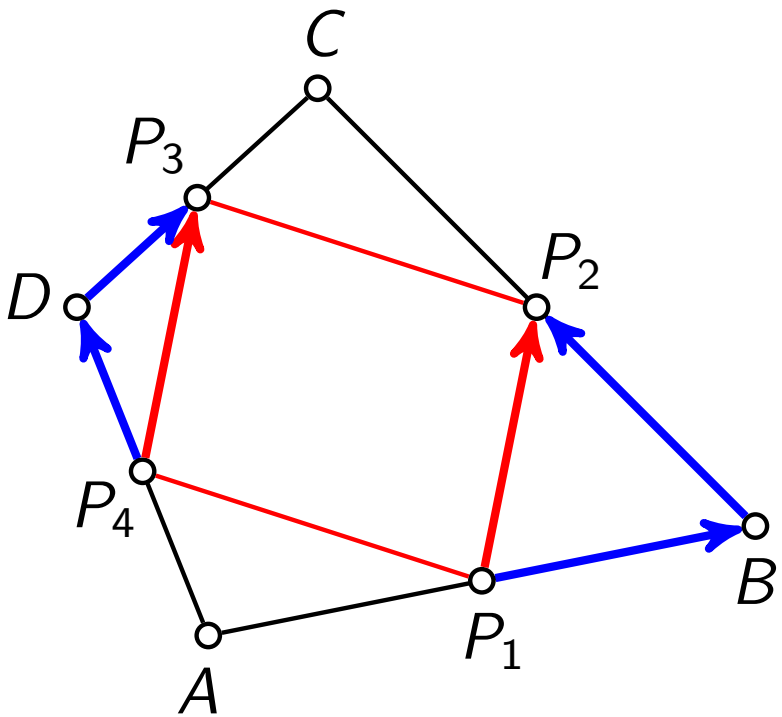
Dokažite da su polovišta stranica bilo kojeg četverokuta vrhovi paralelograma.

$$\Longrightarrow \quad \overrightarrow{P_1P_2} = \overrightarrow{P_4P_3}$$

Rješenje

$|AP_1| = |BP_1| \qquad |CP_3| = |DP_3|$

$|BP_2| = |CP_2| \qquad |AP_4| = |DP_4|$



$$\overrightarrow{P_1P_2} = \overrightarrow{P_1B} + \overrightarrow{BP_2} = \frac{1}{2}\overrightarrow{AB} + \frac{1}{2}\overrightarrow{BC} = \frac{1}{2}\left(\overrightarrow{AB} + \overrightarrow{BC}\right) = \frac{1}{2}\overrightarrow{AC}$$

$$\overrightarrow{P_4P_3} = \overrightarrow{P_4D} + \overrightarrow{DP_3} = \frac{1}{2}\overrightarrow{AD} + \frac{1}{2}\overrightarrow{DC} = \frac{1}{2}\left(\overrightarrow{AD} + \overrightarrow{DC}\right) = \frac{1}{2}\overrightarrow{AC}$$

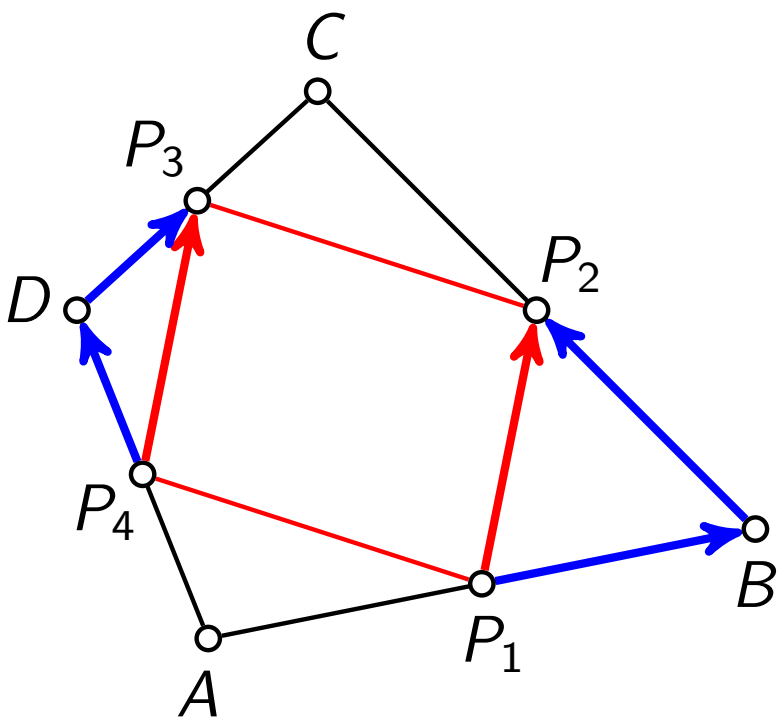
Zadatak 4

Dokažite da su polovišta stranica bilo kojeg četverokuta vrhovi paralelograma.

Rješenje

$$\Longrightarrow \quad \overrightarrow{P_1P_2} = \overrightarrow{P_4P_3} \quad \Longrightarrow \quad P_1P_2P_3P_4 \text{ je paralelogram}$$

$$|AP_1| = |BP_1| \qquad |CP_3| = |DP_3|$$
$$|BP_2| = |CP_2| \qquad |AP_4| = |DP_4|$$

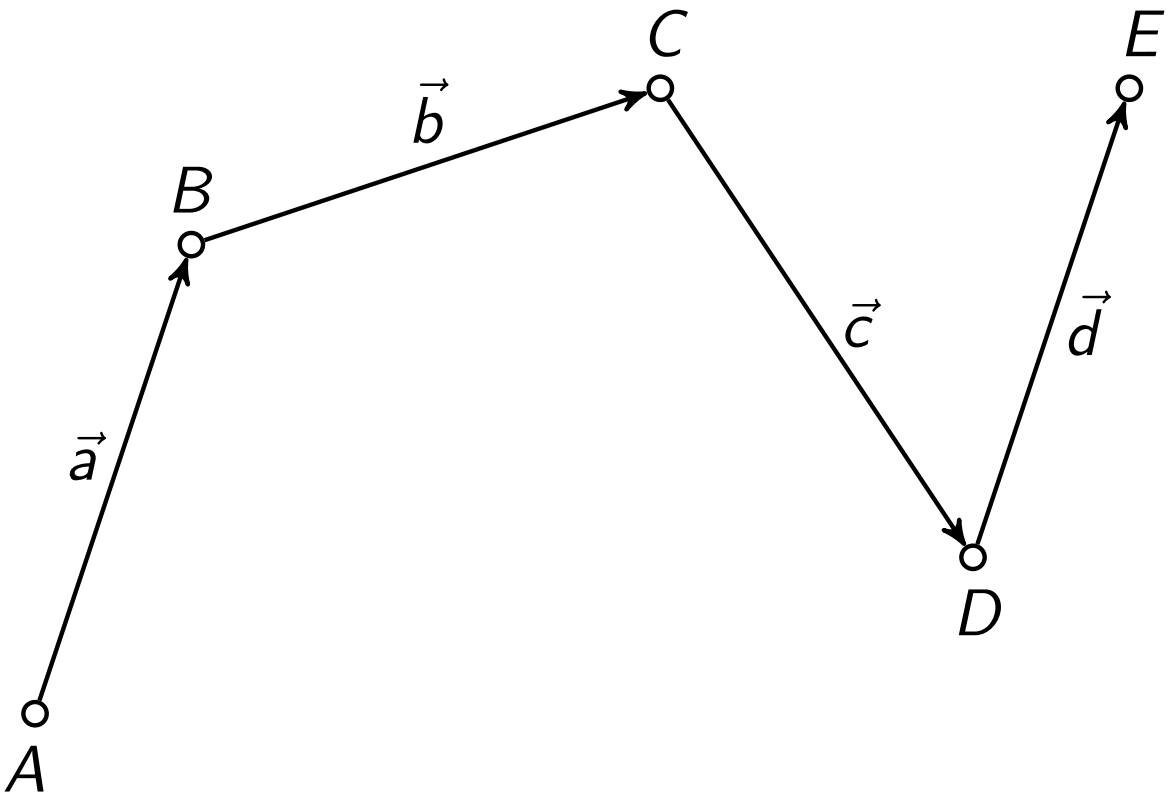


$$\overrightarrow{P_1P_2} = \overrightarrow{P_1B} + \overrightarrow{BP_2} = \frac{1}{2}\overrightarrow{AB} + \frac{1}{2}\overrightarrow{BC} = \frac{1}{2}\left(\overrightarrow{AB} + \overrightarrow{BC}\right) = \frac{1}{2}\overrightarrow{AC}$$

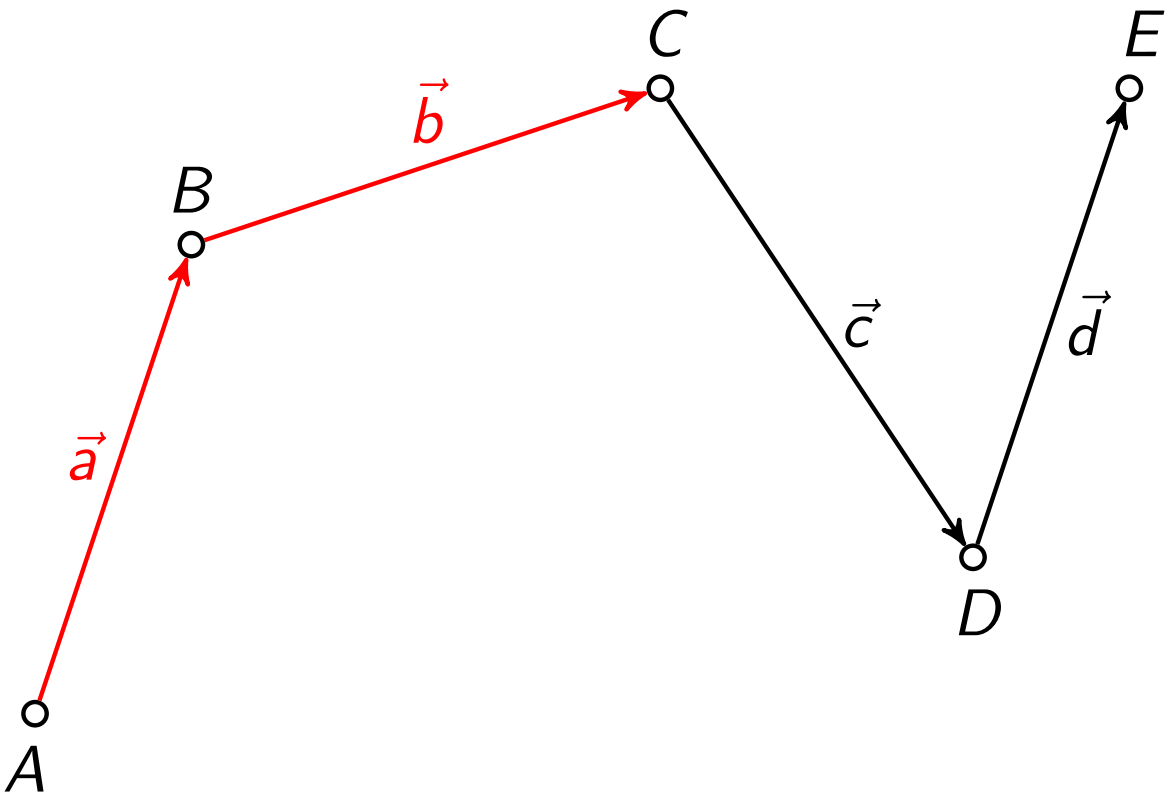
$$\overrightarrow{P_4P_3} = \overrightarrow{P_4D} + \overrightarrow{DP_3} = \frac{1}{2}\overrightarrow{AD} + \frac{1}{2}\overrightarrow{DC} = \frac{1}{2}\left(\overrightarrow{AD} + \overrightarrow{DC}\right) = \frac{1}{2}\overrightarrow{AC}$$

peti zadatak

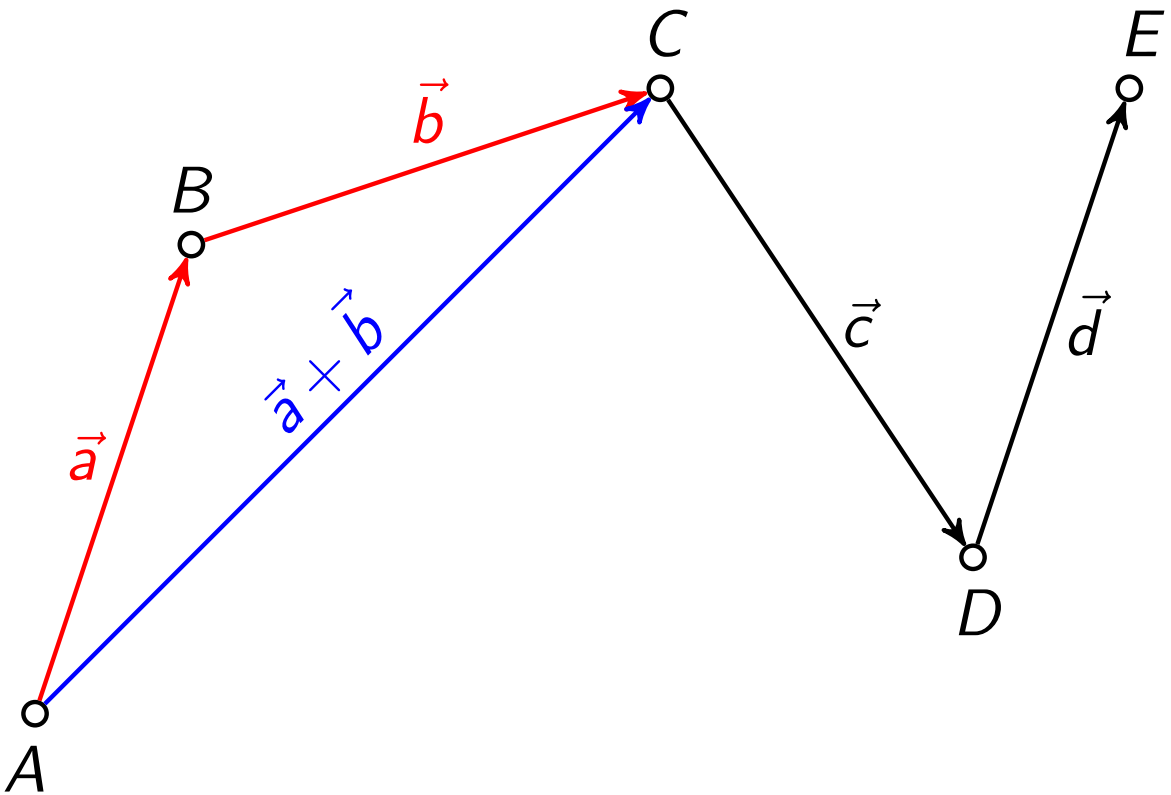
Zbrajanje više vektora



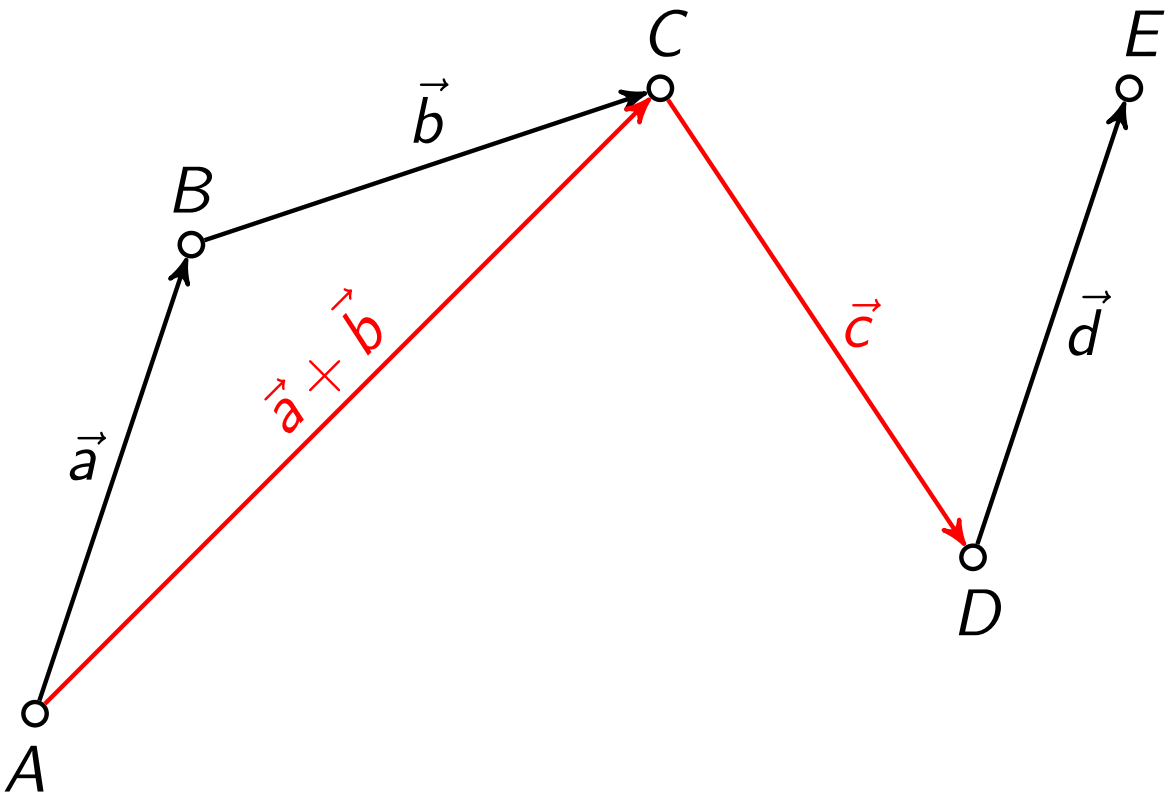
Zbrajanje više vektora



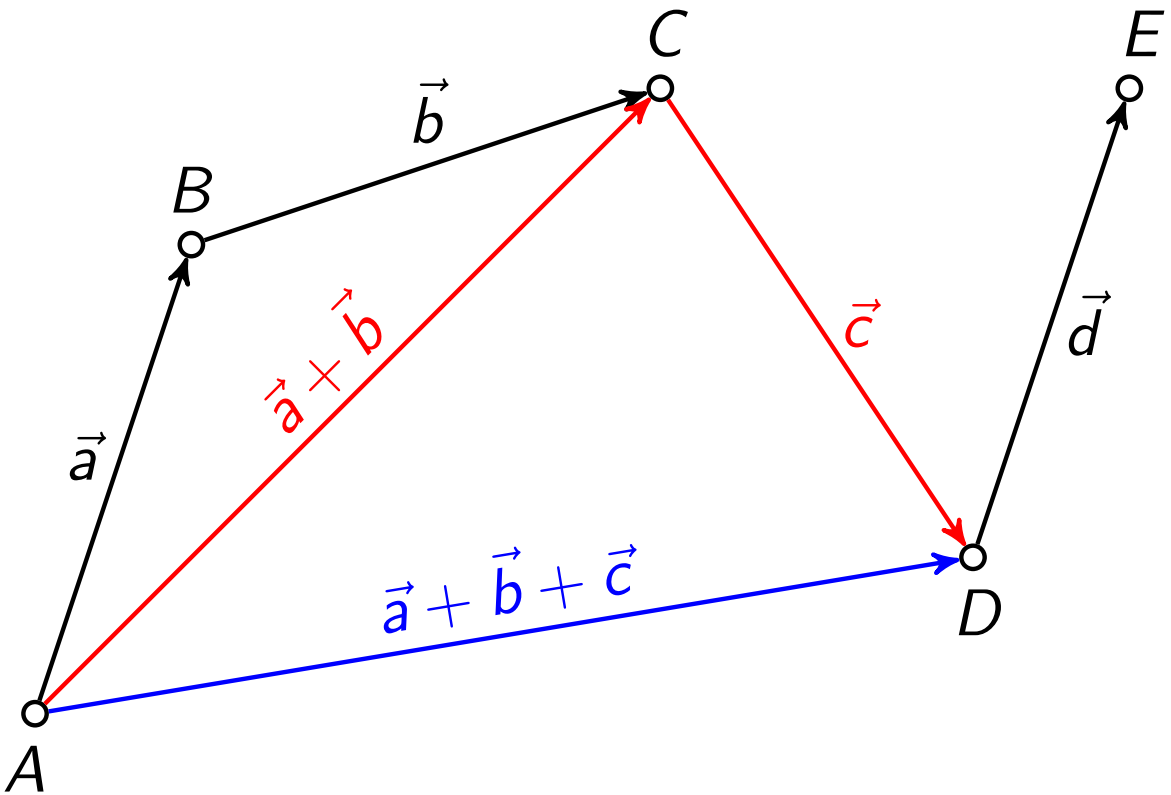
Zbrajanje više vektora



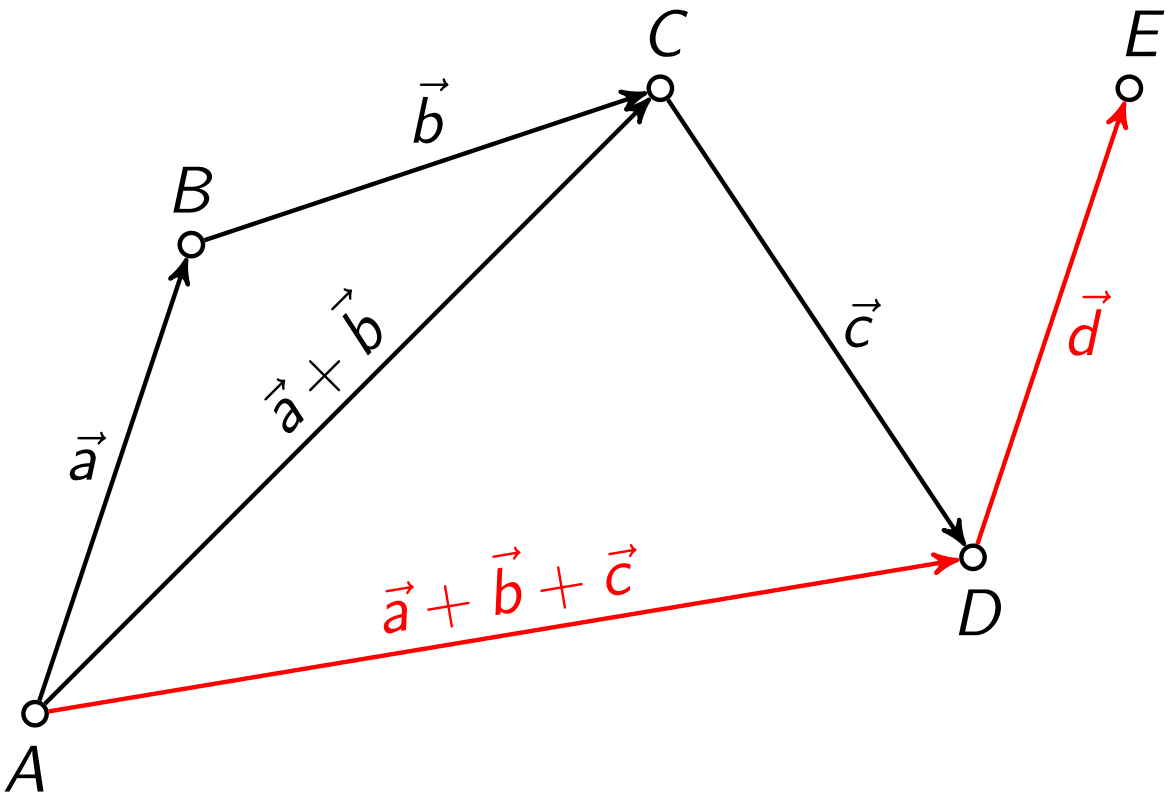
Zbrajanje više vektora



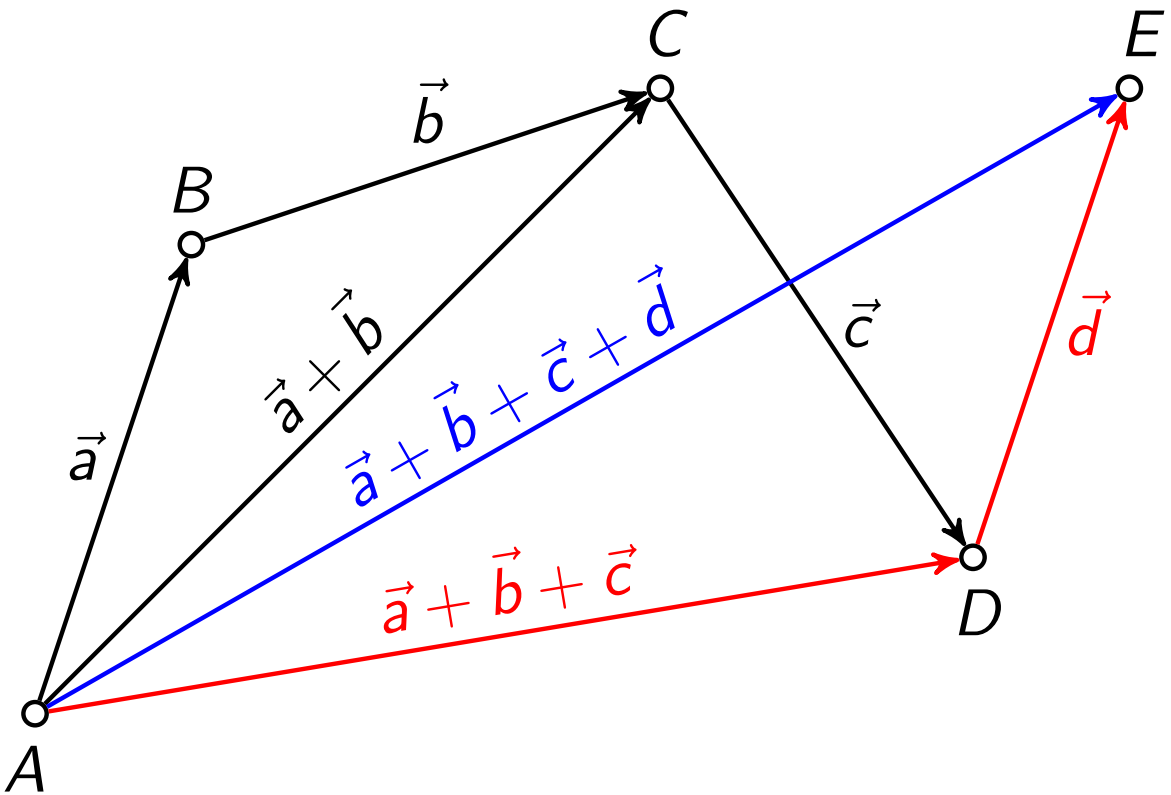
Zbrajanje više vektora



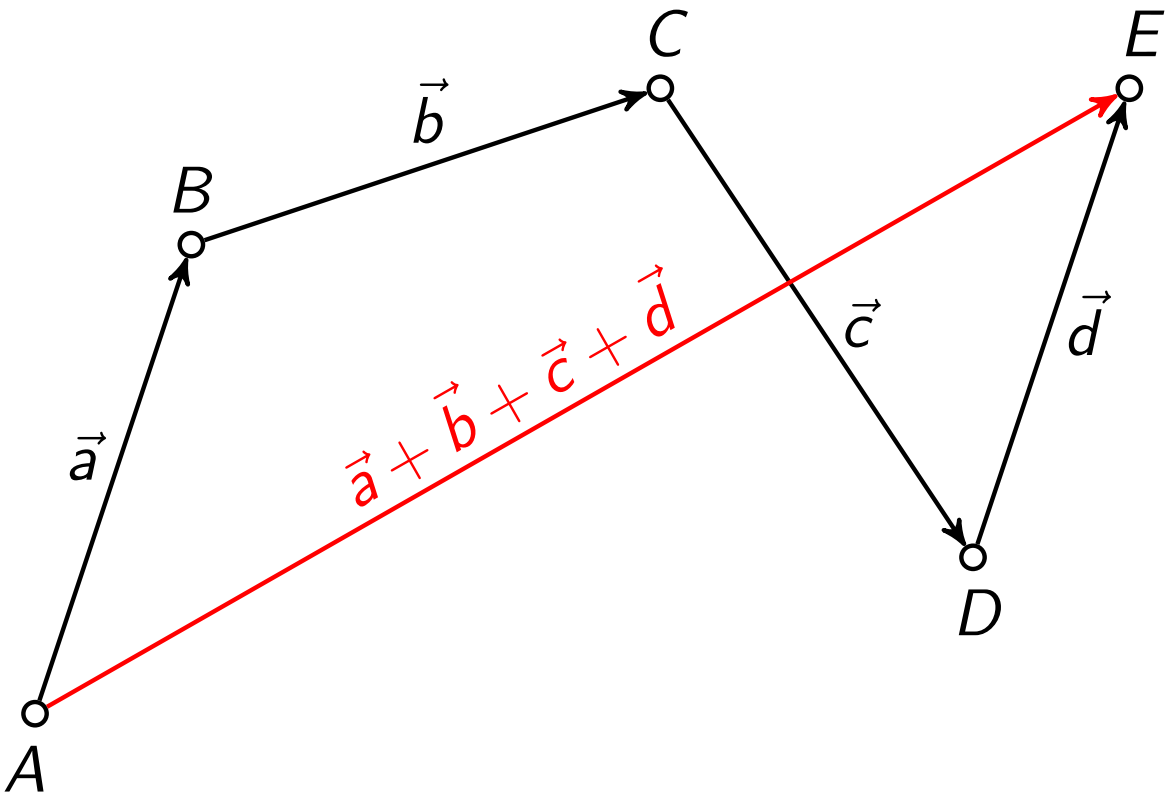
Zbrajanje više vektora



Zbrajanje više vektora



Zbrajanje više vektora



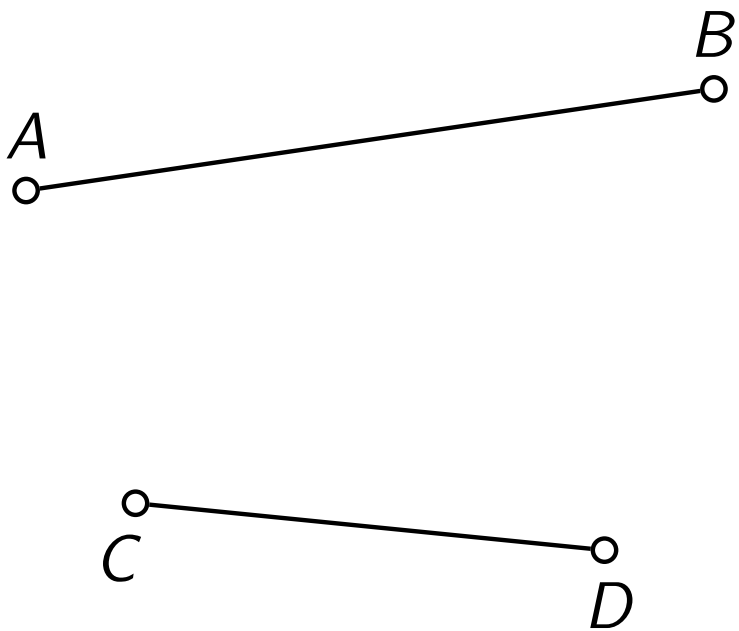
Zadatak 5

Neka su $\overline{AB}$ *i* $\overline{CD}$ *bilo koje dužine, a točke* S *i* T *redom polovišta tih dužina. Dokažite da je* $\overrightarrow{AC} + \overrightarrow{BD} = 2\overrightarrow{ST}$.

Zadatak 5

Neka su $\overline{AB}$ i $\overline{CD}$ bilo koje dužine, a točke S i T redom polovišta tih dužina. Dokažite da je $\overrightarrow{AC} + \overrightarrow{BD} = 2\overrightarrow{ST}$.

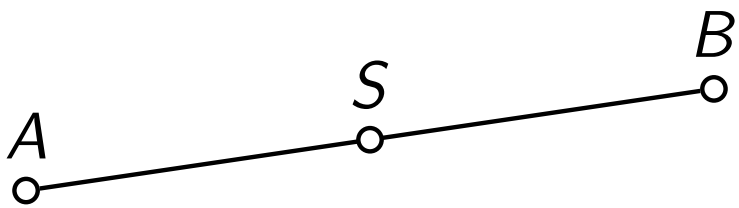
Rješenje

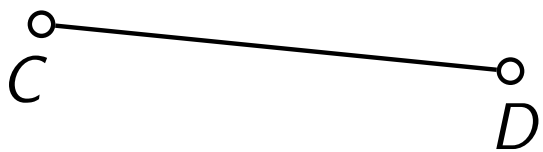


Zadatak 5

Neka su $\overline{AB}$ i $\overline{CD}$ bilo koje dužine, a točke S i T redom polovišta tih dužina. Dokažite da je $\overrightarrow{AC} + \overrightarrow{BD} = 2\overrightarrow{ST}$.

Rješenje



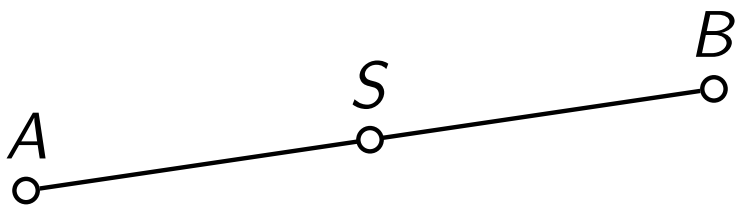


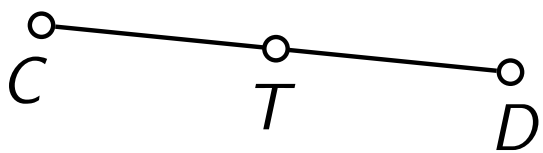
$$|AS| = |BS|$$

Zadatak 5

Neka su $\overline{AB}$ i $\overline{CD}$ bilo koje dužine, a točke S i T redom polovišta tih dužina. Dokažite da je $\overrightarrow{AC} + \overrightarrow{BD} = 2\overrightarrow{ST}$.

Rješenje





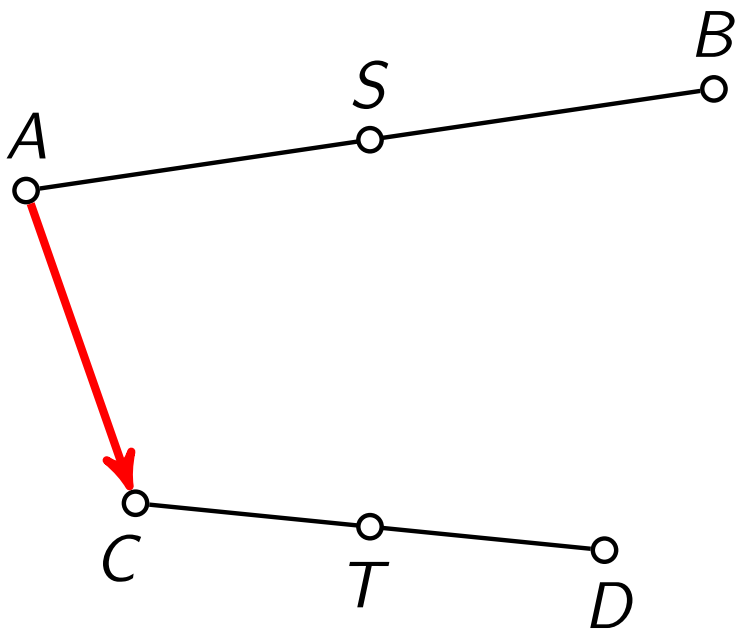
$$|AS| = |BS|$$

$$|CT| = |DT|$$

Zadatak 5

Neka su $\overline{AB}$ i $\overline{CD}$ bilo koje dužine, a točke S i T redom polovišta tih dužina. Dokažite da je $\overrightarrow{AC} + \overrightarrow{BD} = 2\overrightarrow{ST}$.

Rješenje



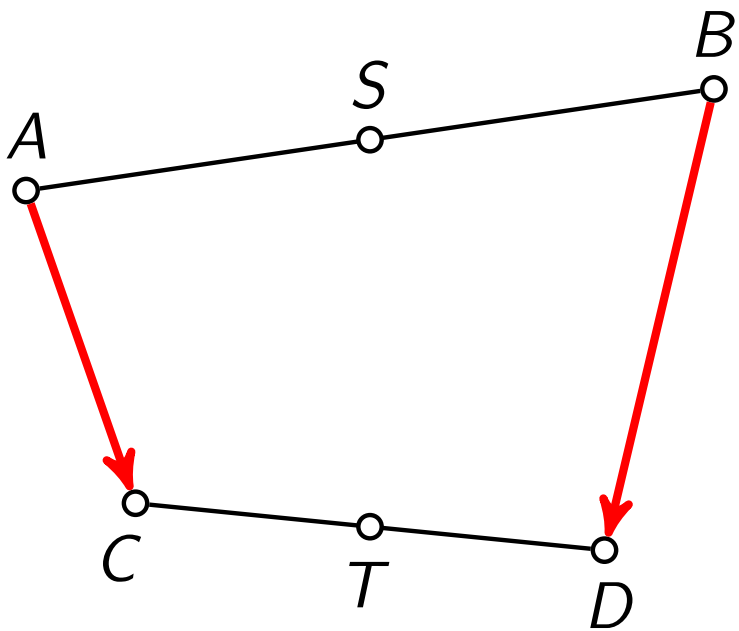
$$|AS| = |BS|$$

$$|CT| = |DT|$$

Zadatak 5

Neka su $\overline{AB}$ i $\overline{CD}$ bilo koje dužine, a točke S i T redom polovišta tih dužina. Dokažite da je $\overrightarrow{AC} + \overrightarrow{BD} = 2\overrightarrow{ST}$.

Rješenje



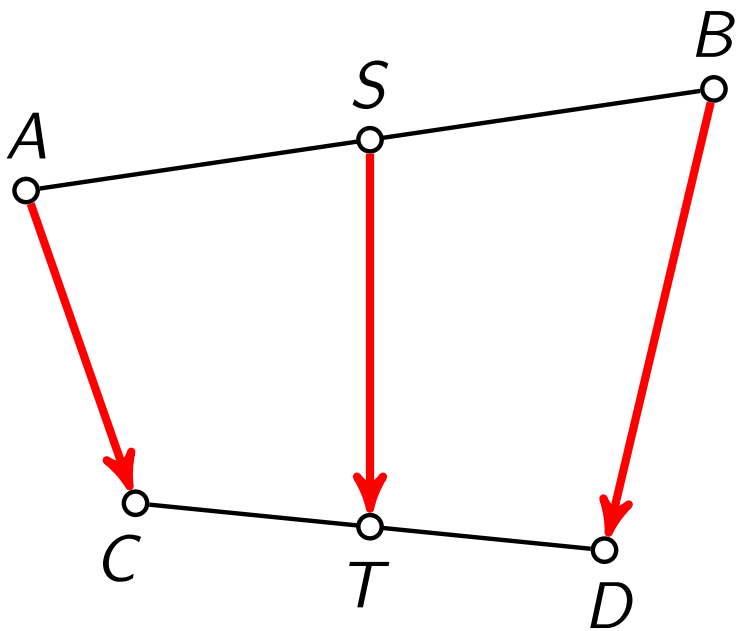
$$|AS| = |BS|$$

$$|CT| = |DT|$$

Zadatak 5

Neka su $\overline{AB}$ i $\overline{CD}$ bilo koje dužine, a točke S i T redom polovišta tih dužina. Dokažite da je $\overrightarrow{AC} + \overrightarrow{BD} = 2\overrightarrow{ST}$.

Rješenje



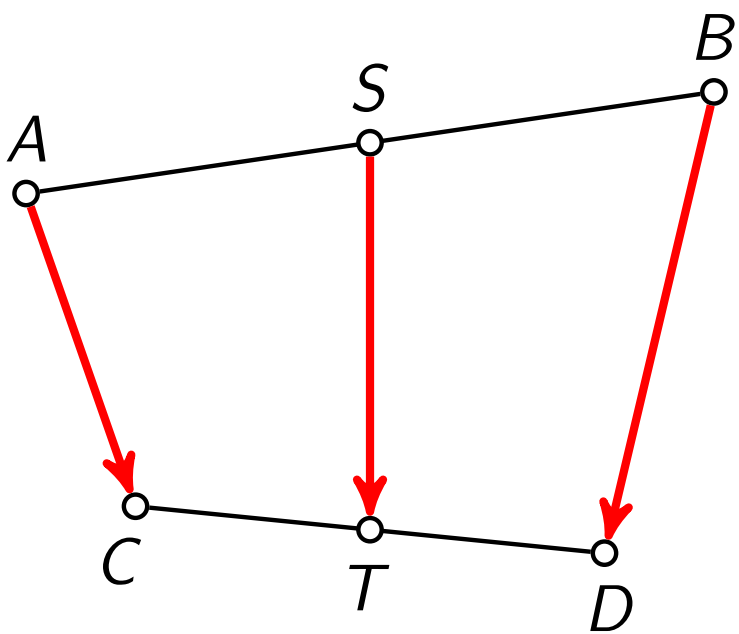
$$|AS| = |BS|$$

$$|CT| = |DT|$$

Zadatak 5

Neka su $\overline{AB}$ i $\overline{CD}$ bilo koje dužine, a točke S i T redom polovišta tih dužina. Dokažite da je $\overrightarrow{AC} + \overrightarrow{BD} = 2\overrightarrow{ST}$.

Rješenje



$\overrightarrow{ST} =$

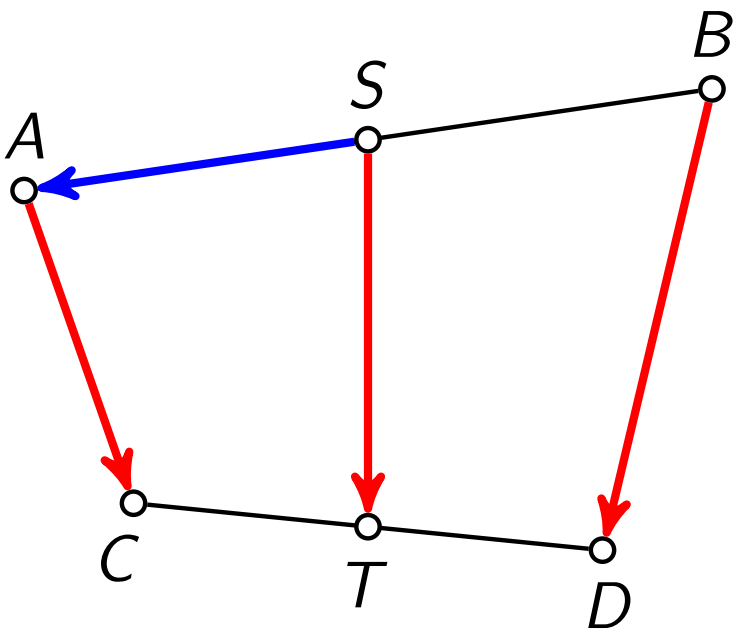
$$|AS| = |BS|$$

$$|CT| = |DT|$$

Zadatak 5

Neka su $\overline{AB}$ i $\overline{CD}$ bilo koje dužine, a točke S i T redom polovišta tih dužina. Dokažite da je $\overrightarrow{AC} + \overrightarrow{BD} = 2\overrightarrow{ST}$.

Rješenje



$$\overrightarrow{ST} = \overrightarrow{SA}$$

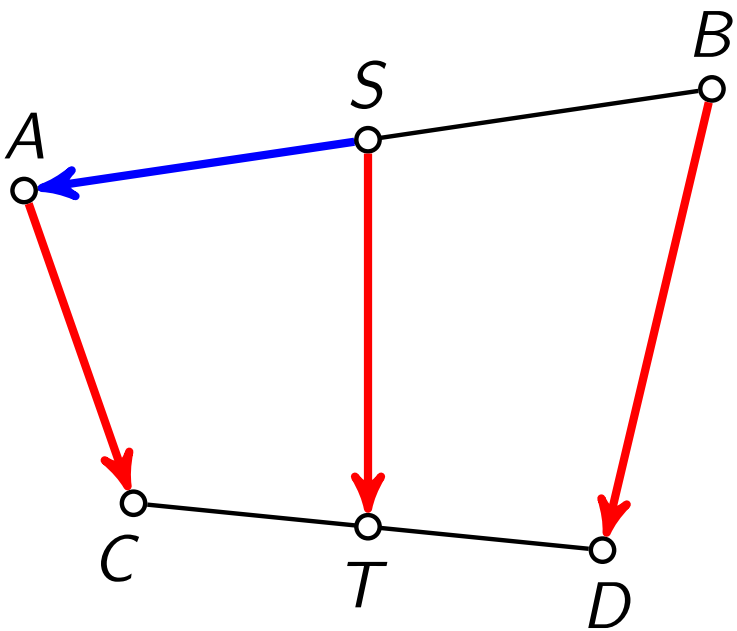
$$|AS| = |BS|$$

$$|CT| = |DT|$$

Zadatak 5

Neka su $\overline{AB}$ i $\overline{CD}$ bilo koje dužine, a točke S i T redom polovišta tih dužina. Dokažite da je $\overrightarrow{AC} + \overrightarrow{BD} = 2\overrightarrow{ST}$.

Rješenje



$$\overrightarrow{ST} = \overrightarrow{SA} + \overrightarrow{AC}$$

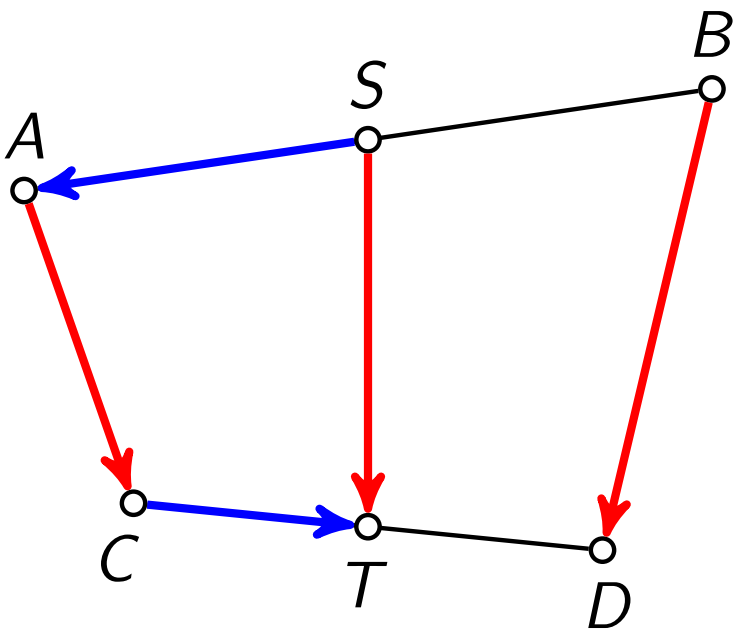
$$|AS| = |BS|$$

$$|CT| = |DT|$$

Zadatak 5

Neka su $\overline{AB}$ i $\overline{CD}$ bilo koje dužine, a točke S i T redom polovišta tih dužina. Dokažite da je $\overrightarrow{AC} + \overrightarrow{BD} = 2\overrightarrow{ST}$.

Rješenje



$$\overrightarrow{ST} = \overrightarrow{SA} + \overrightarrow{AC} + \overrightarrow{CT}$$

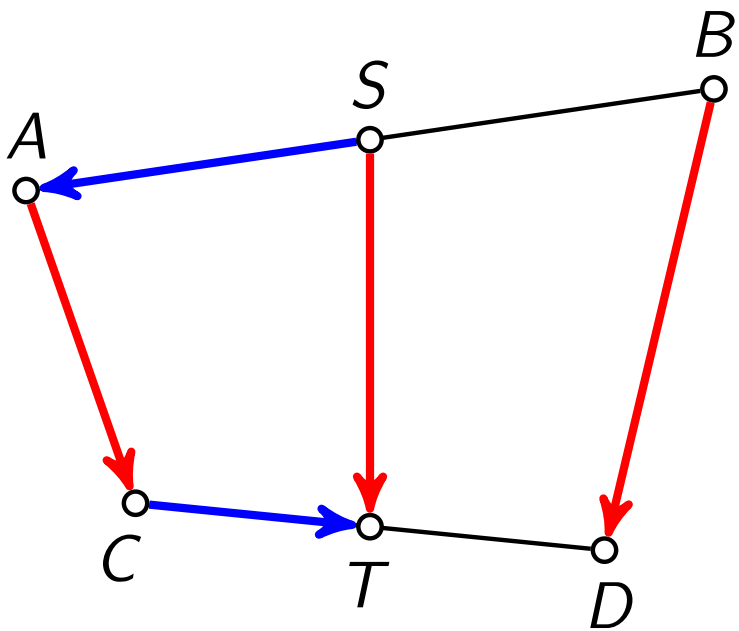
$$|AS| = |BS|$$

$$|CT| = |DT|$$

Zadatak 5

Neka su $\overline{AB}$ i $\overline{CD}$ bilo koje dužine, a točke S i T redom polovišta tih dužina. Dokažite da je $\overrightarrow{AC} + \overrightarrow{BD} = 2\overrightarrow{ST}$.

Rješenje



$$\overrightarrow{ST} = \overrightarrow{SA} + \overrightarrow{AC} + \overrightarrow{CT}$$

$$\overrightarrow{ST} =$$

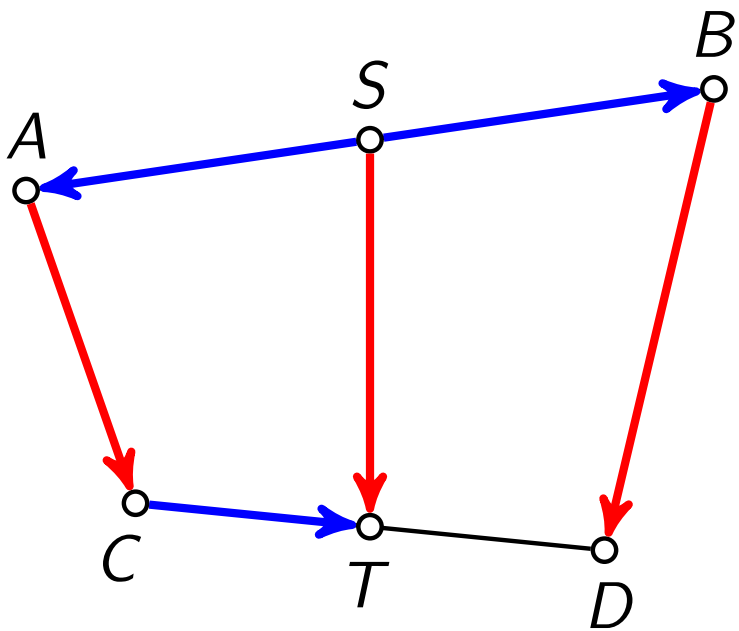
$$|AS| = |BS|$$

$$|CT| = |DT|$$

Zadatak 5

Neka su $\overline{AB}$ i $\overline{CD}$ bilo koje dužine, a točke S i T redom polovišta tih dužina. Dokažite da je $\overrightarrow{AC} + \overrightarrow{BD} = 2\overrightarrow{ST}$.

Rješenje



$$\overrightarrow{ST} = \overrightarrow{SA} + \overrightarrow{AC} + \overrightarrow{CT}$$

$$\overrightarrow{ST} = \overrightarrow{SB}$$

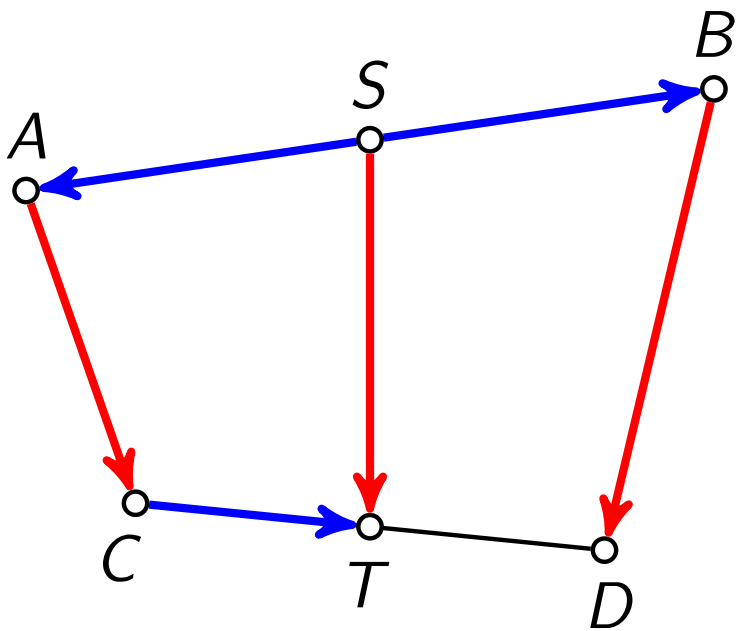
$$|AS| = |BS|$$

$$|CT| = |DT|$$

Zadatak 5

Neka su $\overline{AB}$ i $\overline{CD}$ bilo koje dužine, a točke S i T redom polovišta tih dužina. Dokažite da je $\overrightarrow{AC} + \overrightarrow{BD} = 2\overrightarrow{ST}$.

Rješenje



$$\overrightarrow{ST} = \overrightarrow{SA} + \overrightarrow{AC} + \overrightarrow{CT}$$

$$\overrightarrow{ST} = \overrightarrow{SB} + \overrightarrow{BD}$$

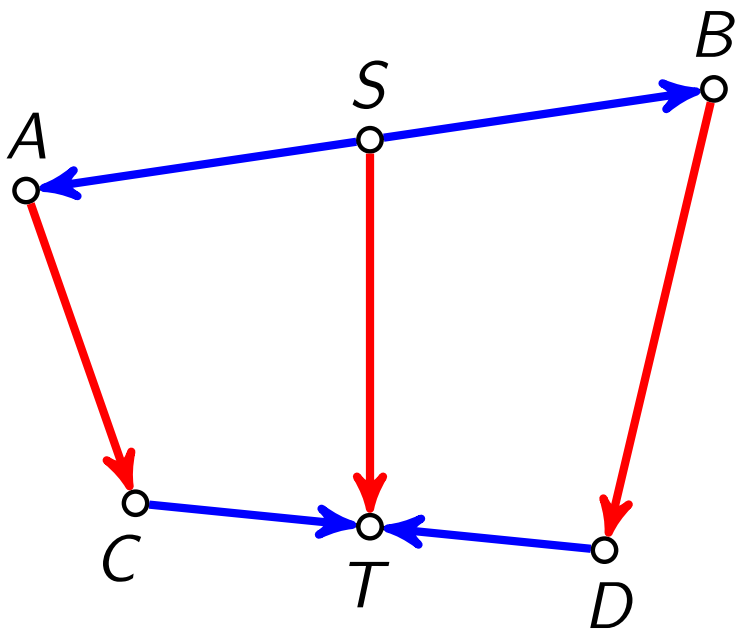
$$|AS| = |BS|$$

$$|CT| = |DT|$$

Zadatak 5

Neka su $\overline{AB}$ i $\overline{CD}$ bilo koje dužine, a točke S i T redom polovišta tih dužina. Dokažite da je $\overrightarrow{AC} + \overrightarrow{BD} = 2\overrightarrow{ST}$.

Rješenje



$$\overrightarrow{ST} = \overrightarrow{SA} + \overrightarrow{AC} + \overrightarrow{CT}$$

$$\overrightarrow{ST} = \overrightarrow{SB} + \overrightarrow{BD} + \overrightarrow{DT}$$

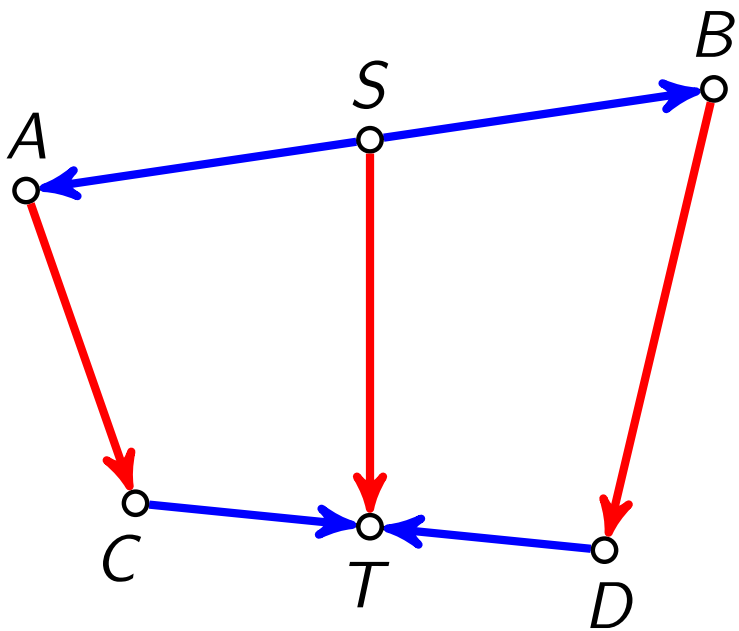
$$|AS| = |BS|$$

$$|CT| = |DT|$$

Zadatak 5

Neka su $\overline{AB}$ i $\overline{CD}$ bilo koje dužine, a točke S i T redom polovišta tih dužina. Dokažite da je $\overrightarrow{AC} + \overrightarrow{BD} = 2\overrightarrow{ST}$.

Rješenje



$$\overrightarrow{ST} = \overrightarrow{SA} + \overrightarrow{AC} + \overrightarrow{CT} \quad /+$$
$$\overrightarrow{ST} = \overrightarrow{SB} + \overrightarrow{BD} + \overrightarrow{DT}$$

$$|AS| = |BS|$$
$$|CT| = |DT|$$

Zadatak 5

Neka su $\overline{AB}$ i $\overline{CD}$ bilo koje dužine, a točke S i T redom polovišta tih dužina. Dokažite da je $\overrightarrow{AC} + \overrightarrow{BD} = 2\overrightarrow{ST}$.

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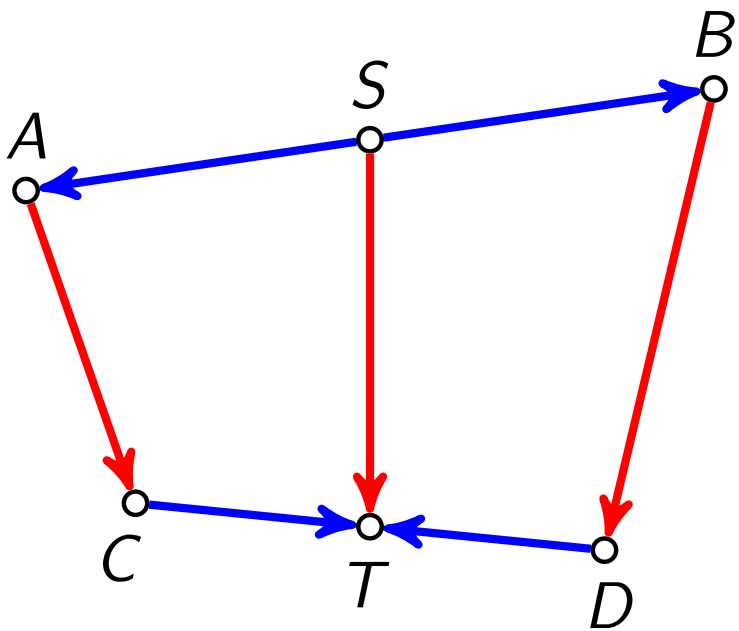


$$\overrightarrow{ST} = \overrightarrow{SA} + \overrightarrow{AC} + \overrightarrow{CT} \quad / +$$

$$\overrightarrow{ST} = \overrightarrow{SB} + \overrightarrow{BD} + \overrightarrow{DT}$$

$$2\overrightarrow{ST} =$$

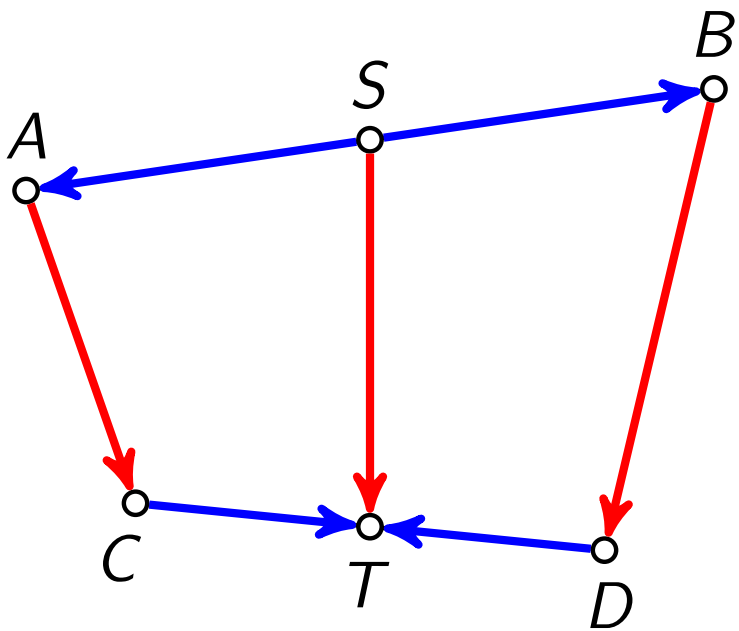
$$|AS| = |BS|$$

$$|CT| = |DT|$$

Zadatak 5

Neka su $\overline{AB}$ i $\overline{CD}$ bilo koje dužine, a točke S i T redom polovišta tih dužina. Dokažite da je $\overrightarrow{AC} + \overrightarrow{BD} = 2\overrightarrow{ST}$.

Rješenje



$$\overrightarrow{ST} = \overrightarrow{SA} + \overrightarrow{AC} + \overrightarrow{CT} \quad / +$$
$$\overrightarrow{ST} = \overrightarrow{SB} + \overrightarrow{BD} + \overrightarrow{DT} \quad / +$$

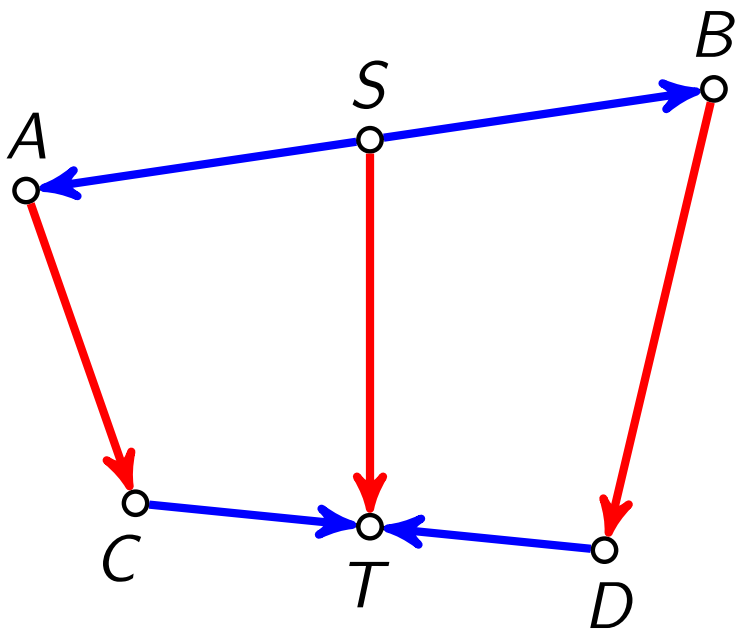
$$2\overrightarrow{ST} = \overrightarrow{AC} + \overrightarrow{BD}$$

$$|AS| = |BS|$$
$$|CT| = |DT|$$

Zadatak 5

Neka su $\overline{AB}$ i $\overline{CD}$ bilo koje dužine, a točke S i T redom polovišta tih dužina. Dokažite da je $\overrightarrow{AC} + \overrightarrow{BD} = 2\overrightarrow{ST}$.

Rješenje



$$\overrightarrow{ST} = \overrightarrow{SA} + \overrightarrow{AC} + \overrightarrow{CT}$$
$$\overrightarrow{ST} = \overrightarrow{SB} + \overrightarrow{BD} + \overrightarrow{DT} \quad / +$$

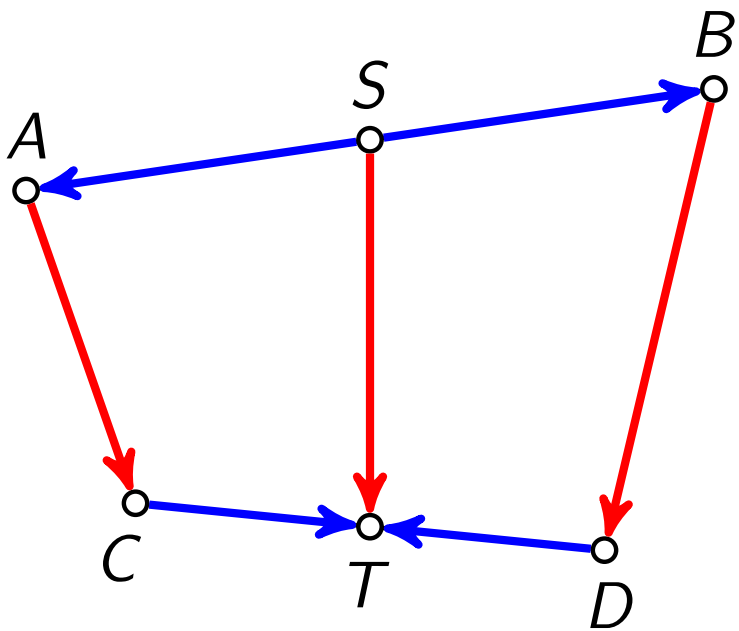
$$2\overrightarrow{ST} = \overrightarrow{AC} + \overrightarrow{BD} + \overrightarrow{SA} + \overrightarrow{SB}$$

$$|AS| = |BS|$$
$$|CT| = |DT|$$

Zadatak 5

Neka su $\overline{AB}$ i $\overline{CD}$ bilo koje dužine, a točke S i T redom polovišta tih dužina. Dokažite da je $\overrightarrow{AC} + \overrightarrow{BD} = 2\overrightarrow{ST}$.

Rješenje



$$\overrightarrow{ST} = \overrightarrow{SA} + \overrightarrow{AC} + \overrightarrow{CT}$$
$$\overrightarrow{ST} = \overrightarrow{SB} + \overrightarrow{BD} + \overrightarrow{DT} \quad / +$$

$$2\overrightarrow{ST} = \overrightarrow{AC} + \overrightarrow{BD} + \overrightarrow{SA} + \overrightarrow{SB} + \overrightarrow{CT} + \overrightarrow{DT}$$

$$|AS| = |BS|$$
$$|CT| = |DT|$$

Zadatak 5

Neka su $\overline{AB}$ i $\overline{CD}$ bilo koje dužine, a točke S i T redom polovišta tih dužina. Dokažite da je $\overrightarrow{AC} + \overrightarrow{BD} = 2\overrightarrow{ST}$.

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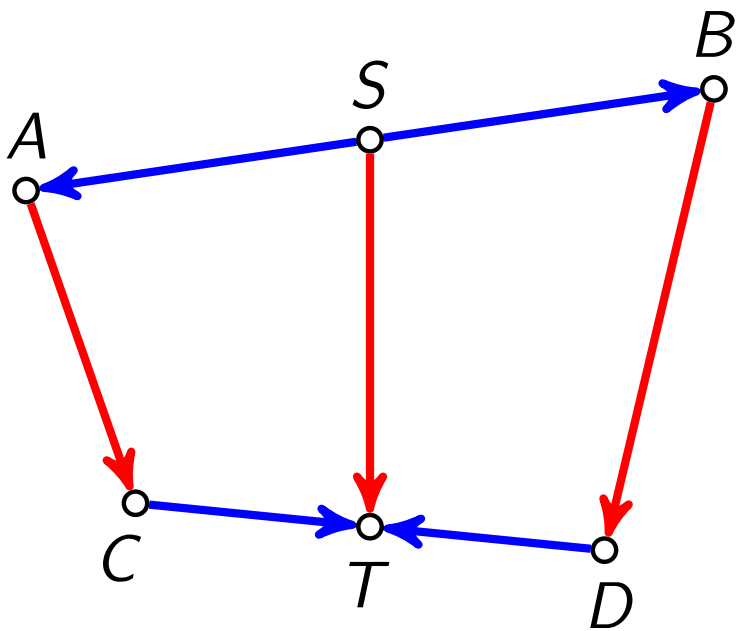


$$\overrightarrow{ST} = \overrightarrow{SA} + \overrightarrow{AC} + \overrightarrow{CT}$$
$$\overrightarrow{ST} = \overrightarrow{SB} + \overrightarrow{BD} + \overrightarrow{DT} \quad / +$$

$$2\overrightarrow{ST} = \overrightarrow{AC} + \overrightarrow{BD} + \underbrace{\overrightarrow{SA} + \overrightarrow{SB}} + \overrightarrow{CT} + \overrightarrow{DT}$$

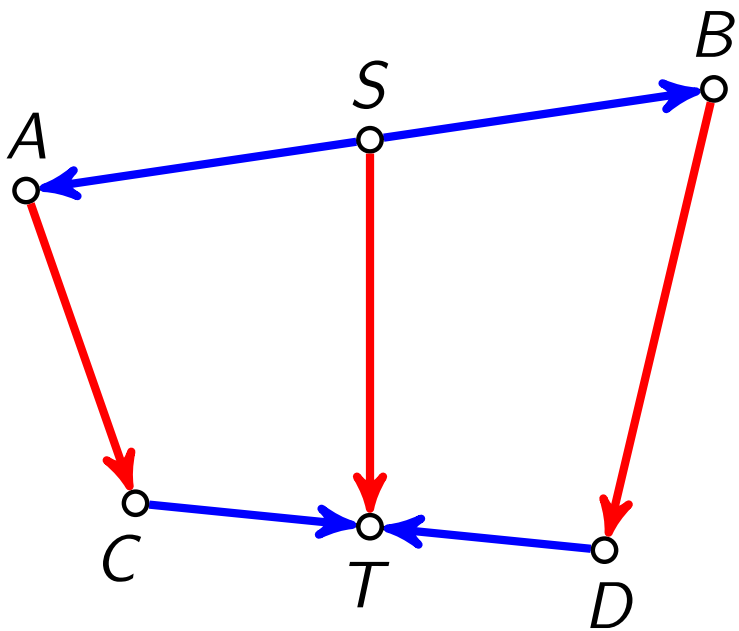
$$|AS| = |BS|$$

$$|CT| = |DT|$$

Zadatak 5

Neka su $\overline{AB}$ i $\overline{CD}$ bilo koje dužine, a točke S i T redom polovišta tih dužina. Dokažite da je $\overrightarrow{AC} + \overrightarrow{BD} = 2\overrightarrow{ST}$.

Rješenje



$$\overrightarrow{ST} = \overrightarrow{SA} + \overrightarrow{AC} + \overrightarrow{CT}$$
$$\overrightarrow{ST} = \overrightarrow{SB} + \overrightarrow{BD} + \overrightarrow{DT} \quad / +$$

$$2\overrightarrow{ST} = \overrightarrow{AC} + \overrightarrow{BD} + \underbrace{\overrightarrow{SA} + \overrightarrow{SB}} + \overrightarrow{CT} + \overrightarrow{DT}$$

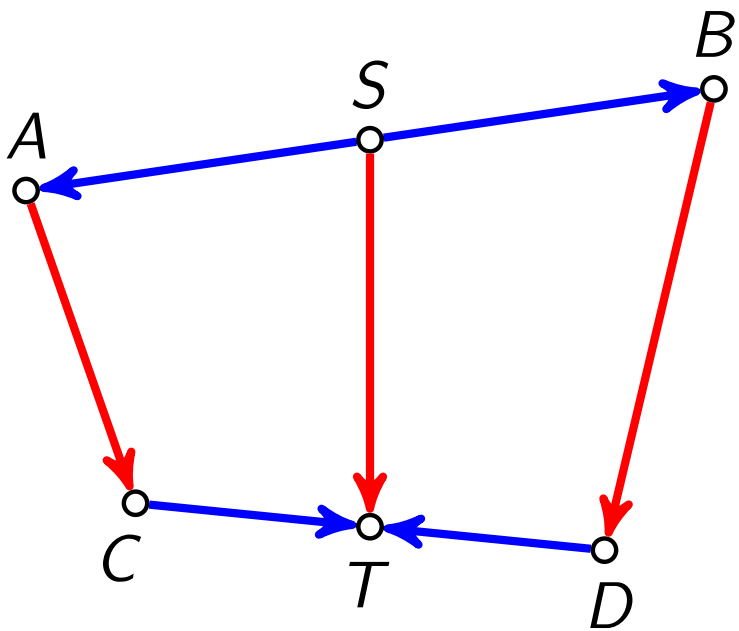
$$|AS| = |BS| \rightsquigarrow \overrightarrow{SB} = -\overrightarrow{SA}$$

$$|CT| = |DT|$$

Zadatak 5

Neka su $\overline{AB}$ i $\overline{CD}$ bilo koje dužine, a točke S i T redom polovišta tih dužina. Dokažite da je $\overrightarrow{AC} + \overrightarrow{BD} = 2\overrightarrow{ST}$.

Rješenje



$$\overrightarrow{ST} = \overrightarrow{SA} + \overrightarrow{AC} + \overrightarrow{CT}$$
$$\overrightarrow{ST} = \overrightarrow{SB} + \overrightarrow{BD} + \overrightarrow{DT} \quad / +$$

$$2\overrightarrow{ST} = \overrightarrow{AC} + \overrightarrow{BD} + \underbrace{\overrightarrow{SA} + \overrightarrow{SB}}_{=\vec{0}} + \overrightarrow{CT} + \overrightarrow{DT}$$

$$|AS| = |BS| \rightsquigarrow \overrightarrow{SB} = -\overrightarrow{SA}$$

$$|CT| = |DT|$$

Zadatak 5

Neka su $\overline{AB}$ i $\overline{CD}$ bilo koje dužine, a točke S i T redom polovišta tih dužina. Dokažite da je $\overrightarrow{AC} + \overrightarrow{BD} = 2\overrightarrow{ST}$.

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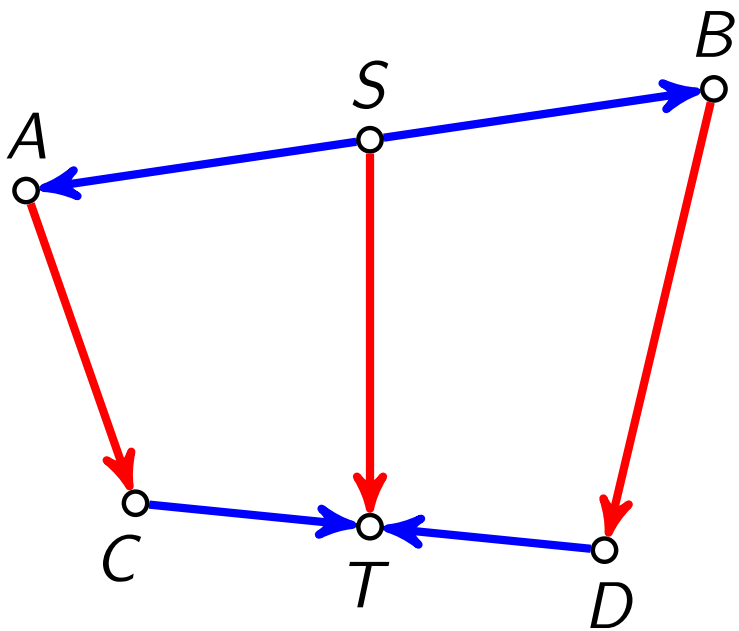


$$\overrightarrow{ST} = \overrightarrow{SA} + \overrightarrow{AC} + \overrightarrow{CT}$$
$$\overrightarrow{ST} = \overrightarrow{SB} + \overrightarrow{BD} + \overrightarrow{DT} \quad / +$$

$$2\overrightarrow{ST} = \overrightarrow{AC} + \overrightarrow{BD} + \underbrace{\overrightarrow{SA} + \overrightarrow{SB}}_{=\vec{0}} + \underbrace{\overrightarrow{CT} + \overrightarrow{DT}}$$

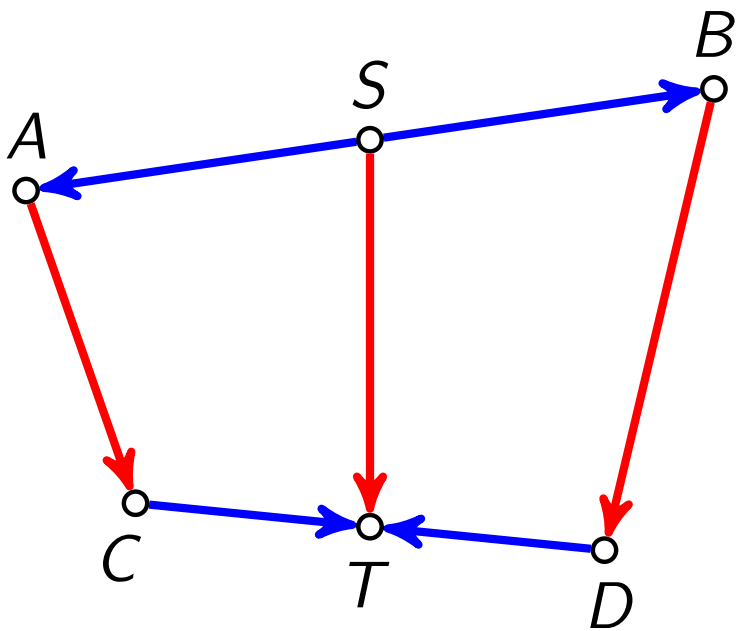
$$|AS| = |BS| \rightsquigarrow \overrightarrow{SB} = -\overrightarrow{SA}$$

$$|CT| = |DT|$$

Zadatak 5

Neka su $\overline{AB}$ i $\overline{CD}$ bilo koje dužine, a točke S i T redom polovišta tih dužina. Dokažite da je $\overrightarrow{AC} + \overrightarrow{BD} = 2\overrightarrow{ST}$.

Rješenje



$$\overrightarrow{ST} = \overrightarrow{SA} + \overrightarrow{AC} + \overrightarrow{CT}$$
$$\overrightarrow{ST} = \overrightarrow{SB} + \overrightarrow{BD} + \overrightarrow{DT} \quad / +$$

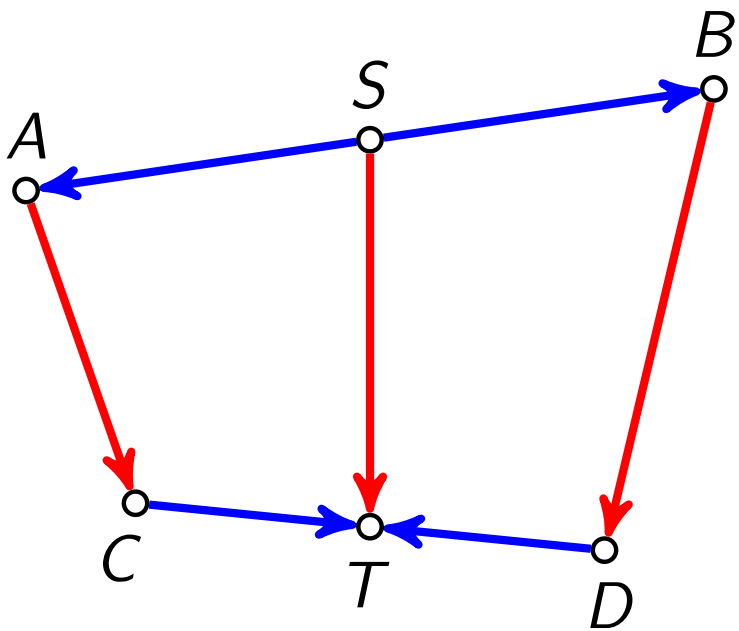
$$2\overrightarrow{ST} = \overrightarrow{AC} + \overrightarrow{BD} + \underbrace{\overrightarrow{SA} + \overrightarrow{SB}}_{=\vec{0}} + \underbrace{\overrightarrow{CT} + \overrightarrow{DT}}$$

$$|AS| = |BS| \rightsquigarrow \overrightarrow{SB} = -\overrightarrow{SA}$$
$$|CT| = |DT| \rightsquigarrow \overrightarrow{DT} = -\overrightarrow{CT}$$

Zadatak 5

Neka su $\overline{AB}$ i $\overline{CD}$ bilo koje dužine, a točke S i T redom polovišta tih dužina. Dokažite da je $\overrightarrow{AC} + \overrightarrow{BD} = 2\overrightarrow{ST}$.

Rješenje



$$\overrightarrow{ST} = \overrightarrow{SA} + \overrightarrow{AC} + \overrightarrow{CT}$$
$$\overrightarrow{ST} = \overrightarrow{SB} + \overrightarrow{BD} + \overrightarrow{DT} \quad / +$$

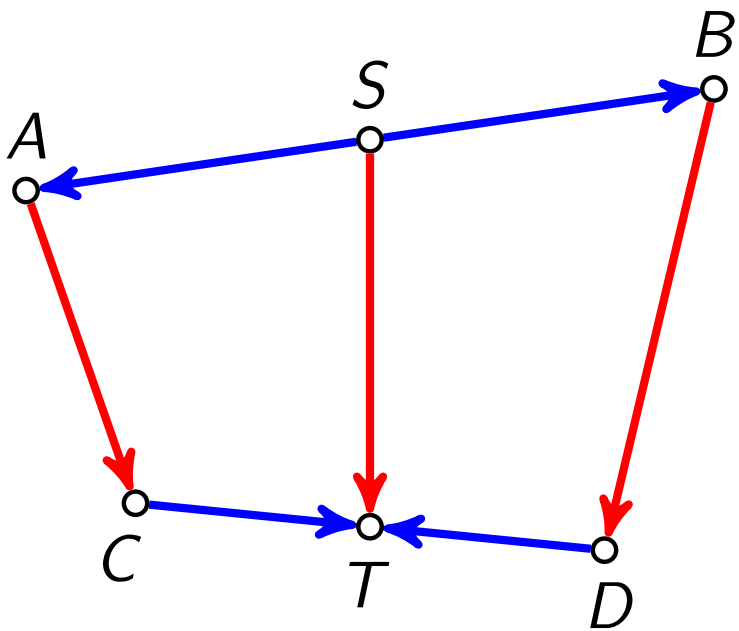
$$2\overrightarrow{ST} = \overrightarrow{AC} + \overrightarrow{BD} + \underbrace{\overrightarrow{SA} + \overrightarrow{SB}}_{=\vec{0}} + \underbrace{\overrightarrow{CT} + \overrightarrow{DT}}_{=\vec{0}}$$

$$|AS| = |BS| \rightsquigarrow \overrightarrow{SB} = -\overrightarrow{SA}$$
$$|CT| = |DT| \rightsquigarrow \overrightarrow{DT} = -\overrightarrow{CT}$$

Zadatak 5

Neka su $\overline{AB}$ i $\overline{CD}$ bilo koje dužine, a točke S i T redom polovišta tih dužina. Dokažite da je $\overrightarrow{AC} + \overrightarrow{BD} = 2\overrightarrow{ST}$.

Rješenje



$$\overrightarrow{ST} = \overrightarrow{SA} + \overrightarrow{AC} + \overrightarrow{CT} \quad / +$$

$$\overrightarrow{ST} = \overrightarrow{SB} + \overrightarrow{BD} + \overrightarrow{DT} \quad /$$

$$2\overrightarrow{ST} = \overrightarrow{AC} + \overrightarrow{BD} + \underbrace{\overrightarrow{SA} + \overrightarrow{SB}}_{=\vec{0}} + \underbrace{\overrightarrow{CT} + \overrightarrow{DT}}_{=\vec{0}}$$

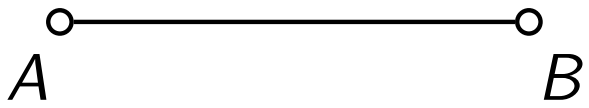
$$2\overrightarrow{ST} = \overrightarrow{AC} + \overrightarrow{BD}$$

$$|AS| = |BS| \rightsquigarrow \overrightarrow{SB} = -\overrightarrow{SA}$$

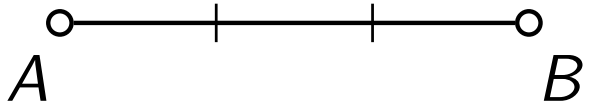
$$|CT| = |DT| \rightsquigarrow \overrightarrow{DT} = -\overrightarrow{CT}$$

Dijeljenje dužine u zadanom omjeru

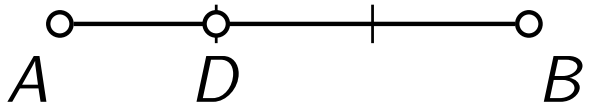
Dijeljenje dužine u zadanom omjeru



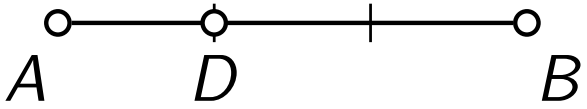
Dijeljenje dužine u zadanom omjeru



Dijeljenje dužine u zadanom omjeru

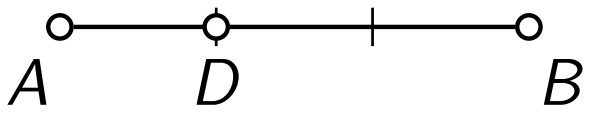


Dijeljenje dužine u zadanom omjeru



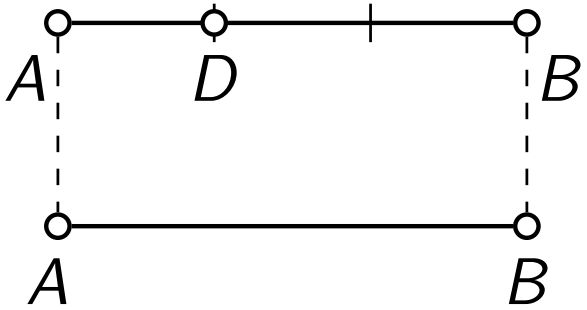
$$\frac{|AD|}{|BD|} =$$

Dijeljenje dužine u zadanom omjeru



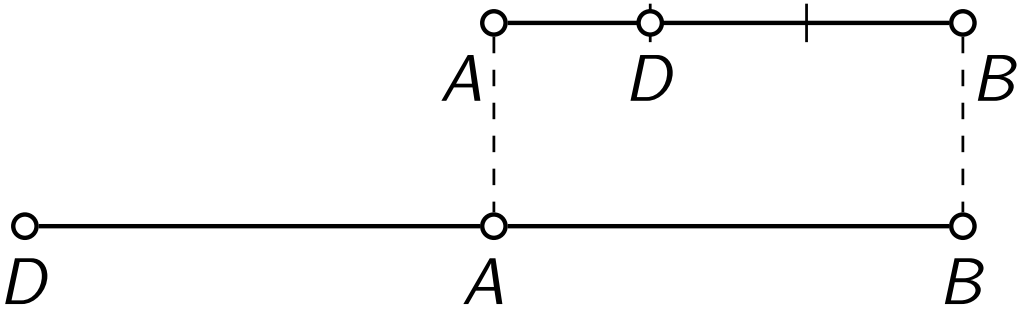
$$\frac{|AD|}{|BD|} = \frac{1}{2}$$

Dijeljenje dužine u zadanom omjeru



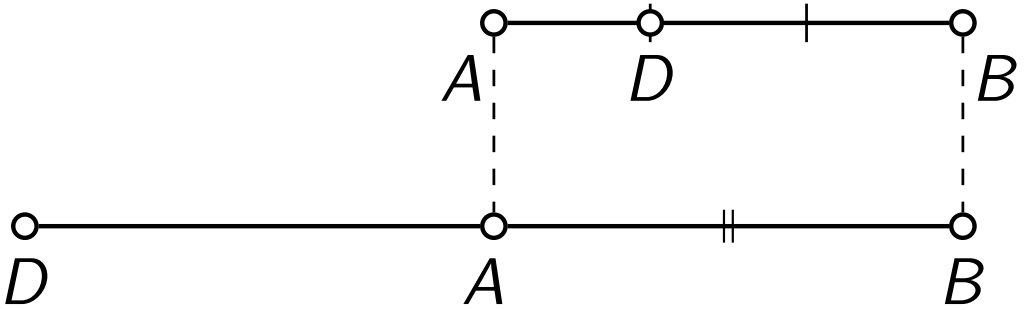
$$\frac{|AD|}{|BD|} = \frac{1}{2}$$

Dijeljenje dužine u zadanom omjeru



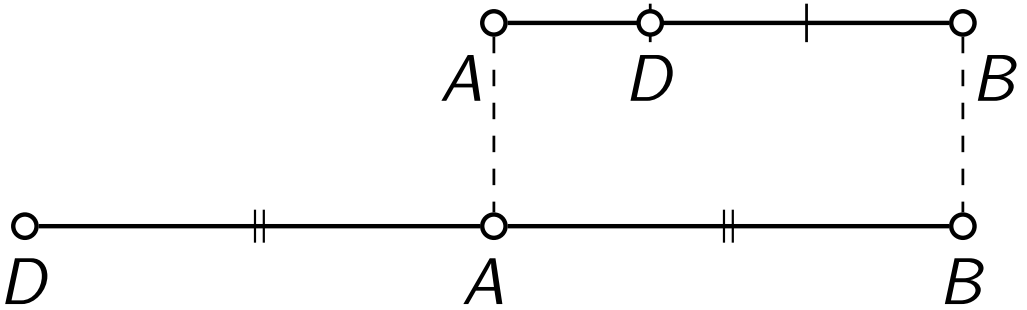
$$\frac{|AD|}{|BD|} = \frac{1}{2}$$

Dijeljenje dužine u zadanom omjeru



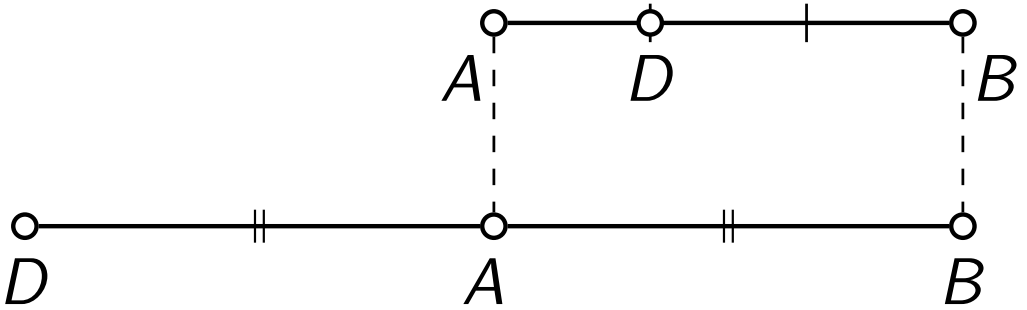
$$\frac{|AD|}{|BD|} = \frac{1}{2}$$

Dijeljenje dužine u zadanom omjeru



$$\frac{|AD|}{|BD|} = \frac{1}{2}$$

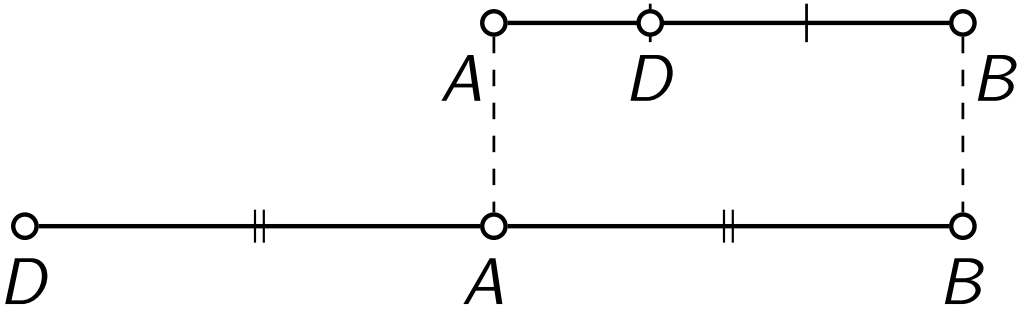
Dijeljenje dužine u zadanom omjeru



$$\frac{|AD|}{|BD|} = \frac{1}{2}$$

$$\frac{|AD|}{|BD|} =$$

Dijeljenje dužine u zadanom omjeru



$$\frac{|AD|}{|BD|} = \frac{1}{2}$$

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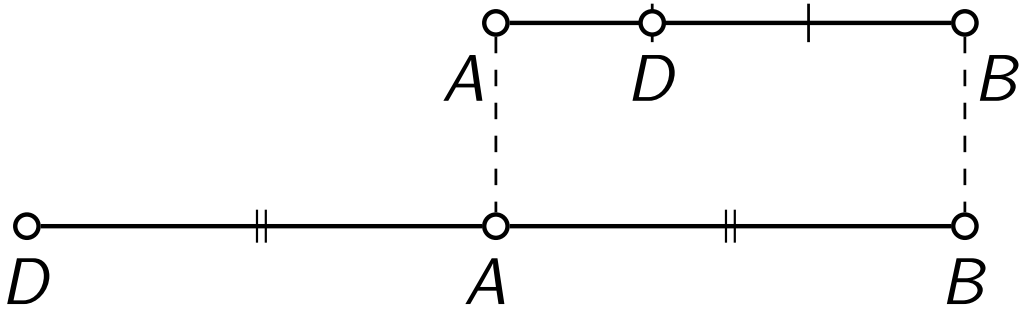
Dijeljenje dužine u zadanom omjeru



$$\frac{|AD|}{|BD|} = \frac{1}{2}$$ iznutra

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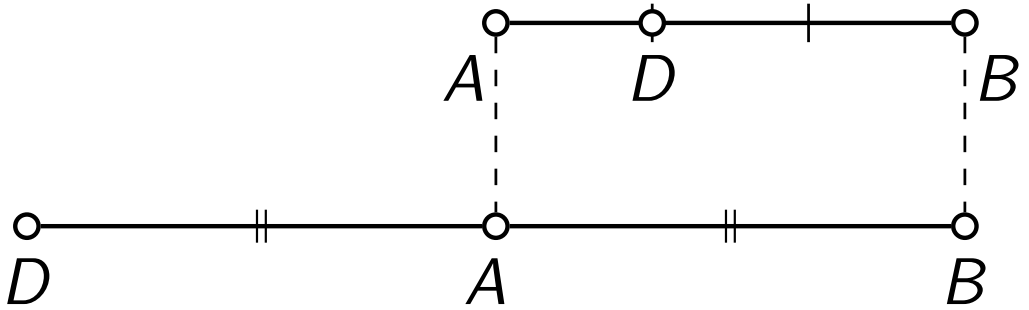
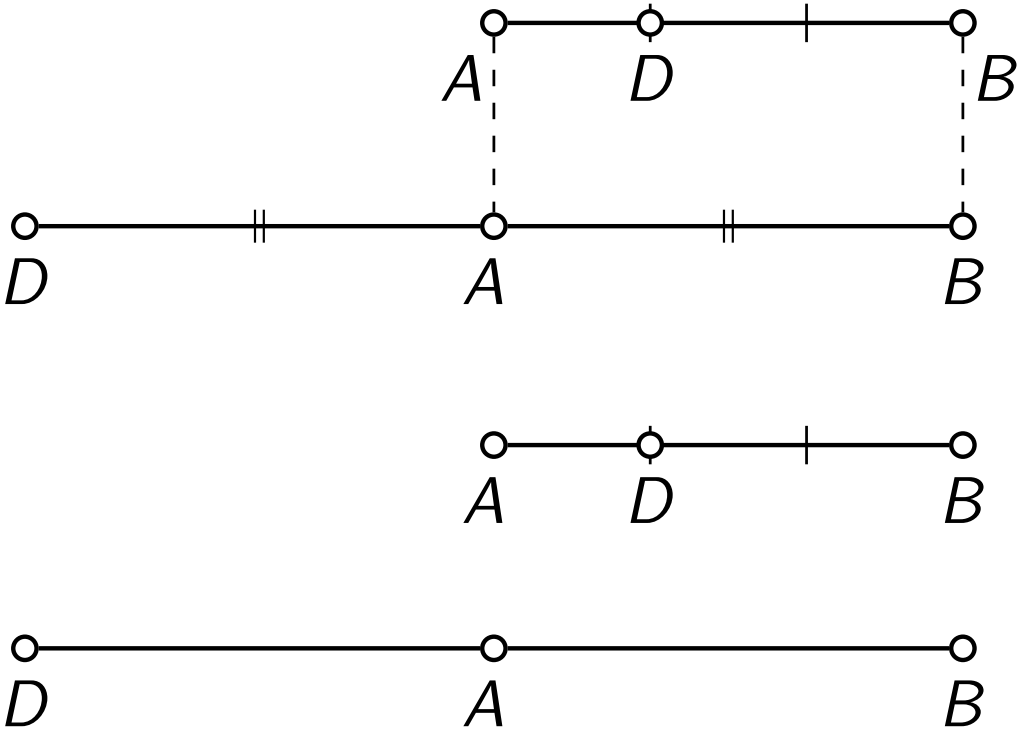
Dijeljenje dužine u zadanom omjeru



$$\frac{|AD|}{|BD|} = \frac{1}{2}$$ iznutra

$$\frac{|AD|}{|BD|} = \frac{1}{2}$$ izvana

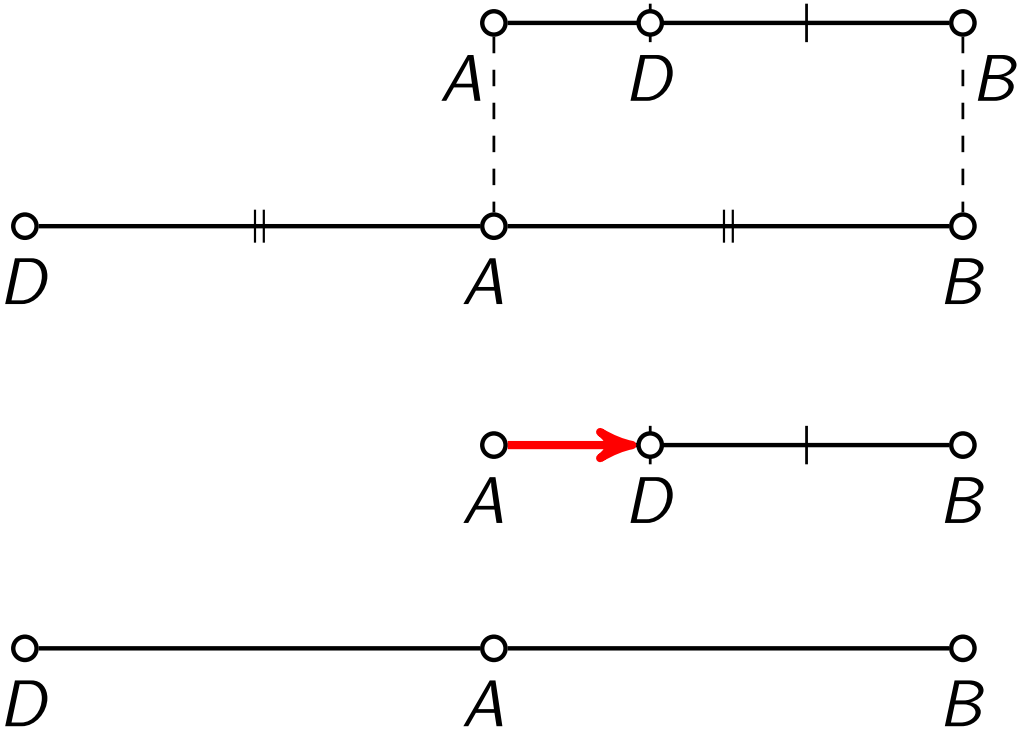
Dijeljenje dužine u zadanom omjeru



$$\frac{|AD|}{|BD|} = \frac{1}{2}$$ iznutra

$$\frac{|AD|}{|BD|} = \frac{1}{2}$$ izvana

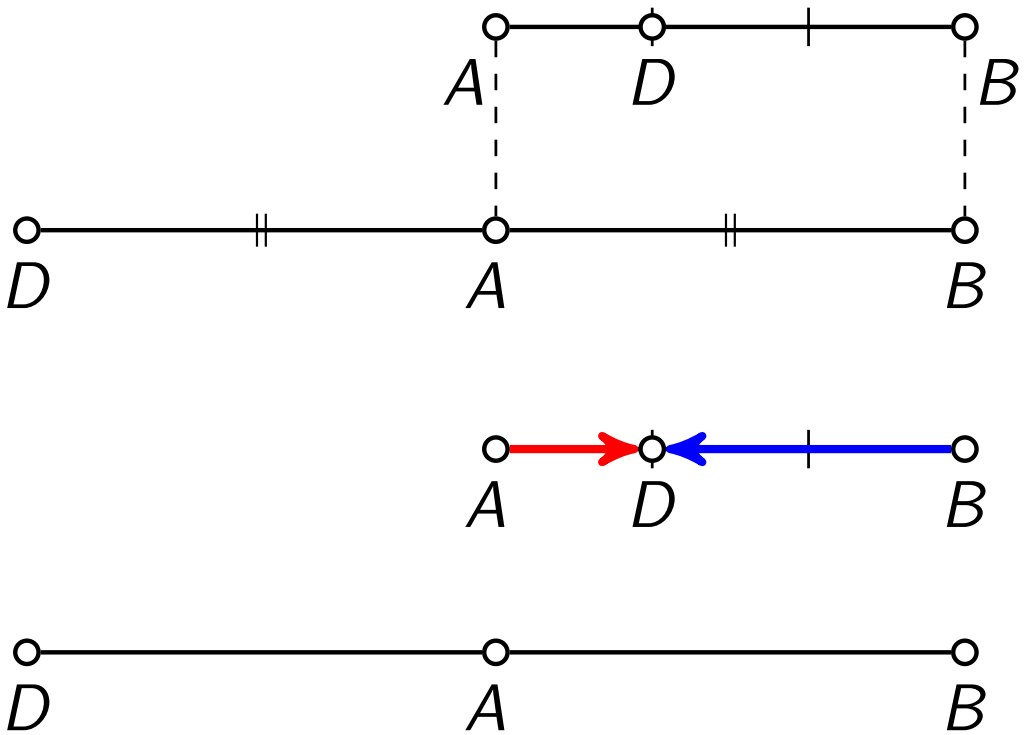
Dijeljenje dužine u zadanom omjeru



$$\frac{|AD|}{|BD|} = \frac{1}{2}$$ iznutra

$$\frac{|AD|}{|BD|} = \frac{1}{2}$$ izvana

Dijeljenje dužine u zadanom omjeru



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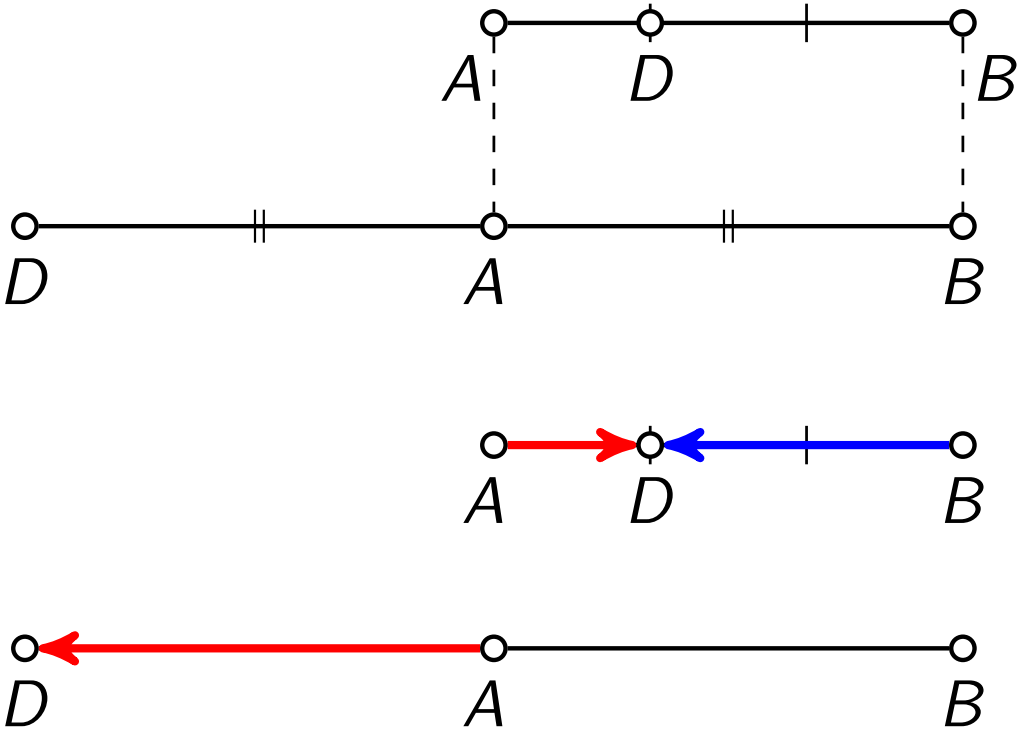
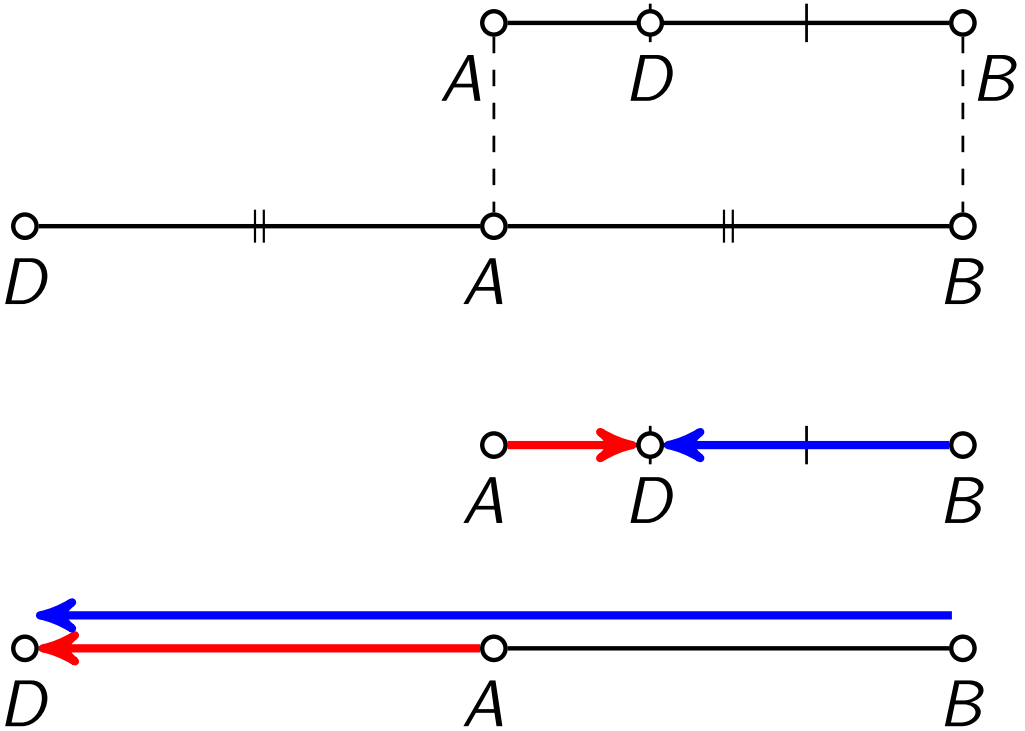
Dijeljenje dužine u zadanom omjeru



$$\frac{|AD|}{|BD|} = \frac{1}{2}$$ iznutra

$$\frac{|AD|}{|BD|} = \frac{1}{2}$$ izvana

Dijeljenje dužine u zadanom omjeru



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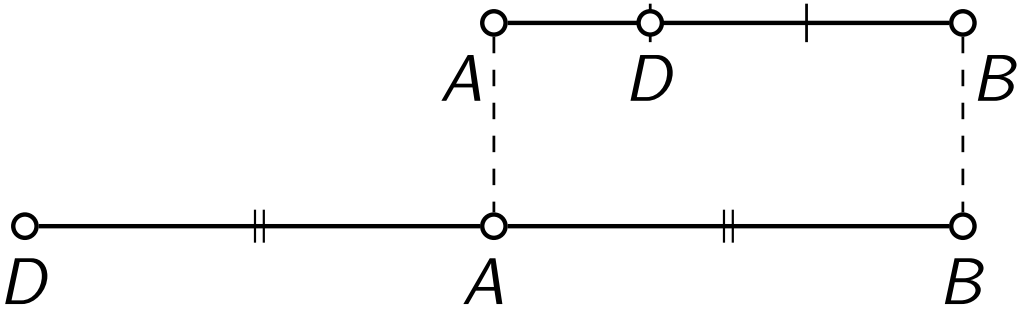
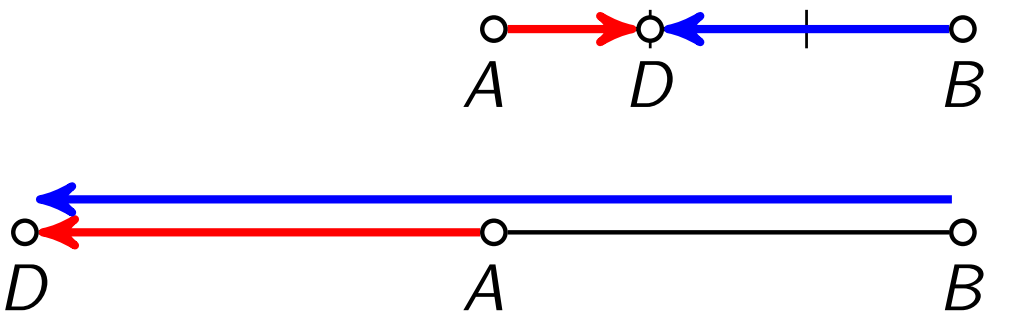


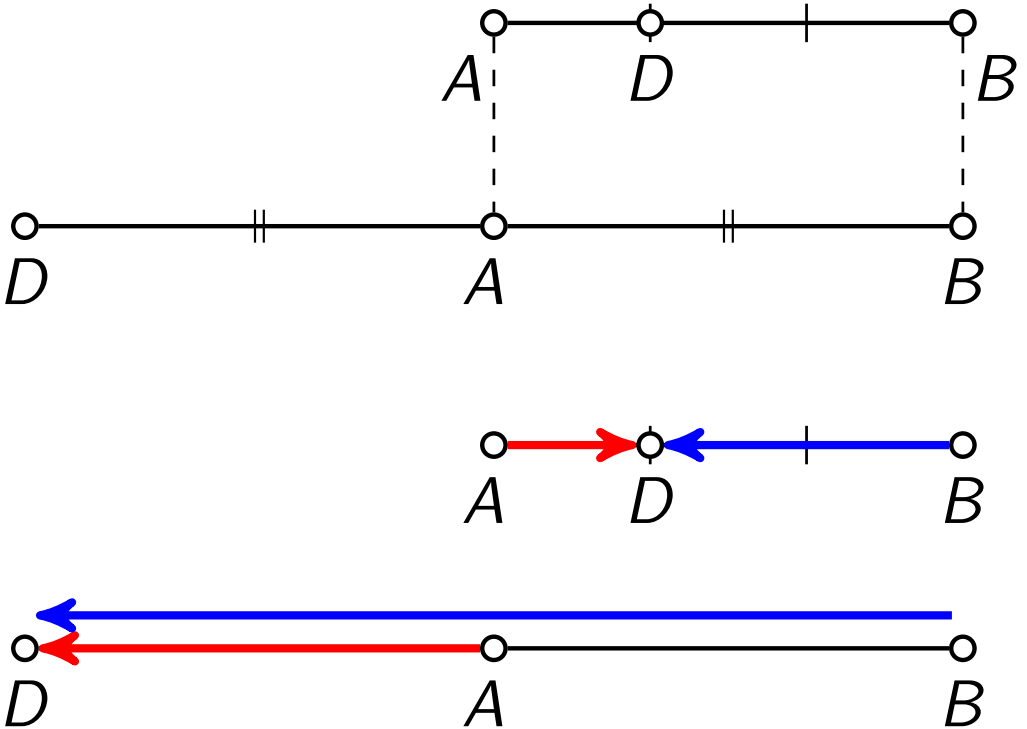
$$\frac{|AD|}{|BD|} = \frac{1}{2}$$ iznutra

$$\frac{|AD|}{|BD|} = \frac{1}{2}$$ izvana



$\overrightarrow{AD} =$

Dijeljenje dužine u zadanom omjeru

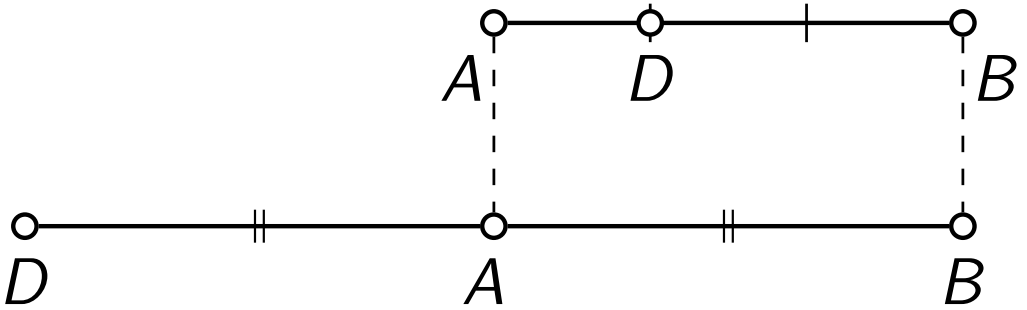


$$\frac{|AD|}{|BD|} = \frac{1}{2}$$ iznutra

$$\frac{|AD|}{|BD|} = \frac{1}{2}$$ izvana

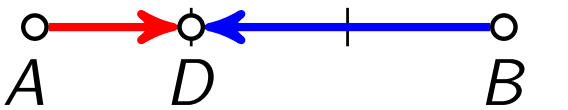
$$\overrightarrow{AD} = -\frac{1}{2}\overrightarrow{BD}$$

Dijeljenje dužine u zadanom omjeru

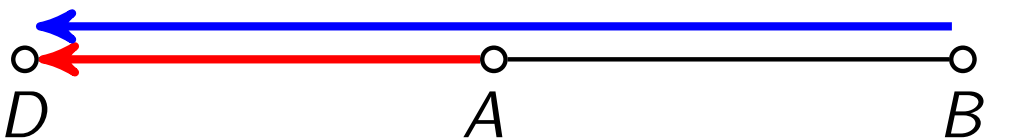


$$\frac{|AD|}{|BD|} = \frac{1}{2}$$ iznutra

$$\frac{|AD|}{|BD|} = \frac{1}{2}$$ izvana

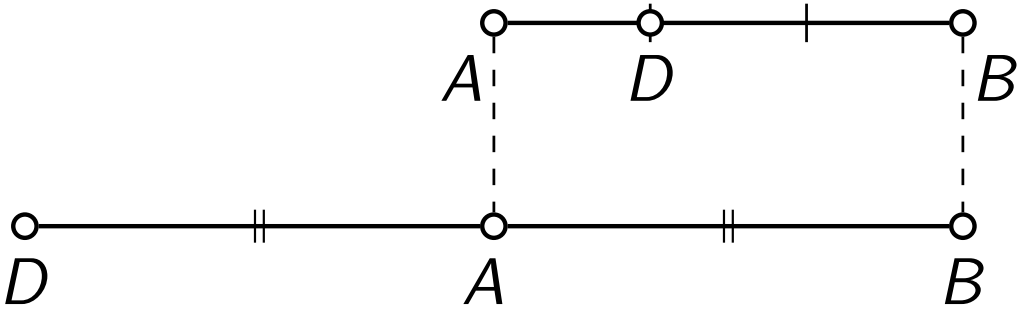


$$\overrightarrow{AD} = -\frac{1}{2}\overrightarrow{BD}$$



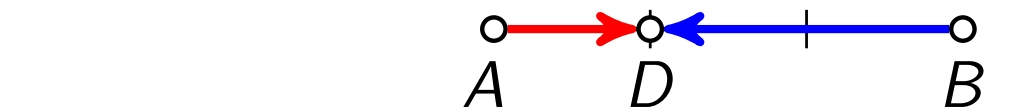
$$\overrightarrow{AD} =$$

Dijeljenje dužine u zadanom omjeru

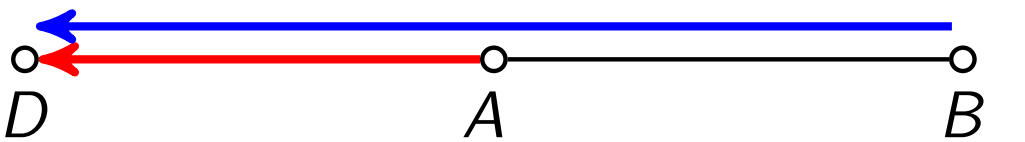


$$\frac{|AD|}{|BD|} = \frac{1}{2}$$ iznutra

$$\frac{|AD|}{|BD|} = \frac{1}{2}$$ izvana

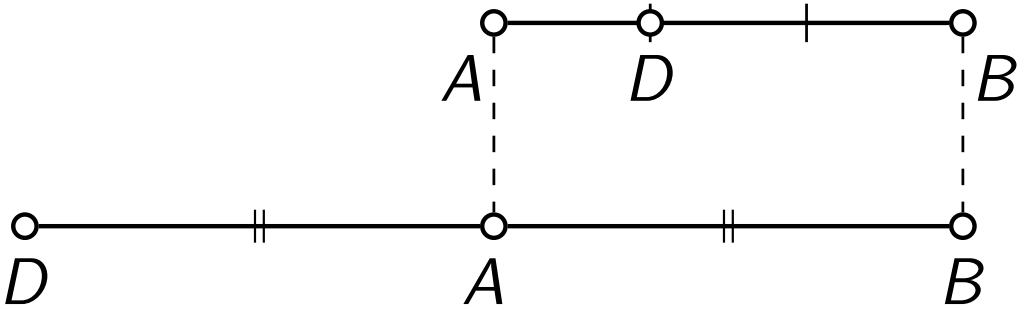


$$\overrightarrow{AD} = -\frac{1}{2}\overrightarrow{BD}$$



$$\overrightarrow{AD} = \frac{1}{2}\overrightarrow{BD}$$

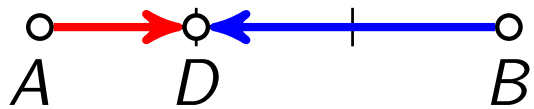
Dijeljenje dužine u zadanom omjeru



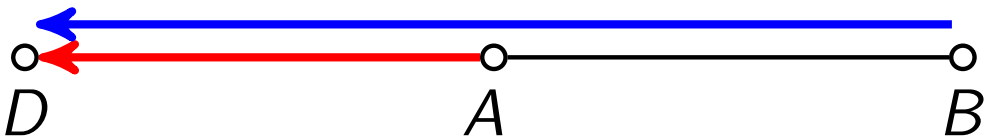
$$\frac{|AD|}{|BD|} = \frac{1}{2}$$ iznutra

$$\frac{|AD|}{|BD|} = \frac{1}{2}$$ izvana

1. način

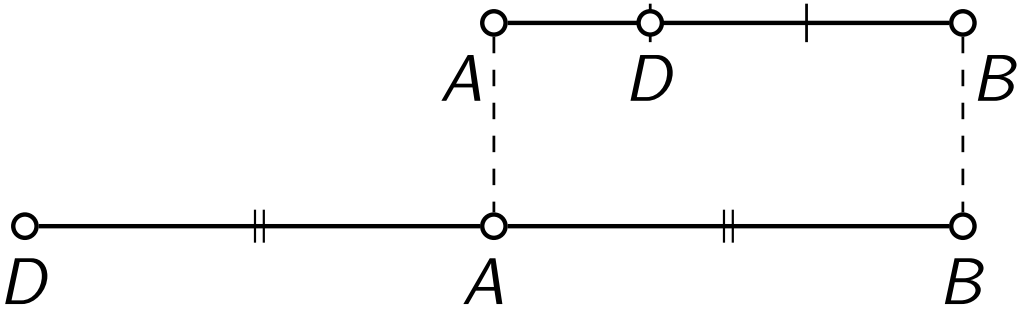


$$\overrightarrow{AD} = -\frac{1}{2}\overrightarrow{BD}$$



$$\overrightarrow{AD} = \frac{1}{2}\overrightarrow{BD}$$

Dijeljenje dužine u zadanom omjeru



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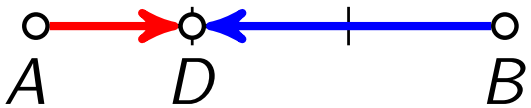
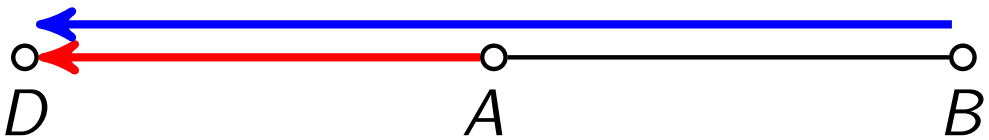
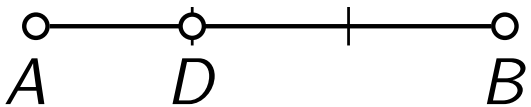


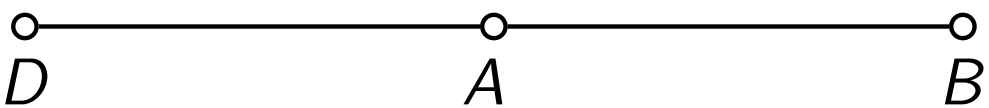
$$\overrightarrow{AD} = -\frac{1}{2}\overrightarrow{BD}$$



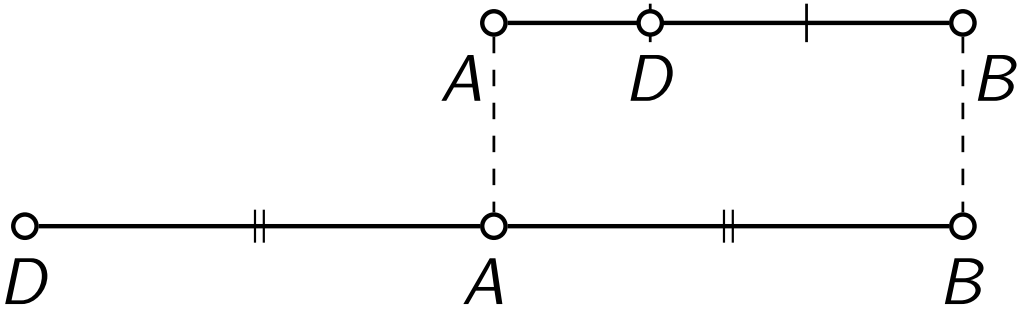
$$\overrightarrow{AD} = \frac{1}{2}\overrightarrow{BD}$$

2. način





Dijeljenje dužine u zadanom omjeru



$$\frac{|AD|}{|BD|} = \frac{1}{2}$$ iznutra

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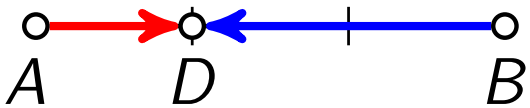
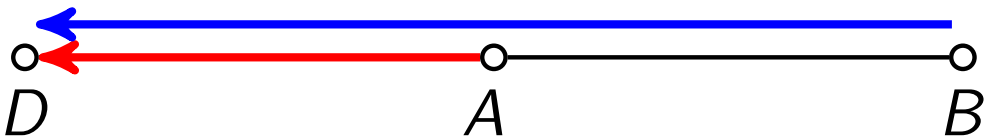
1. način

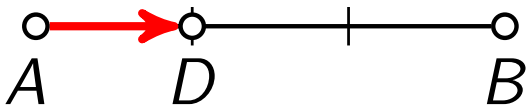


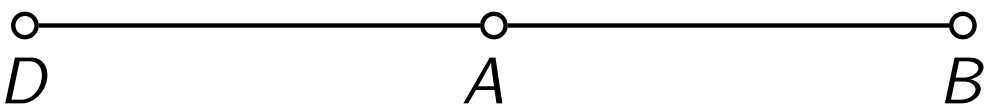
$$\overrightarrow{AD} = -\frac{1}{2}\overrightarrow{BD}$$



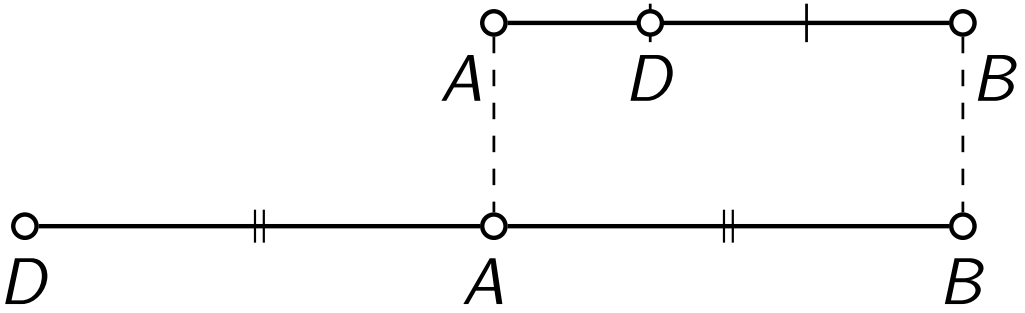
$$\overrightarrow{AD} = \frac{1}{2}\overrightarrow{BD}$$

2. način





Dijeljenje dužine u zadanom omjeru



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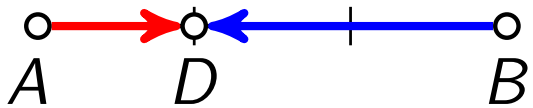
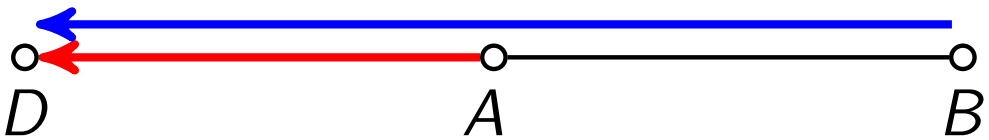
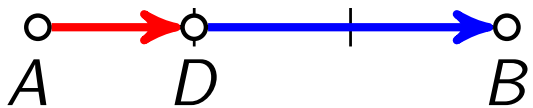


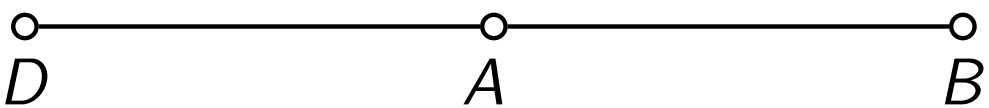
$$\overrightarrow{AD} = -\frac{1}{2}\overrightarrow{BD}$$



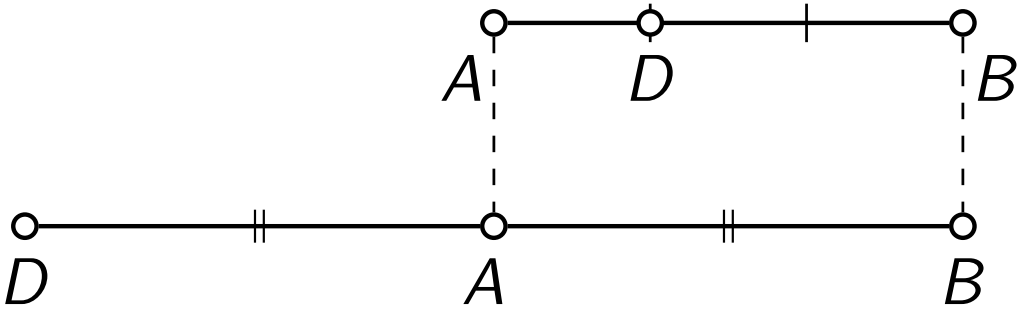
$$\overrightarrow{AD} = \frac{1}{2}\overrightarrow{BD}$$

2. način





Dijeljenje dužine u zadanom omjeru



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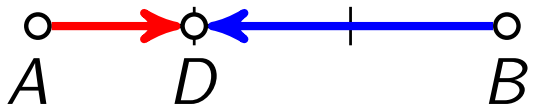
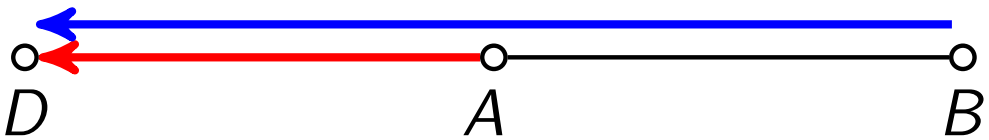
$$\frac{|AD|}{|BD|} = \frac{1}{2}$$ izvana

1. način

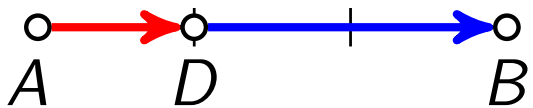


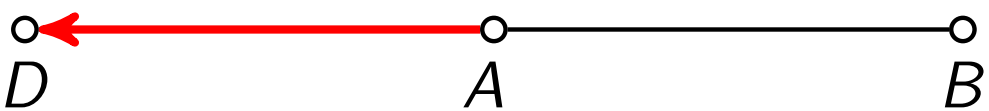
$$\overrightarrow{AD} = -\frac{1}{2}\overrightarrow{BD}$$



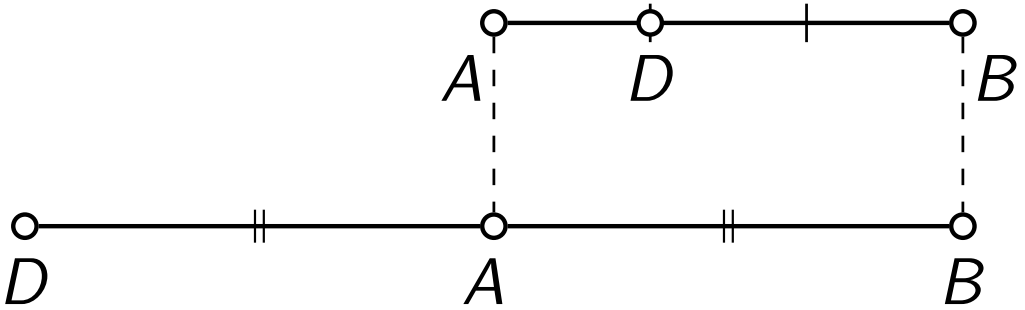
$$\overrightarrow{AD} = \frac{1}{2}\overrightarrow{BD}$$

2. način





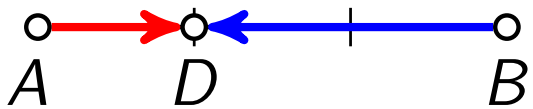
Dijeljenje dužine u zadanom omjeru



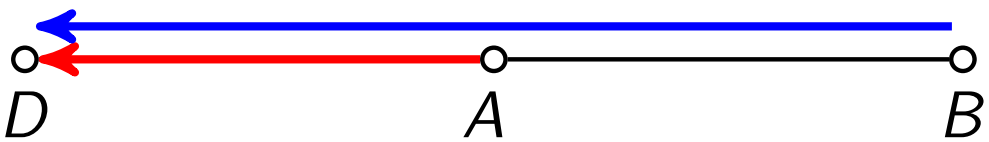
$$\frac{|AD|}{|BD|} = \frac{1}{2}$$ iznutra

$$\frac{|AD|}{|BD|} = \frac{1}{2}$$ izvana

1. način

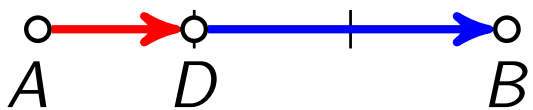


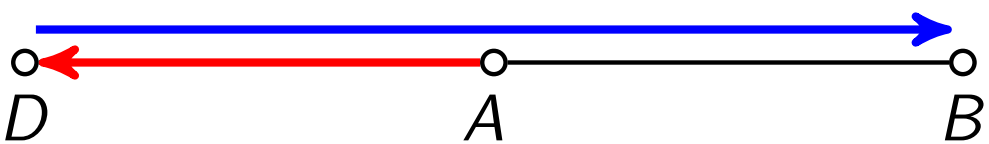
$$\overrightarrow{AD} = -\frac{1}{2}\overrightarrow{BD}$$



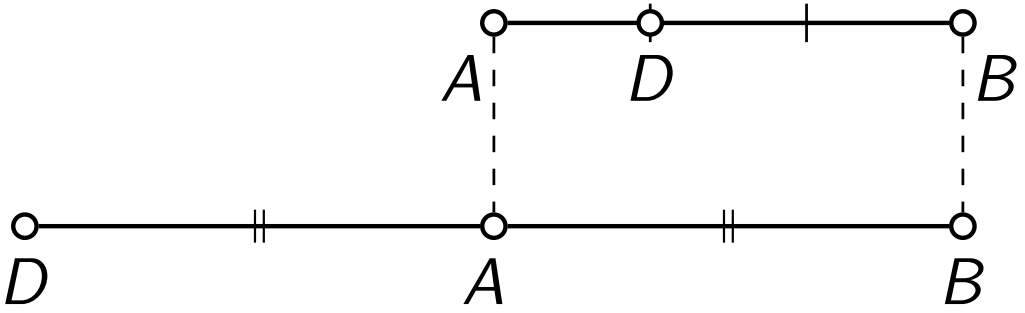
$$\overrightarrow{AD} = \frac{1}{2}\overrightarrow{BD}$$

2. način





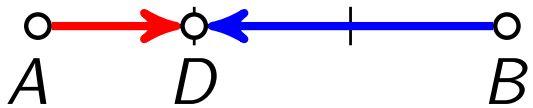
Dijeljenje dužine u zadanom omjeru



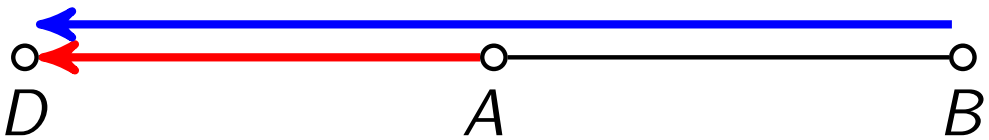
$$\frac{|AD|}{|BD|} = \frac{1}{2}$$ iznutra

$$\frac{|AD|}{|BD|} = \frac{1}{2}$$ izvana

1. način

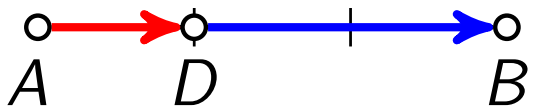


$$\overrightarrow{AD} = -\frac{1}{2}\overrightarrow{BD}$$

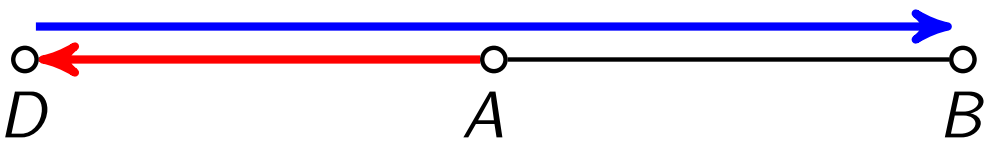


$$\overrightarrow{AD} = \frac{1}{2}\overrightarrow{BD}$$

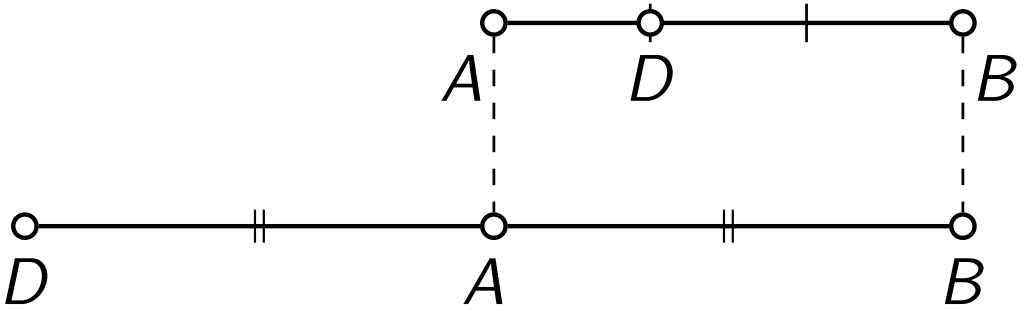
2. način



$$\overrightarrow{AD} =$$



Dijeljenje dužine u zadanom omjeru



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$$\frac{|AD|}{|BD|} = \frac{1}{2}$$ izvana

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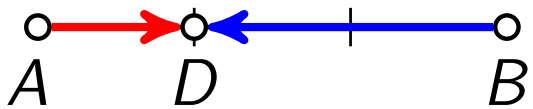

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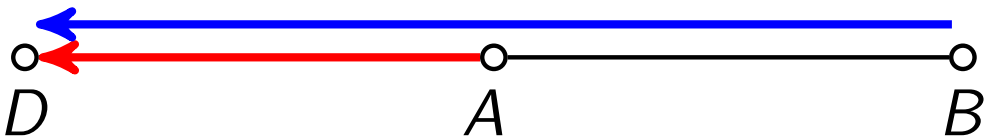

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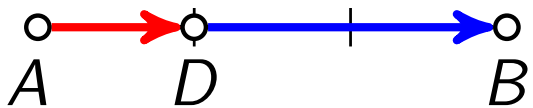
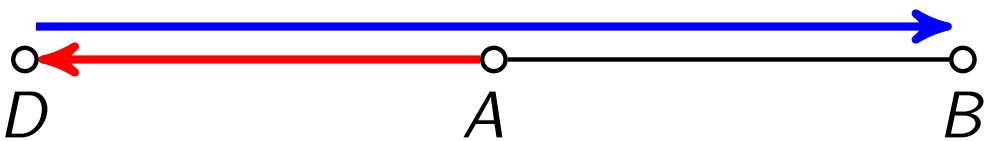
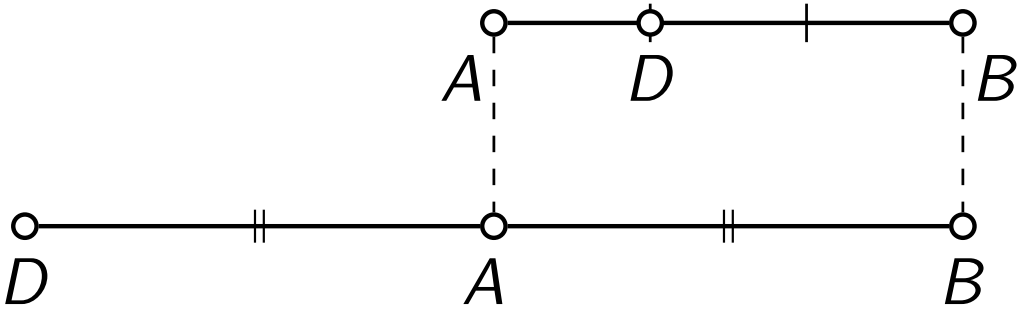


$$\overrightarrow{AD} = \frac{1}{2}\overrightarrow{DB}$$



Dijeljenje dužine u zadanom omjeru



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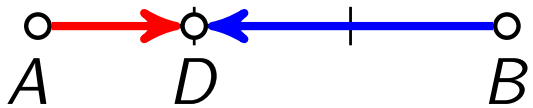

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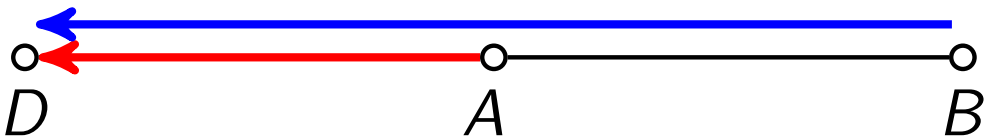

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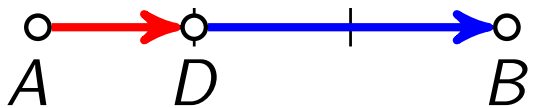
2. način



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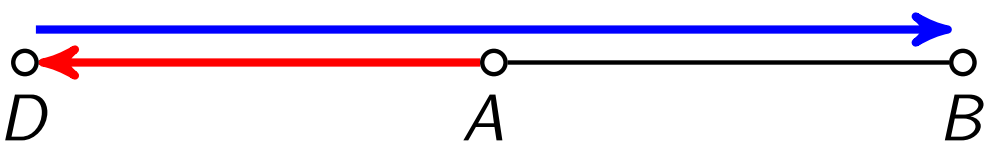
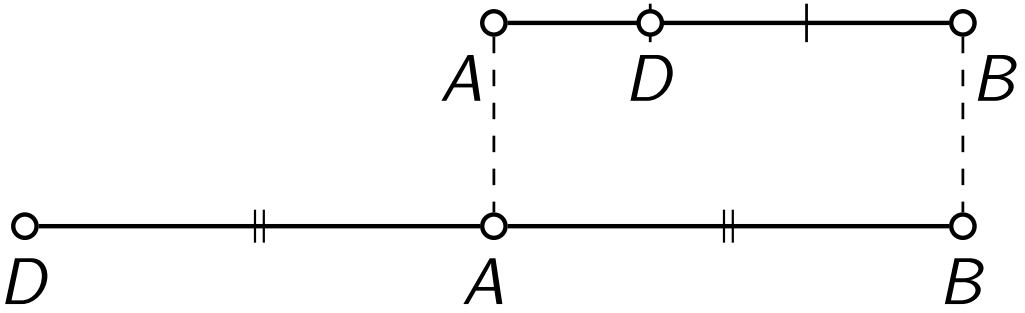


$$\overrightarrow{AD} =$$

Dijeljenje dužine u zadanom omjeru



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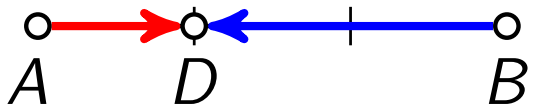

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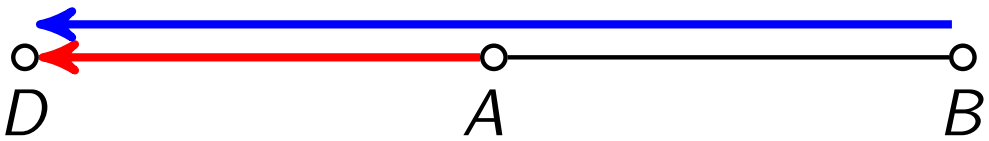

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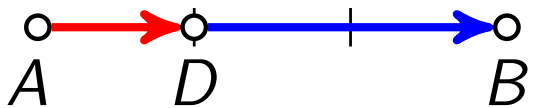
2. način



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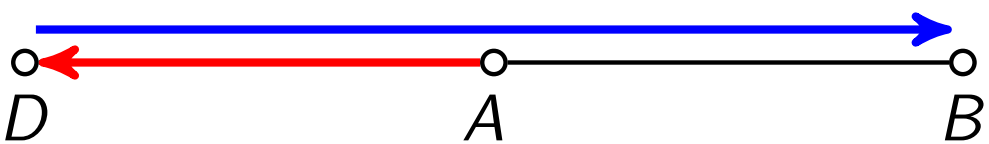

$$\overrightarrow{AD} = -\frac{1}{2}\overrightarrow{DB}$$

1. način

Kažemo da točka D dijeli dužinu $\overline{AB}$ u omjeru λ ako je $\overrightarrow{AD} = \lambda \overrightarrow{BD}$.

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Kažemo da točka D dijeli dužinu $\overline{AB}$ u omjeru λ ako je $\overrightarrow{AD} = \lambda \overrightarrow{BD}$.

Ako je $\lambda < 0$, točka D se nalazi unutar dužine $\overline{AB}$.

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Ako je $\lambda < 0$, točka D se nalazi unutar dužine $\overline{AB}$.

Ako je $\lambda > 0$, točka D se nalazi izvan dužine $\overline{AB}$.

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2. način

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1. način ⇜ *koristit ćemo ovaj pristup*

Kažemo da točka D dijeli dužinu $\overline{AB}$ u omjeru λ ako je $\overrightarrow{AD} = \lambda \overrightarrow{BD}$.

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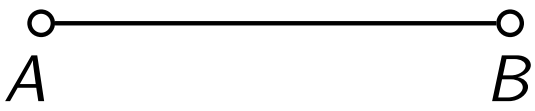
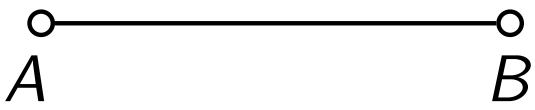
Ako je $\lambda > 0$, točka D se nalazi unutar dužine $\overline{AB}$.

Ako je $\lambda < 0$, točka D se nalazi izvan dužine $\overline{AB}$.

$\lambda = 0$

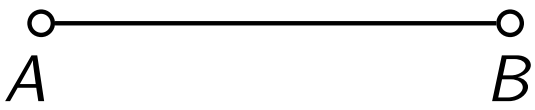


$\lambda = 0$



$$\overrightarrow{AD} = \lambda \overrightarrow{BD}$$

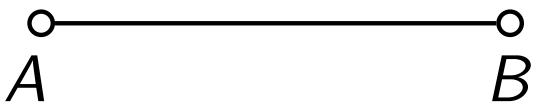
$\lambda = 0$



$$\overrightarrow{AD} = \lambda \overrightarrow{BD}$$

$$\overrightarrow{AD} = 0 \cdot \overrightarrow{BD}$$

$\lambda = 0$

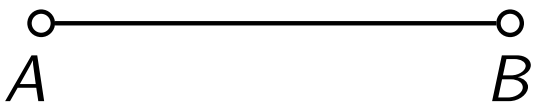


$$\overrightarrow{AD} = \lambda \overrightarrow{BD}$$

$$\overrightarrow{AD} = 0 \cdot \overrightarrow{BD}$$

$$\overrightarrow{AD} = \vec{0}$$

$\lambda = 0$



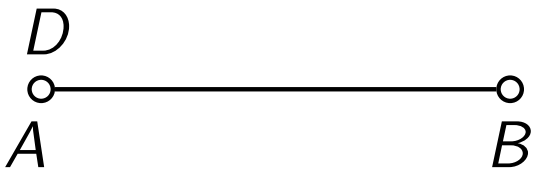
$$\overrightarrow{AD} = \lambda \overrightarrow{BD}$$

$$\overrightarrow{AD} = 0 \cdot \overrightarrow{BD}$$

$$\overrightarrow{AD} = \vec{0}$$

$$D = A$$

$\lambda = 0$



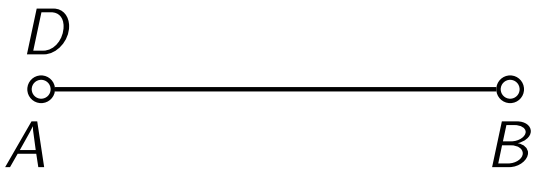
$$\overrightarrow{AD} = \lambda \overrightarrow{BD}$$

$$\overrightarrow{AD} = 0 \cdot \overrightarrow{BD}$$

$$\overrightarrow{AD} = \vec{0}$$

$$D = A$$

$\lambda = 0$



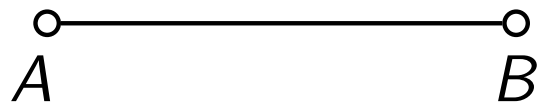
$$\overrightarrow{AD} = \lambda \overrightarrow{BD}$$

$$\overrightarrow{AD} = 0 \cdot \overrightarrow{BD}$$

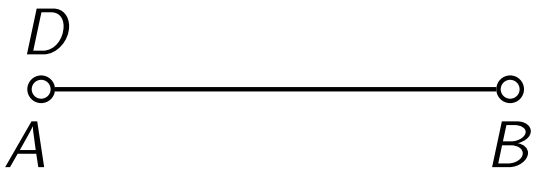
$$\overrightarrow{AD} = \vec{0}$$

$$D = A$$

polovište



$\lambda = 0$



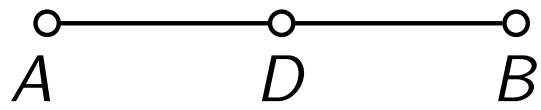
$$\overrightarrow{AD} = \lambda \overrightarrow{BD}$$

$$\overrightarrow{AD} = 0 \cdot \overrightarrow{BD}$$

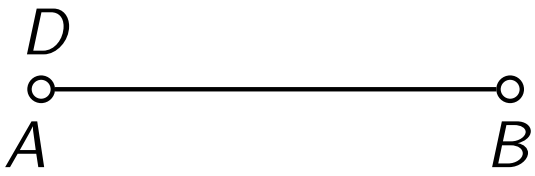
$$\overrightarrow{AD} = \vec{0}$$

$$D = A$$

polovište

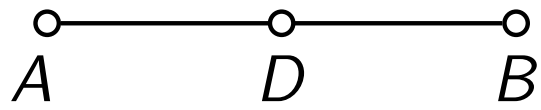


$\lambda = 0$



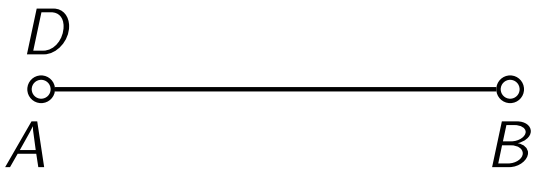
$$\overrightarrow{AD} = \lambda \overrightarrow{BD}$$
$$\overrightarrow{AD} = 0 \cdot \overrightarrow{BD}$$
$$\overrightarrow{AD} = \vec{0}$$
$$D = A$$

polovište



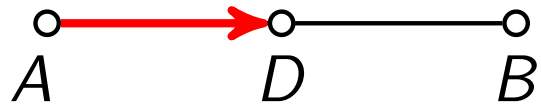
$$\overrightarrow{AD} = \lambda \overrightarrow{BD}$$

$\lambda = 0$



$$\overrightarrow{AD} = \lambda \overrightarrow{BD}$$
$$\overrightarrow{AD} = 0 \cdot \overrightarrow{BD}$$
$$\overrightarrow{AD} = \vec{0}$$
$$D = A$$

polovište



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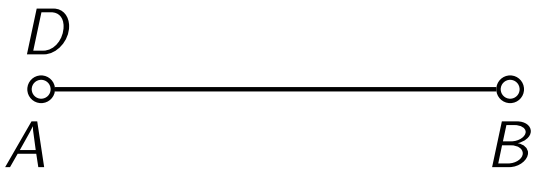

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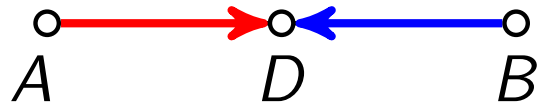
polovište



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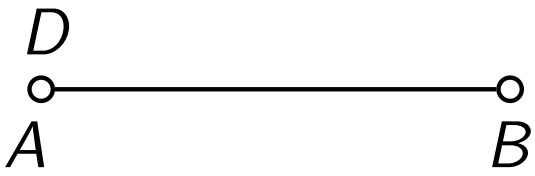
$\lambda = 0$



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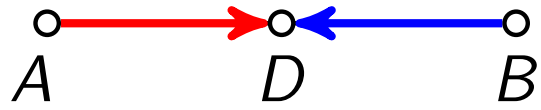

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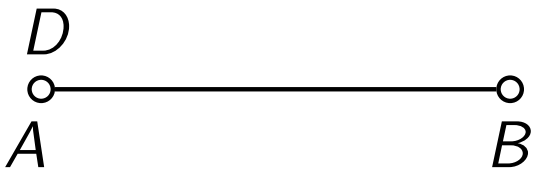

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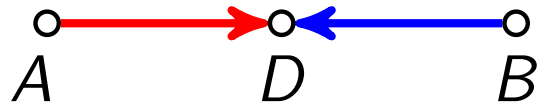
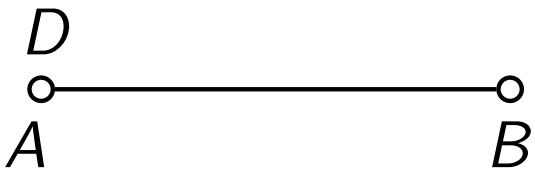


$$\overrightarrow{AD} = \lambda \overrightarrow{BD}$$
$$\overrightarrow{AD} = -\overrightarrow{BD}$$
$$\lambda = -1$$

$\lambda = 0$



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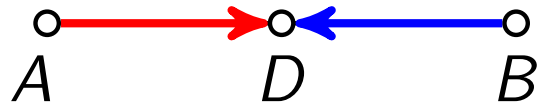

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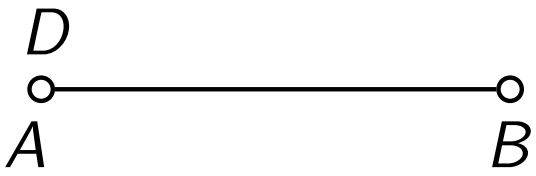

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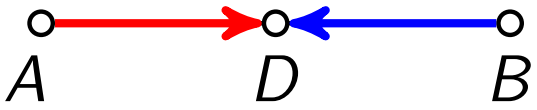

$$\overrightarrow{AD} = \lambda \overrightarrow{BD}$$
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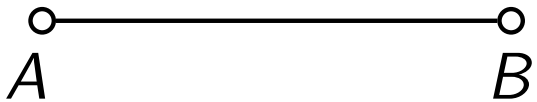
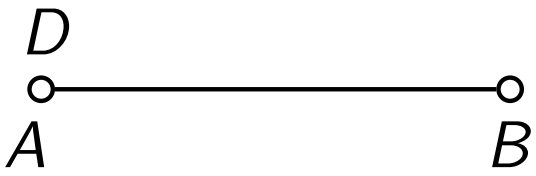
$$\lambda = -1$$

$\lambda = 1$



$\lambda = 0$



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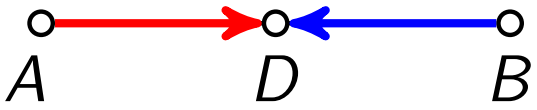
polovište



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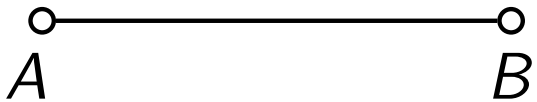

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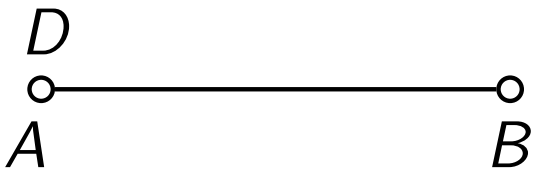

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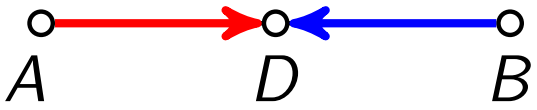
polovište



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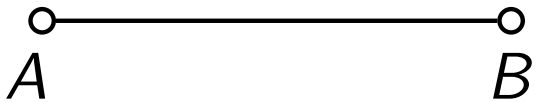

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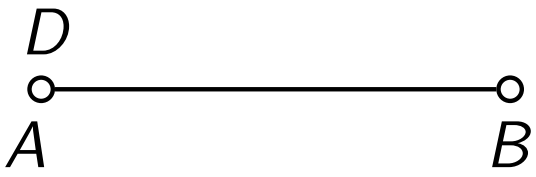

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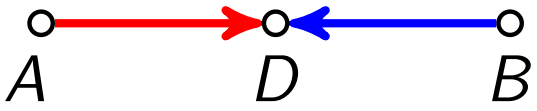
polovište



$$\overrightarrow{AD} = \lambda \overrightarrow{BD}$$
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$$\boxed{\lambda = -1}$$

$\lambda = 1$

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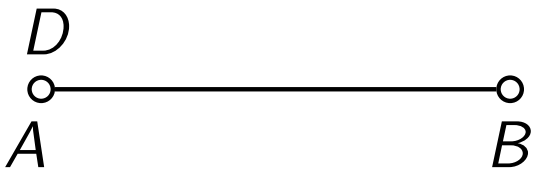
$\lambda = 0$



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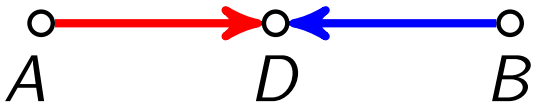

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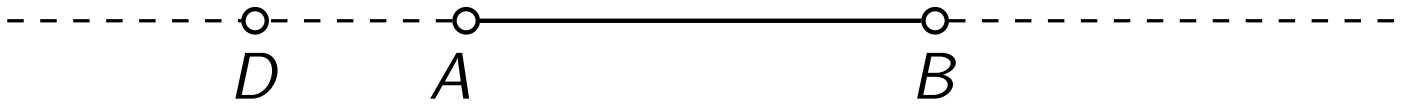

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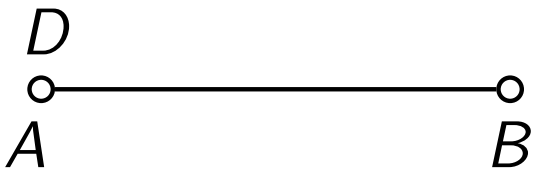

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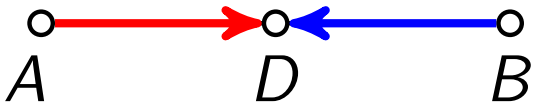

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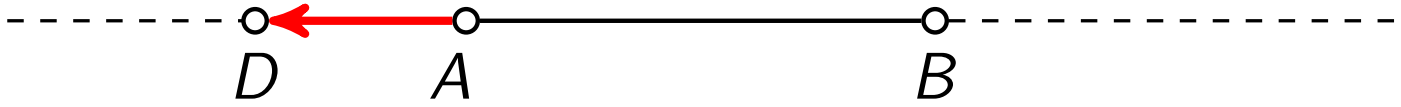

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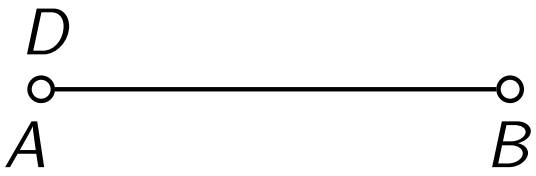

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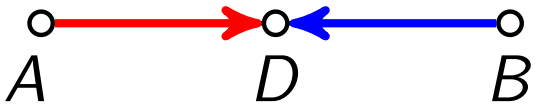

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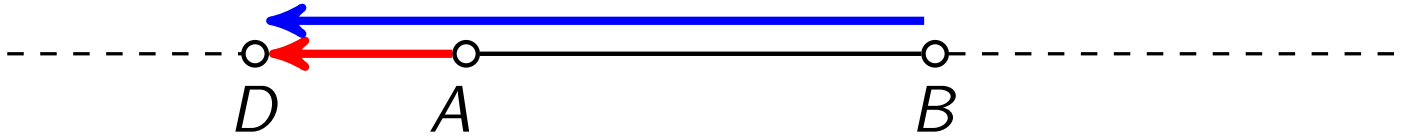

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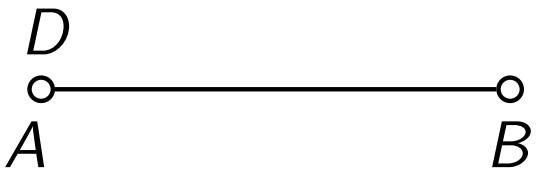

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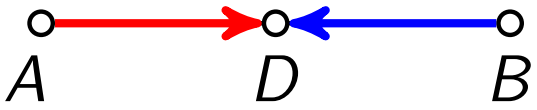

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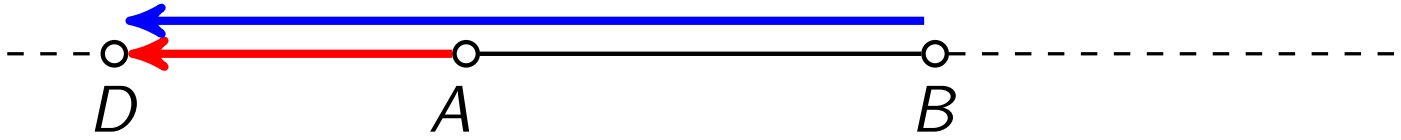

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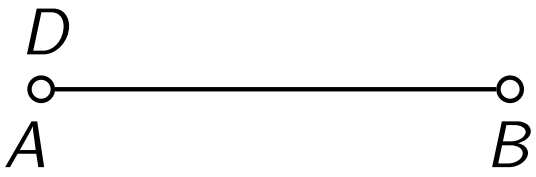

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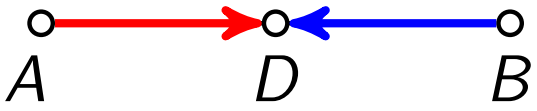

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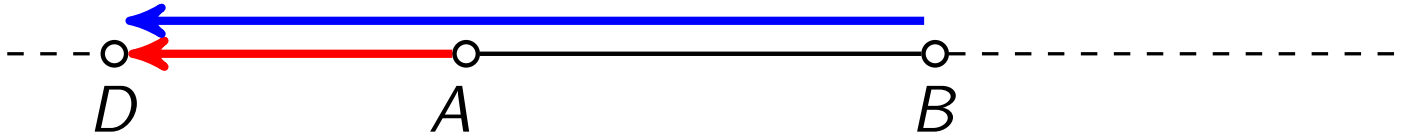
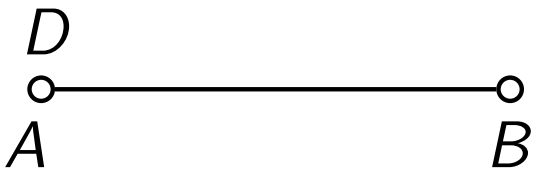


$$\overrightarrow{AD} = \lambda \overrightarrow{BD}$$
$$\overrightarrow{AD} = \overrightarrow{BD}$$

Hm?

$\lambda = 0$



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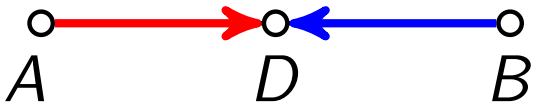
polovište



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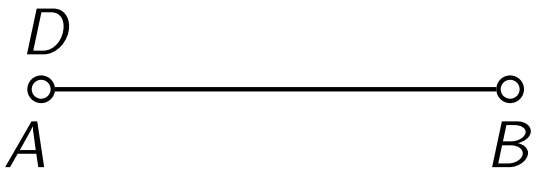

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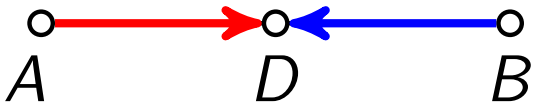
polovište



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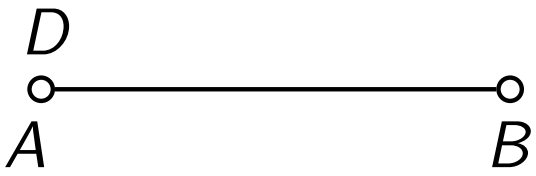

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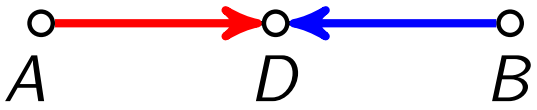

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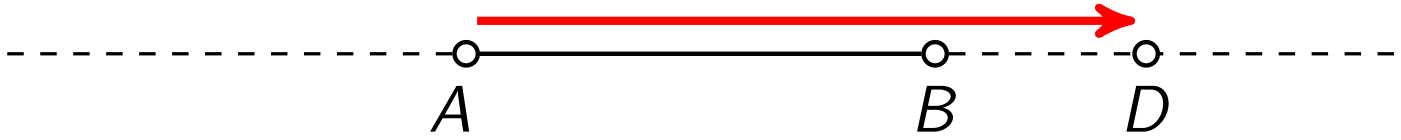

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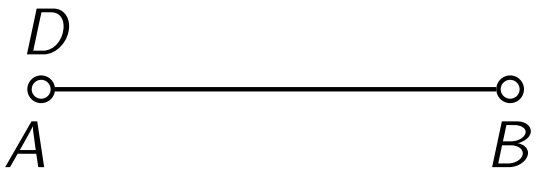
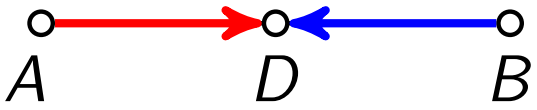
$$\overrightarrow{AD} = \overrightarrow{BD}$$

$\lambda = 0$



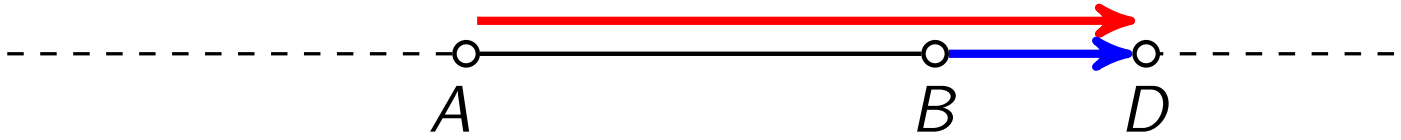
$$\overrightarrow{AD} = \lambda \overrightarrow{BD}$$
$$\overrightarrow{AD} = 0 \cdot \overrightarrow{BD}$$
$$\overrightarrow{AD} = \vec{0}$$
$$D = A$$

polovište



$$\overrightarrow{AD} = \lambda \overrightarrow{BD}$$
$$\overrightarrow{AD} = -\overrightarrow{BD}$$
$$\lambda = -1$$

$\lambda = 1$



$$\overrightarrow{AD} = \lambda \overrightarrow{BD}$$
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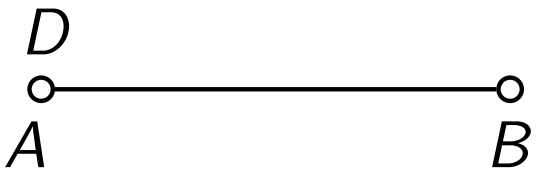
$\lambda = 0$



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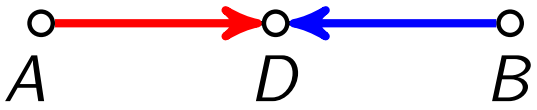
polovište



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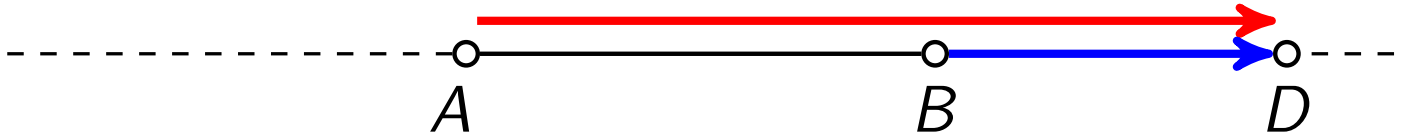

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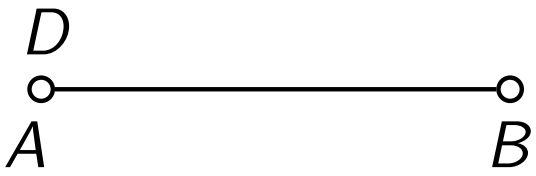

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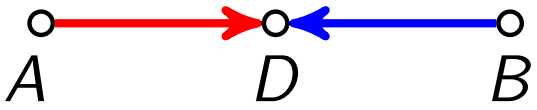

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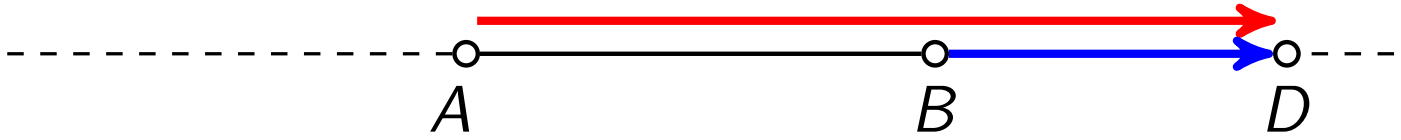
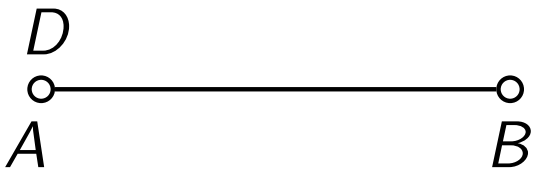


$$\overrightarrow{AD} = \lambda \overrightarrow{BD}$$
$$\overrightarrow{AD} = \overrightarrow{BD}$$

Hm?

$\lambda = 0$



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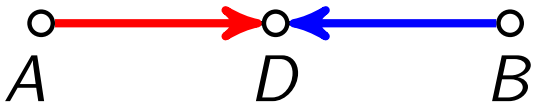
polovište



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$$\overrightarrow{AD} = \lambda \overrightarrow{BD}$$
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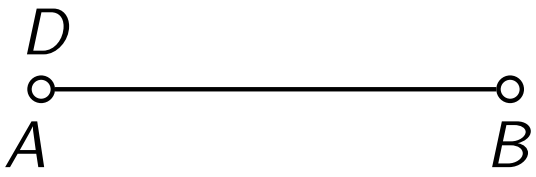
Točko D, javi se! Gdje si?

$\lambda = 0$



$$\overrightarrow{AD} = \lambda \overrightarrow{BD}$$
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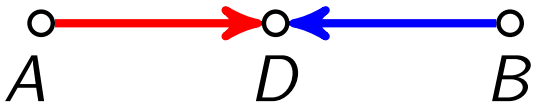
$$D = A$$

polovište



$$\overrightarrow{AD} = \lambda \overrightarrow{BD}$$
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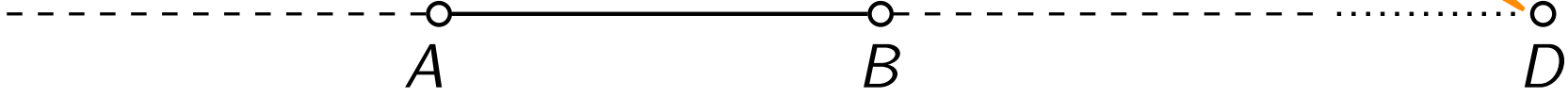

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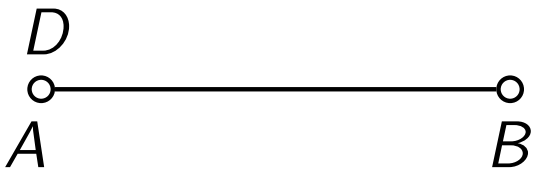

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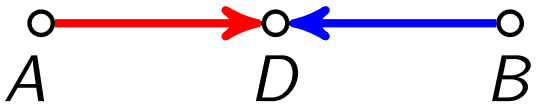
polovište



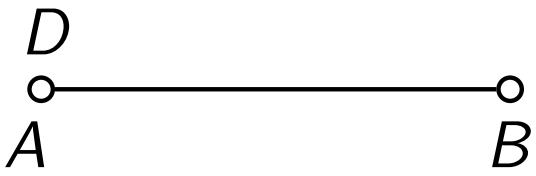
$$\overrightarrow{AD} = \lambda \overrightarrow{BD}$$
$$\overrightarrow{AD} = -\overrightarrow{BD}$$
$$\boxed{\lambda = -1}$$

$\lambda = 1$

$$\overrightarrow{AD} = \lambda \overrightarrow{BD}$$
$$\overrightarrow{AD} = \overrightarrow{BD}$$

Točka D je beskonačno daleka točka na pravcu AB.

$\lambda = 0$



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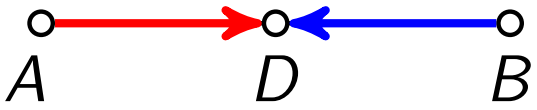
$$D = A$$

polovište



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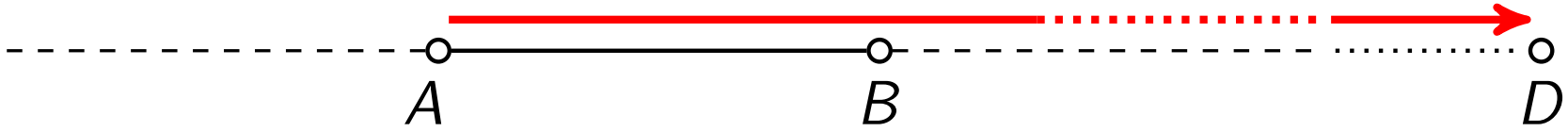
$$\lambda = -1$$

$\lambda = 1$



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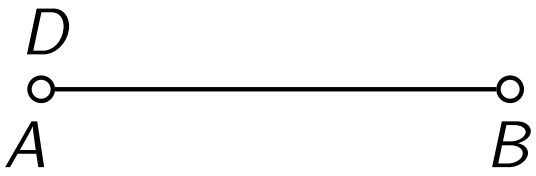

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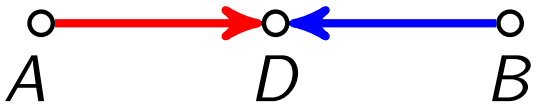

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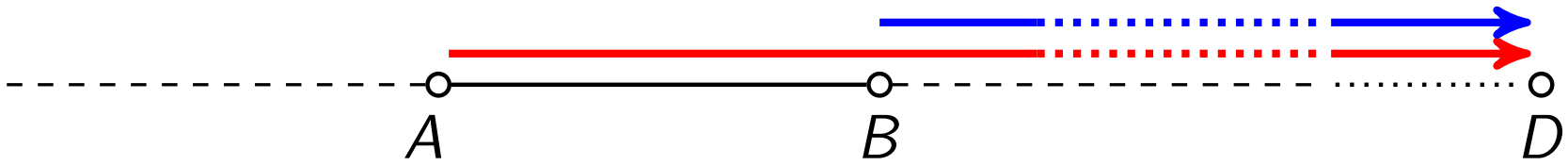
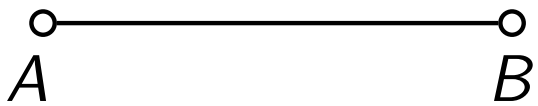


$$\overrightarrow{AD} = \lambda \overrightarrow{BD}$$
$$\overrightarrow{AD} = \overrightarrow{BD}$$

Točka D je beskonačno daleka točka na pravcu AB.

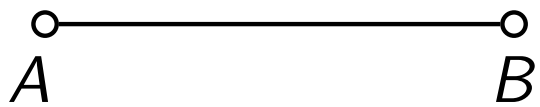
Primjer

$$\overrightarrow{AD} = -\frac{2}{5}\overrightarrow{BD}$$



Primjer

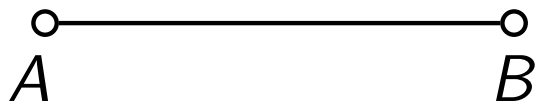
$$\overrightarrow{AD} = -\frac{2}{5}\overrightarrow{BD}$$



$$\frac{|AD|}{|BD|} = \frac{2}{5}$$

Primjer

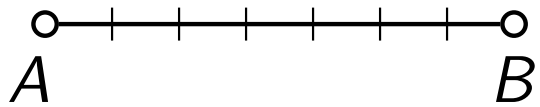
$$\overrightarrow{AD} = -\frac{2}{5}\overrightarrow{BD}$$



$$\frac{|AD|}{|BD|} = \frac{2}{5} \qquad 5 + 2 = 7$$

Primjer

$$\overrightarrow{AD} = -\frac{2}{5}\overrightarrow{BD}$$



$$\frac{|AD|}{|BD|} = \frac{2}{5} \qquad 5 + 2 = 7$$

Primjer

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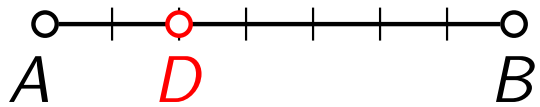

$$\frac{|AD|}{|BD|} = \frac{2}{5} \qquad 5 + 2 = 7$$

Primjer

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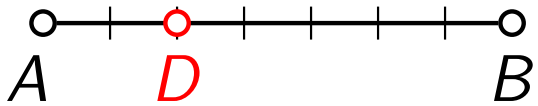

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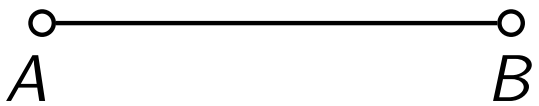
$$\overrightarrow{AD} = \frac{2}{5}\overrightarrow{BD}$$



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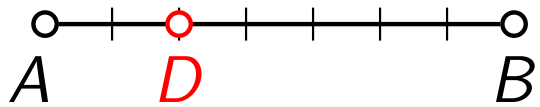

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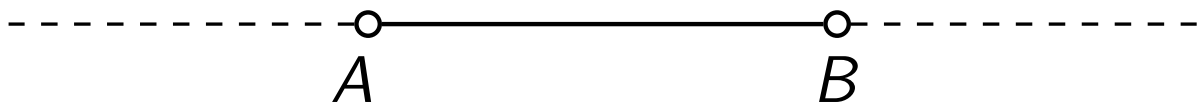

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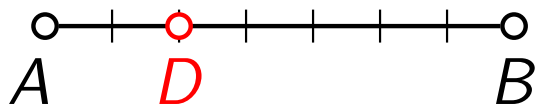

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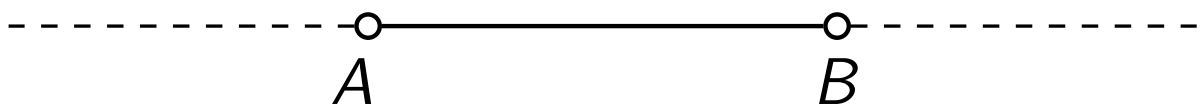
$$\overrightarrow{AD} = \frac{2}{5}\overrightarrow{BD}$$



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Primjer

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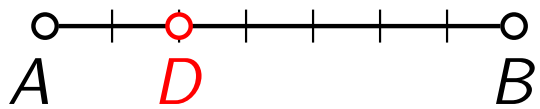
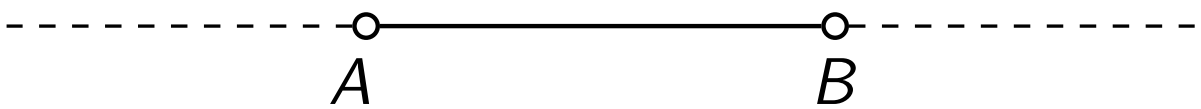


$$\frac{|AD|}{|BD|} = \frac{2}{5} \qquad 5 + 2 = 7$$

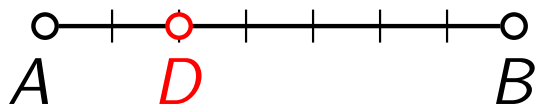
$$\overrightarrow{AD} = \frac{2}{5}\overrightarrow{BD}$$



$$\frac{|AD|}{|BD|} = \frac{2}{5} \qquad 5 - 2 = 3$$

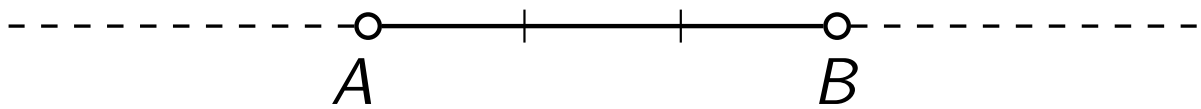
Primjer

$$\overrightarrow{AD} = -\frac{2}{5}\overrightarrow{BD}$$



$$\frac{|AD|}{|BD|} = \frac{2}{5} \qquad 5 + 2 = 7$$

$$\overrightarrow{AD} = \frac{2}{5}\overrightarrow{BD}$$



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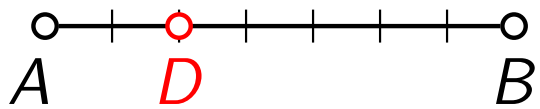

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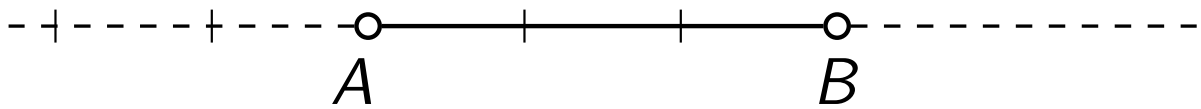

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Primjer

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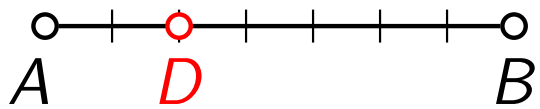

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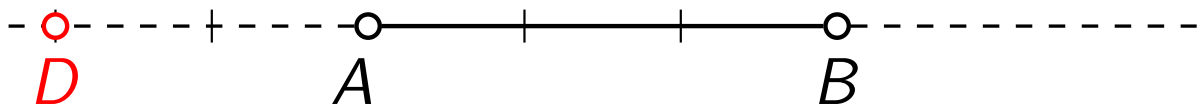
$$\overrightarrow{AD} = \frac{2}{5}\overrightarrow{BD}$$



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Primjer

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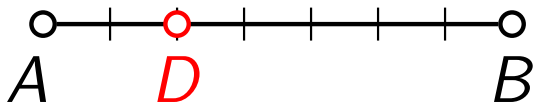

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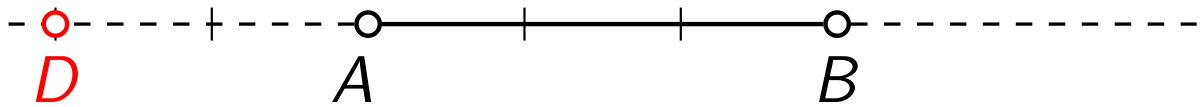
$$\overrightarrow{AD} = \frac{2}{5}\overrightarrow{BD}$$



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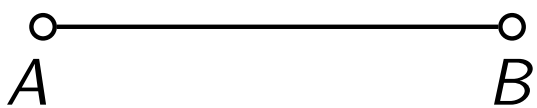

Primjer

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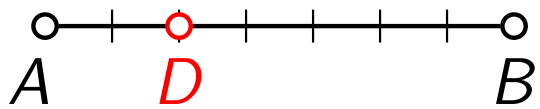

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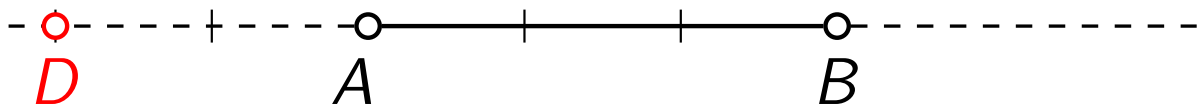

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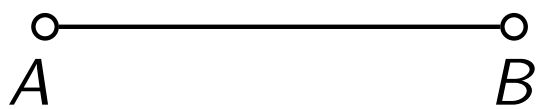

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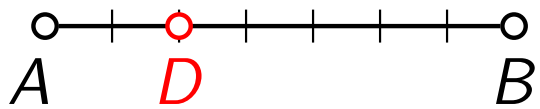

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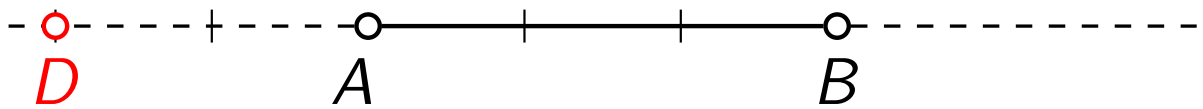

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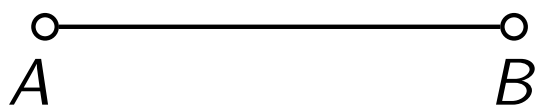

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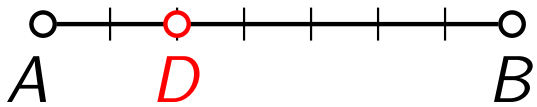

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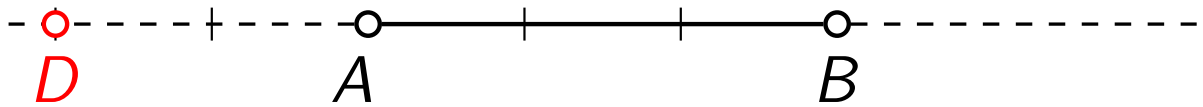

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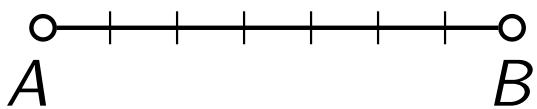

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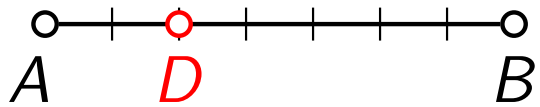

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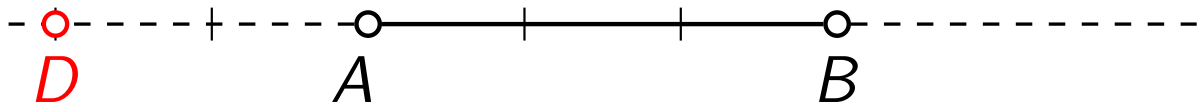

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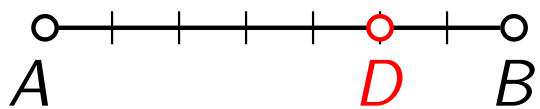

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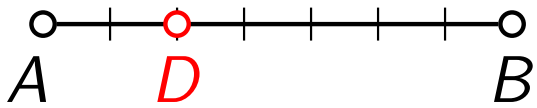

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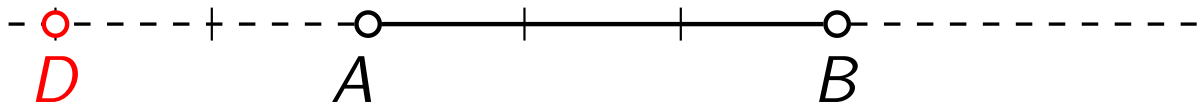

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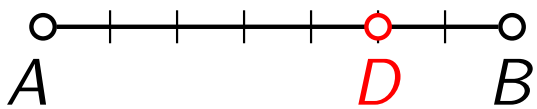

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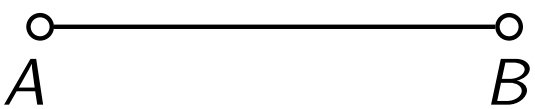

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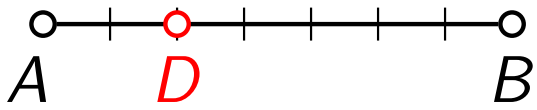

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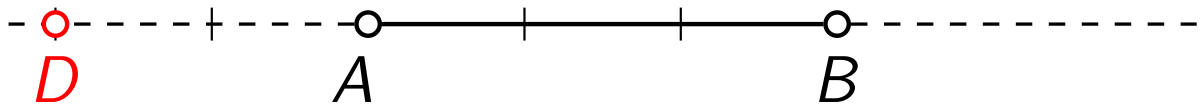

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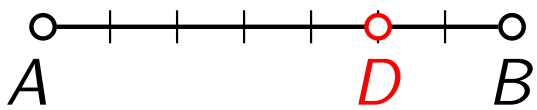

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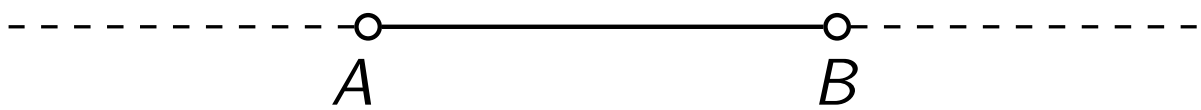

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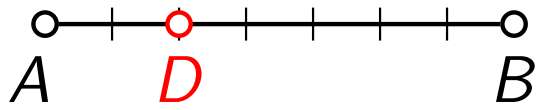

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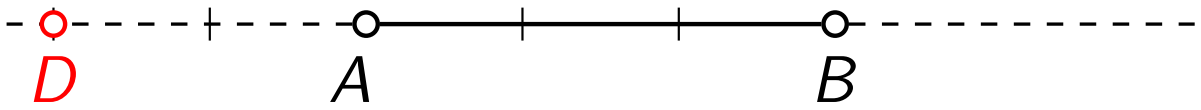

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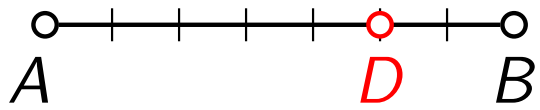

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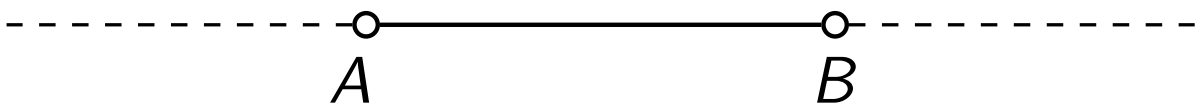

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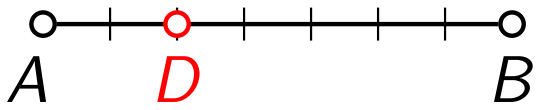

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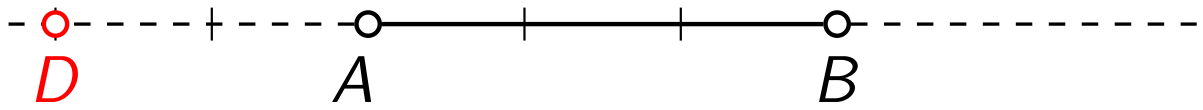

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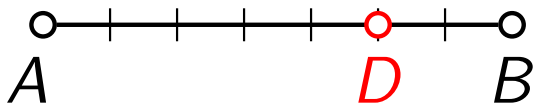

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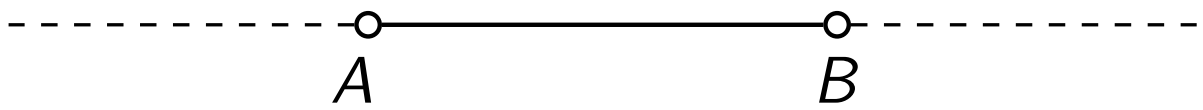

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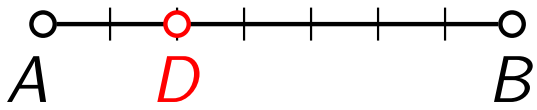

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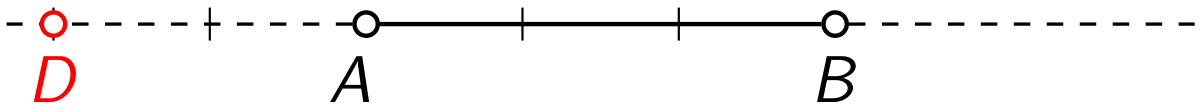

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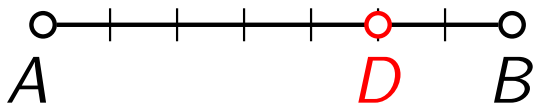

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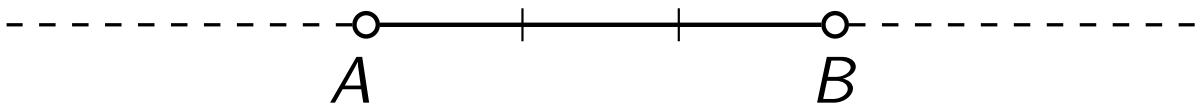

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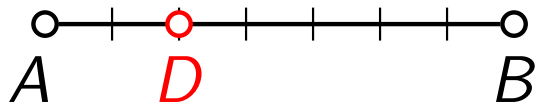

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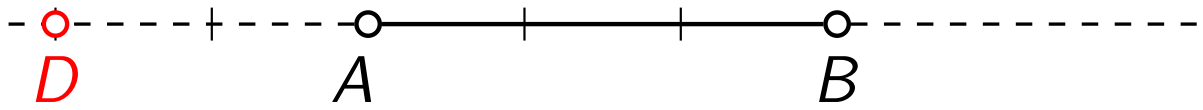

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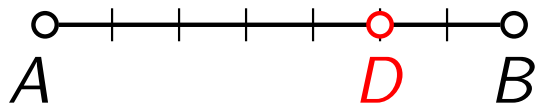

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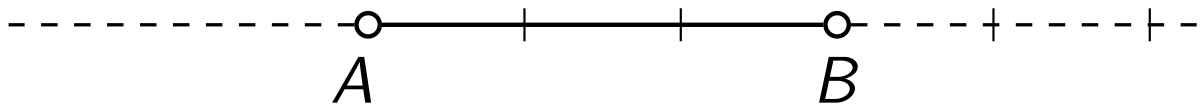

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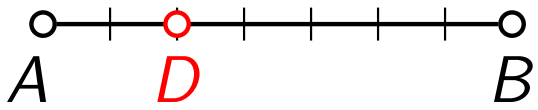

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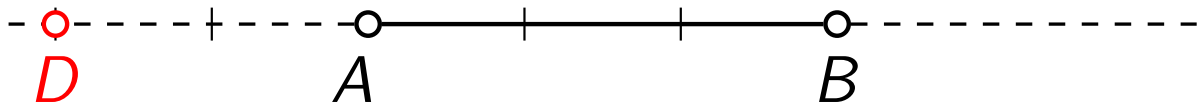

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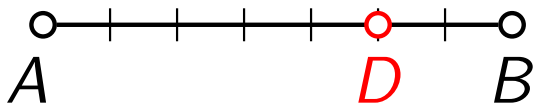

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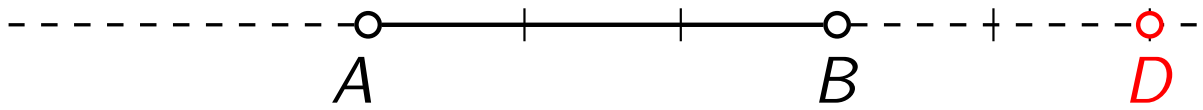

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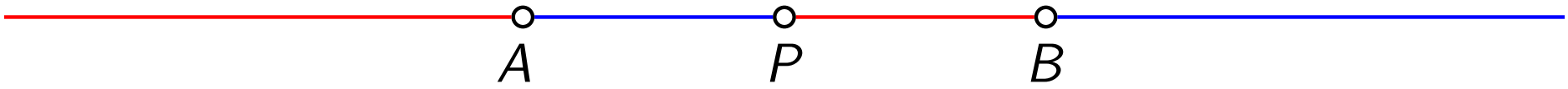
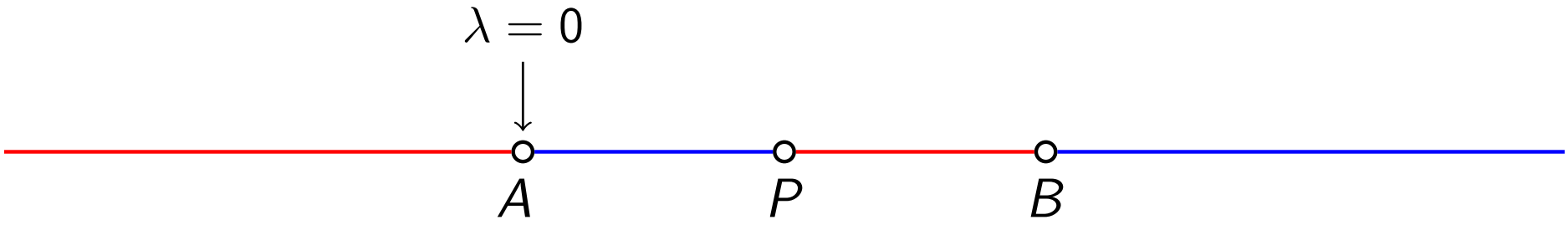

A
P
B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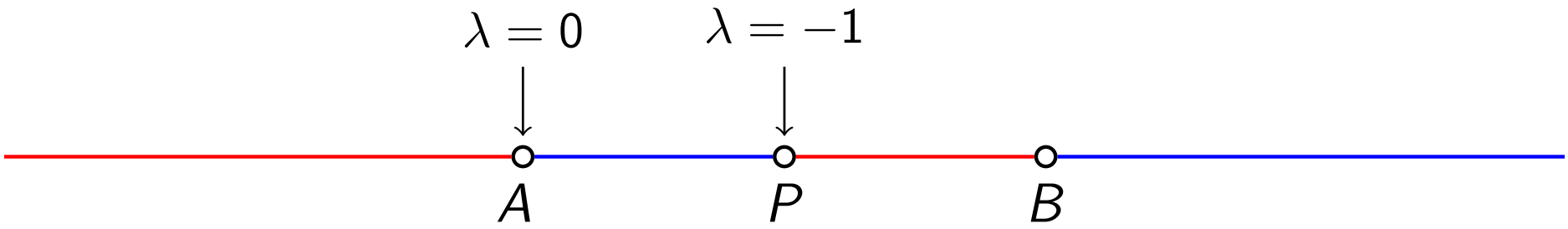
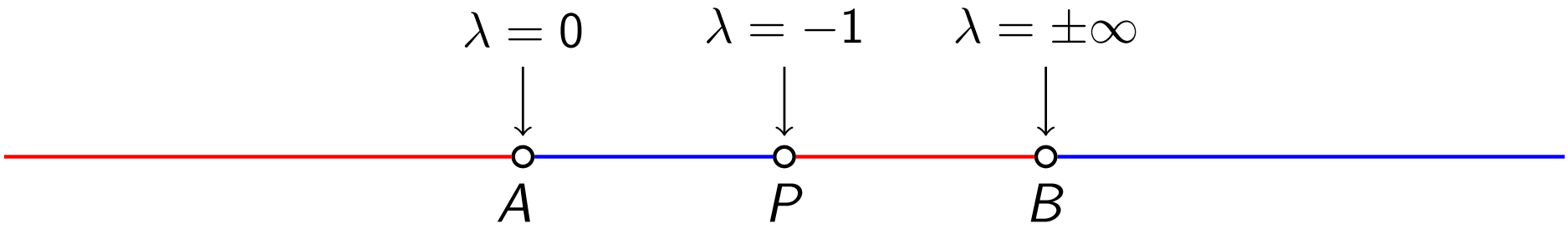
A
P
B


$\lambda = 0$
$\lambda = -1$
A
P
B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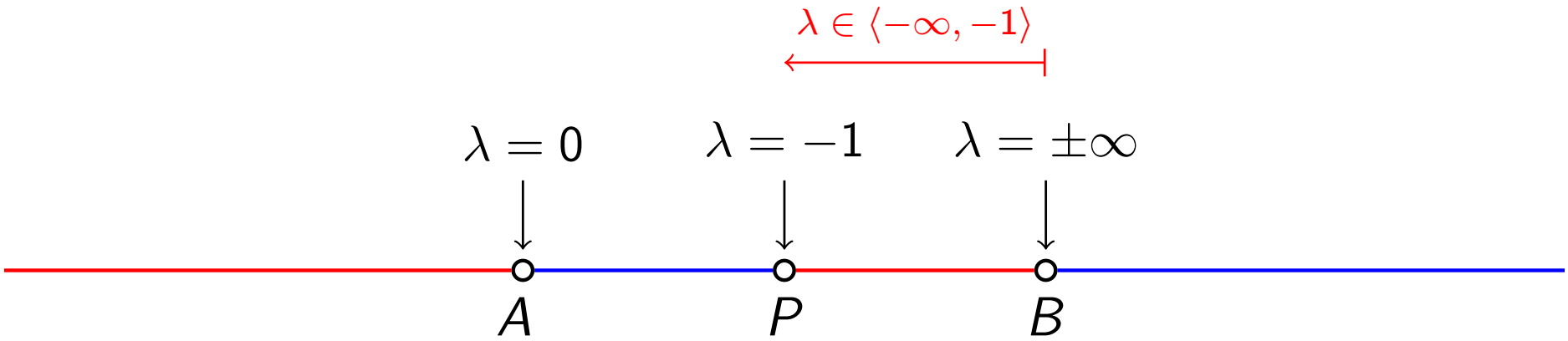
A
P
B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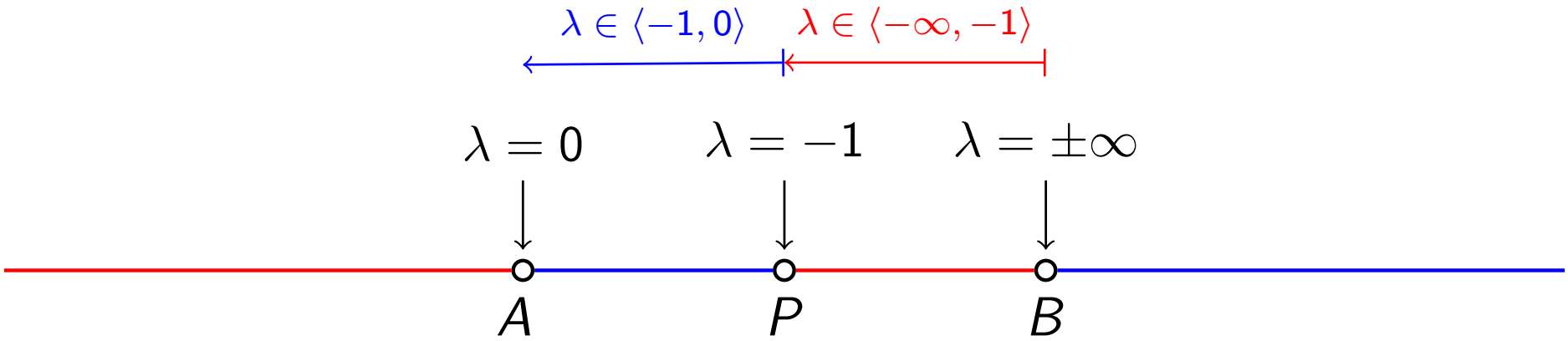
A
P
B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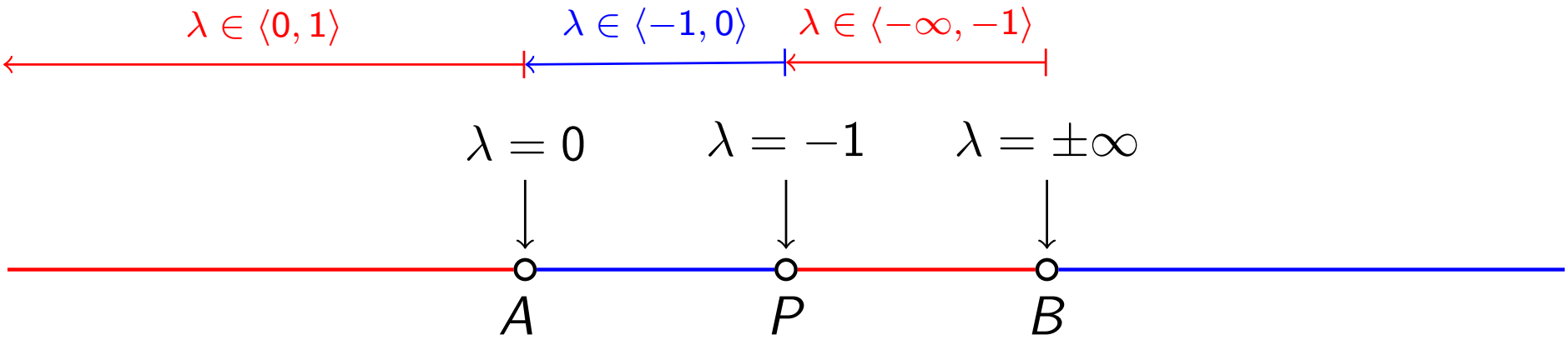
A
P
B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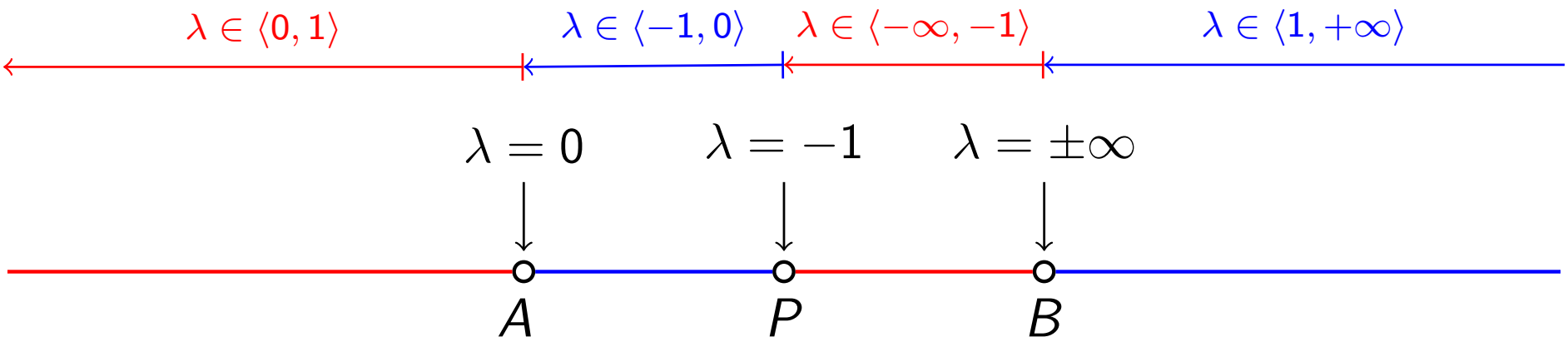
$\lambda = \pm\infty$
A
P
B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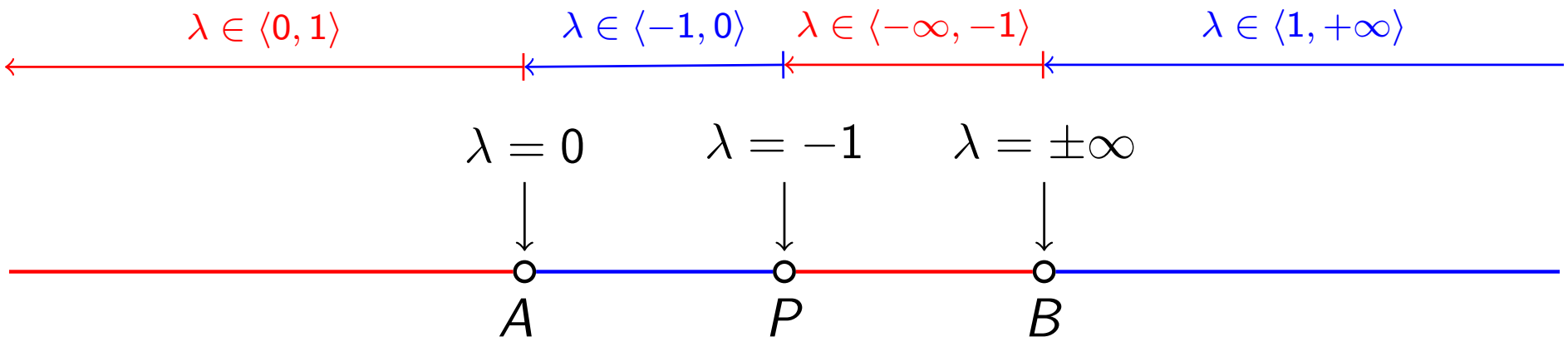
A
P
B



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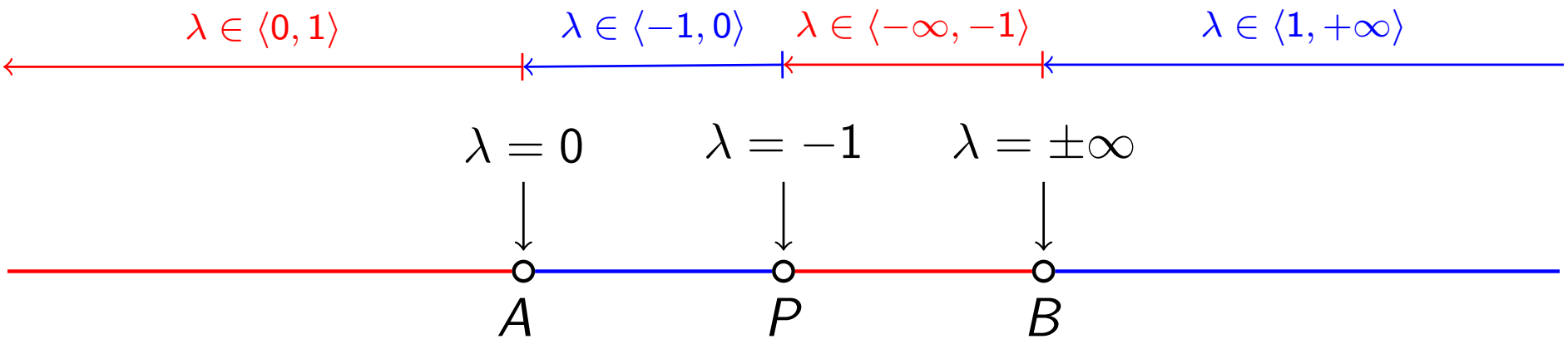

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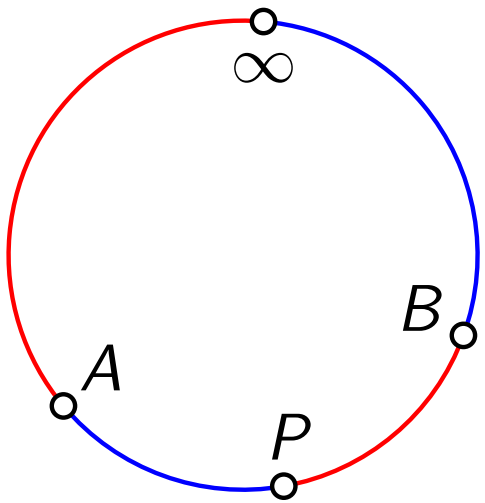

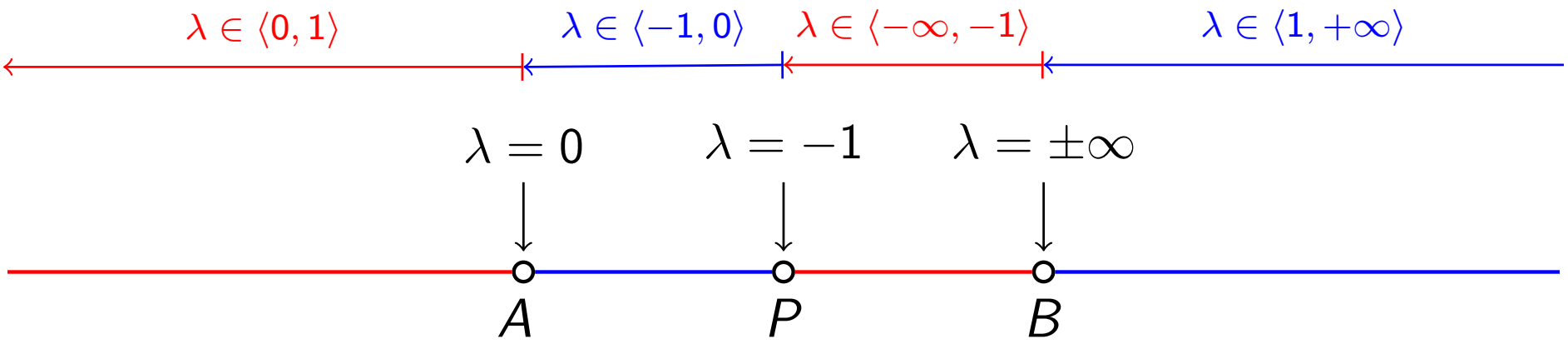

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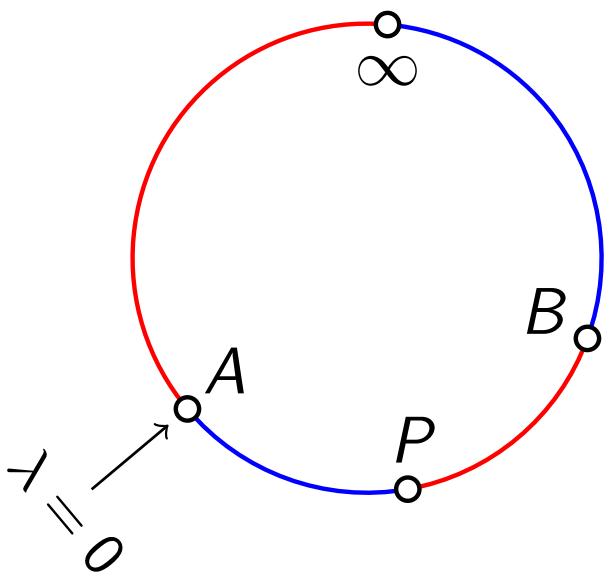

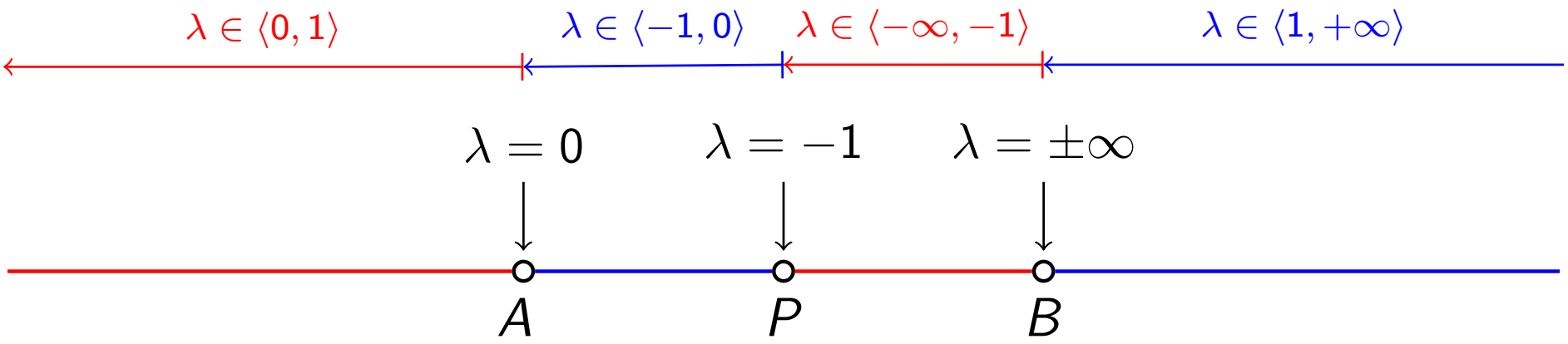

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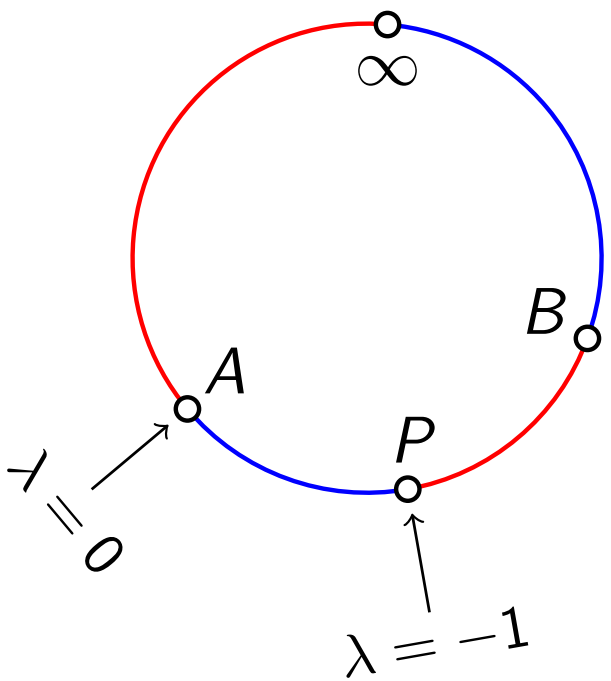

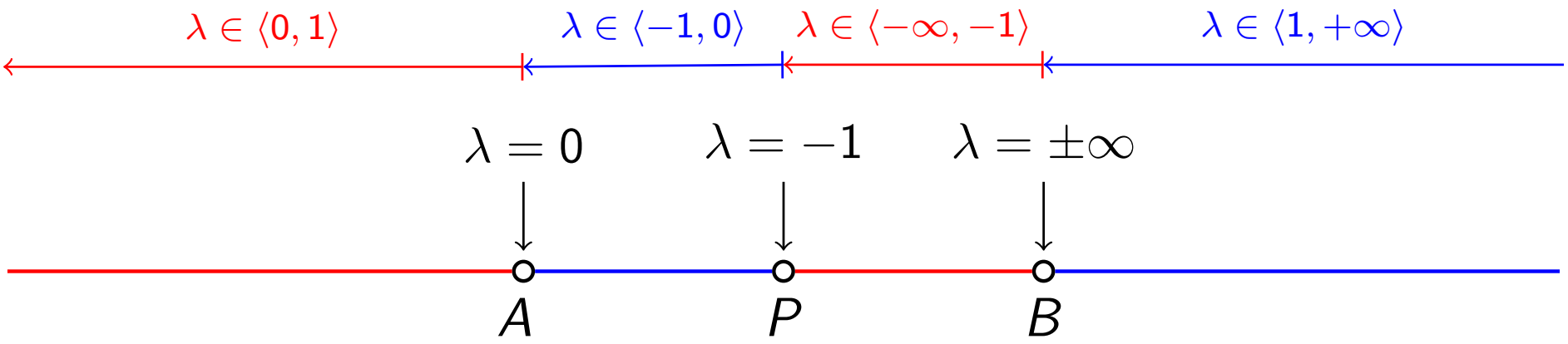

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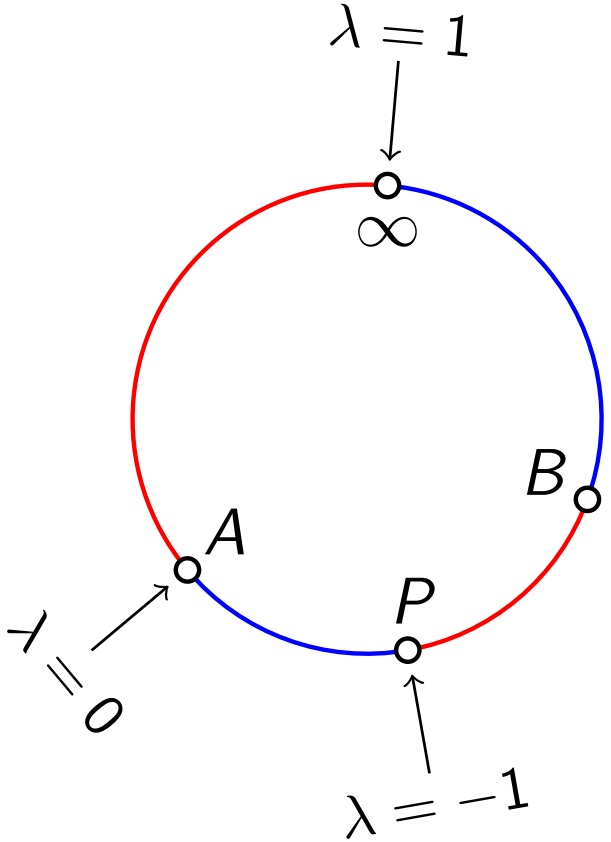

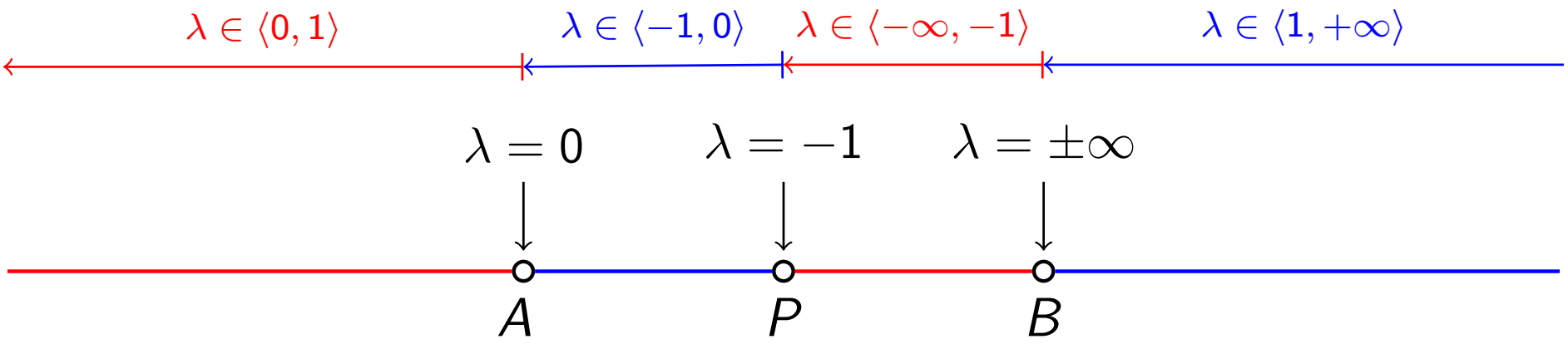

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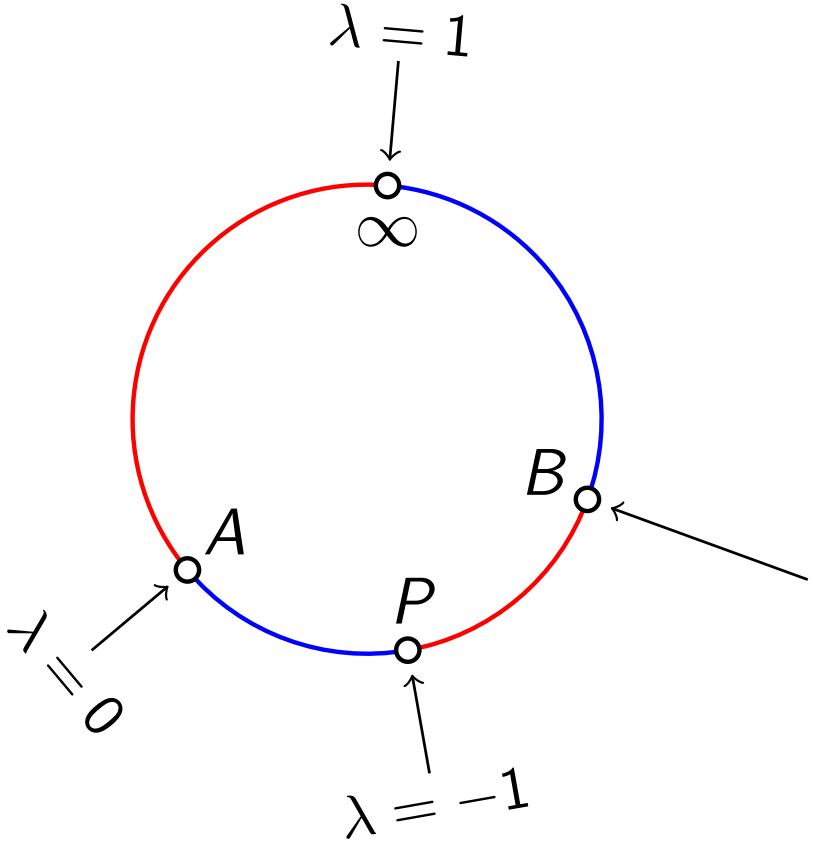

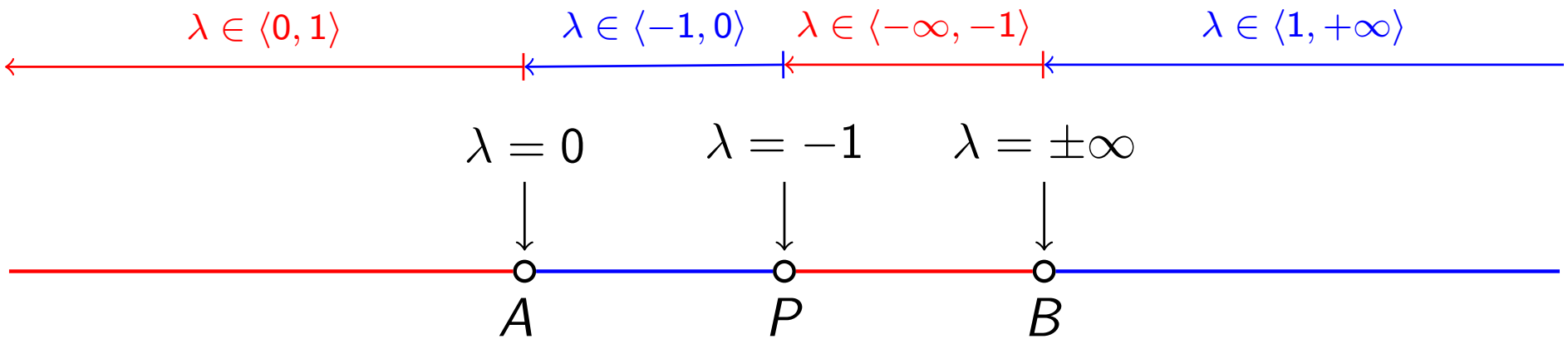

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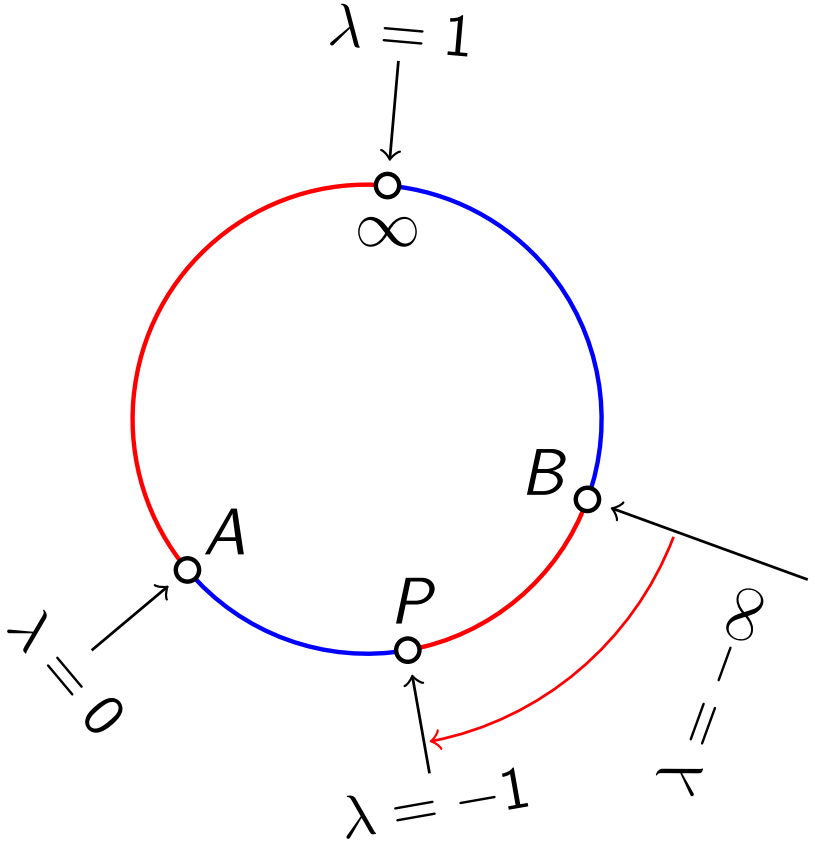

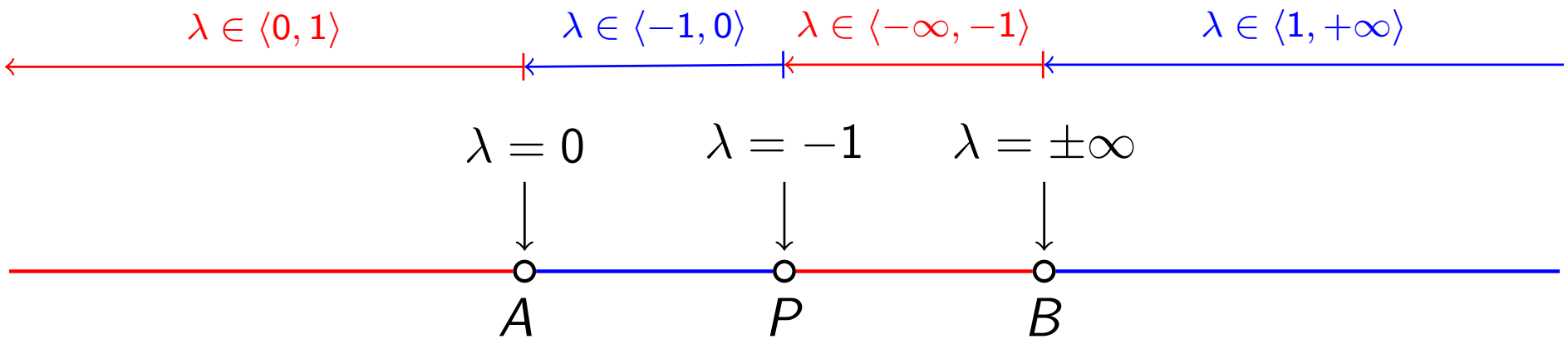

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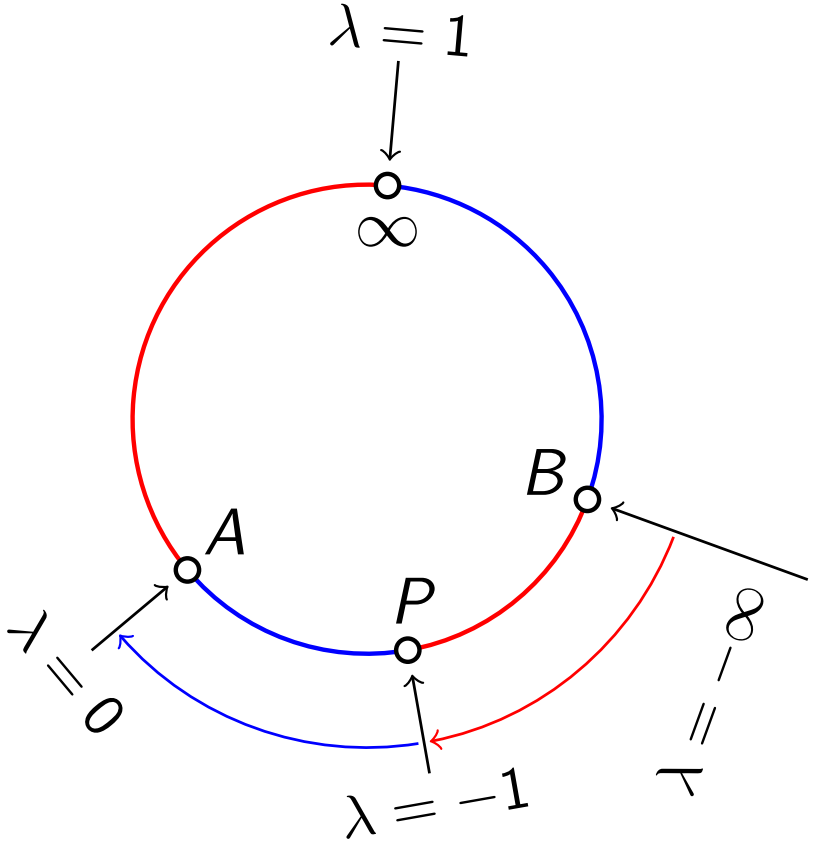

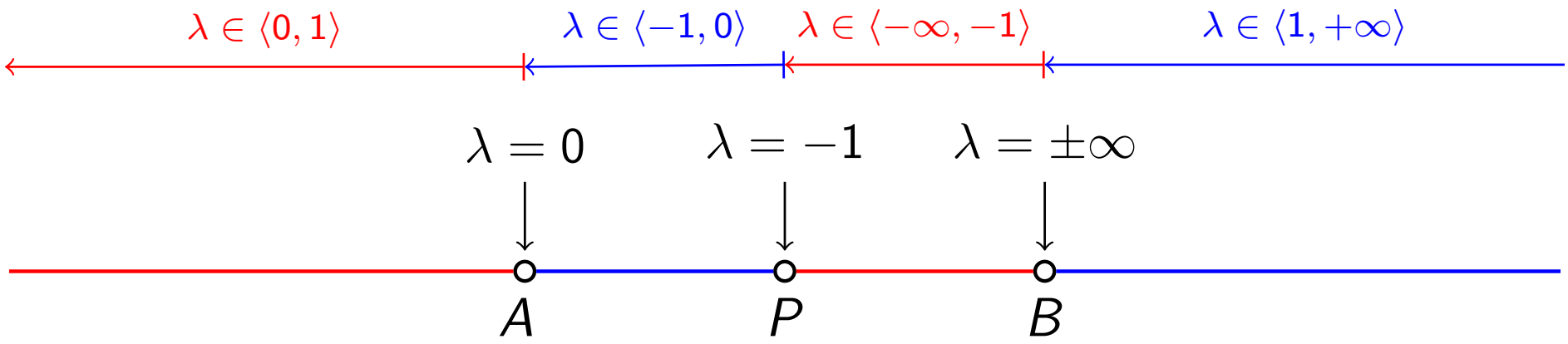

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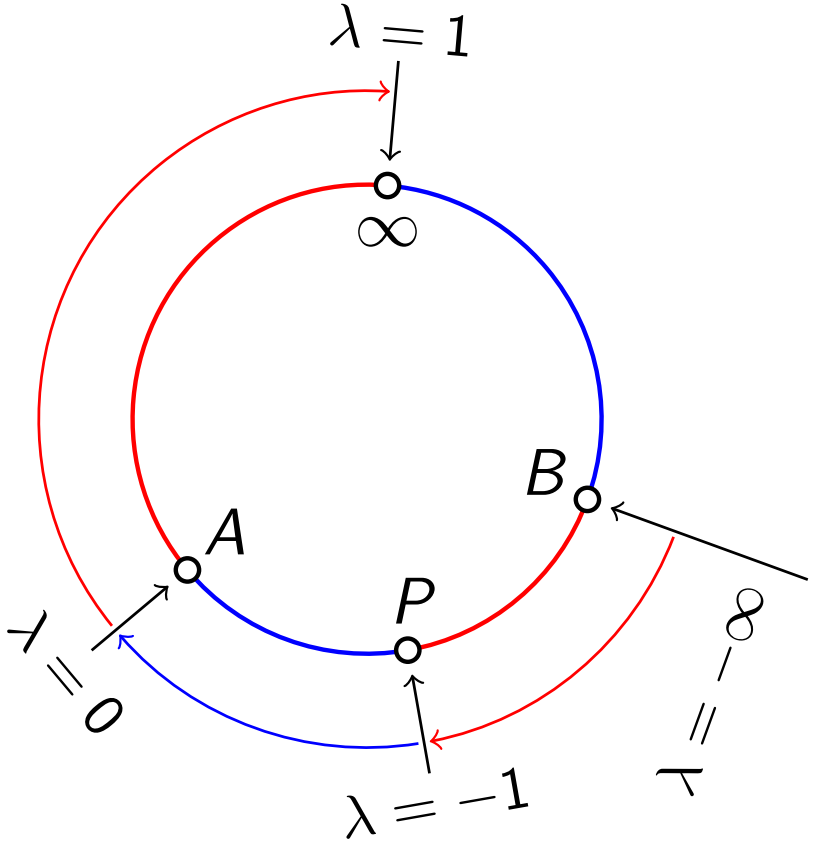

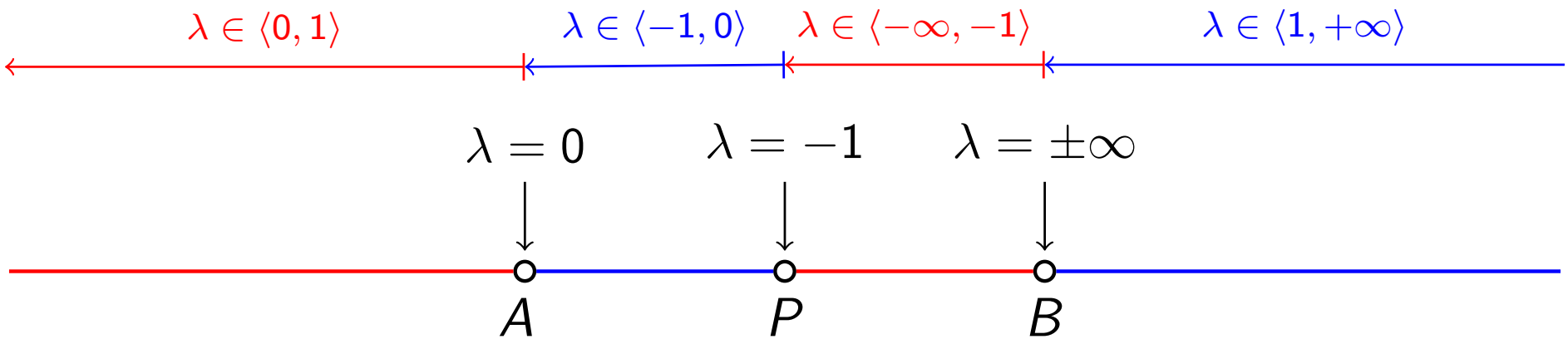
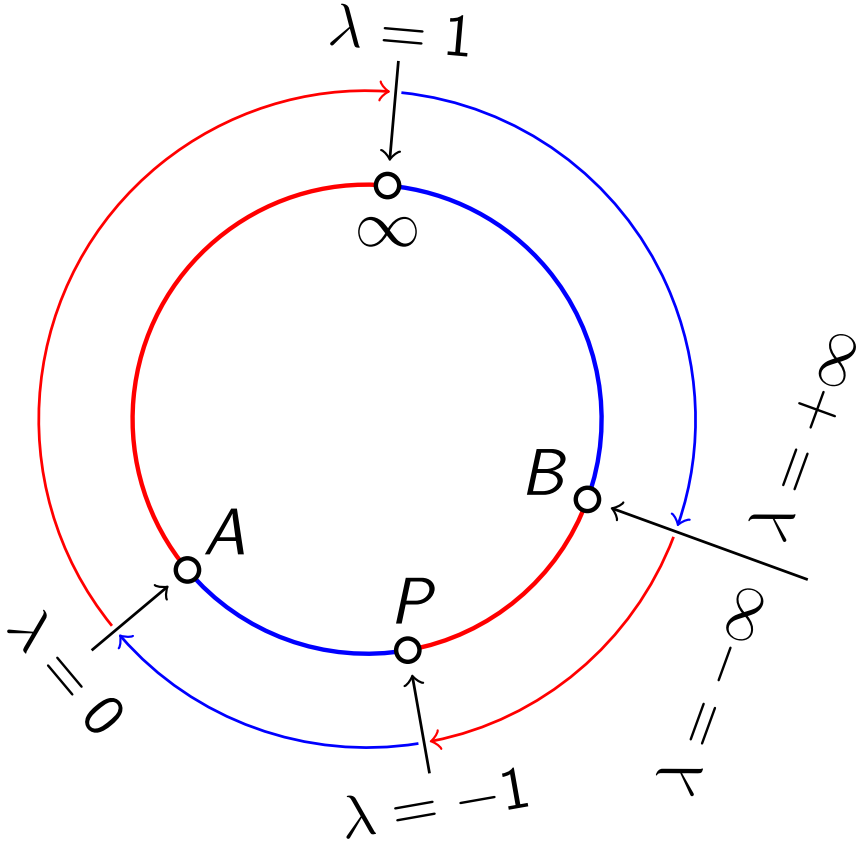
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