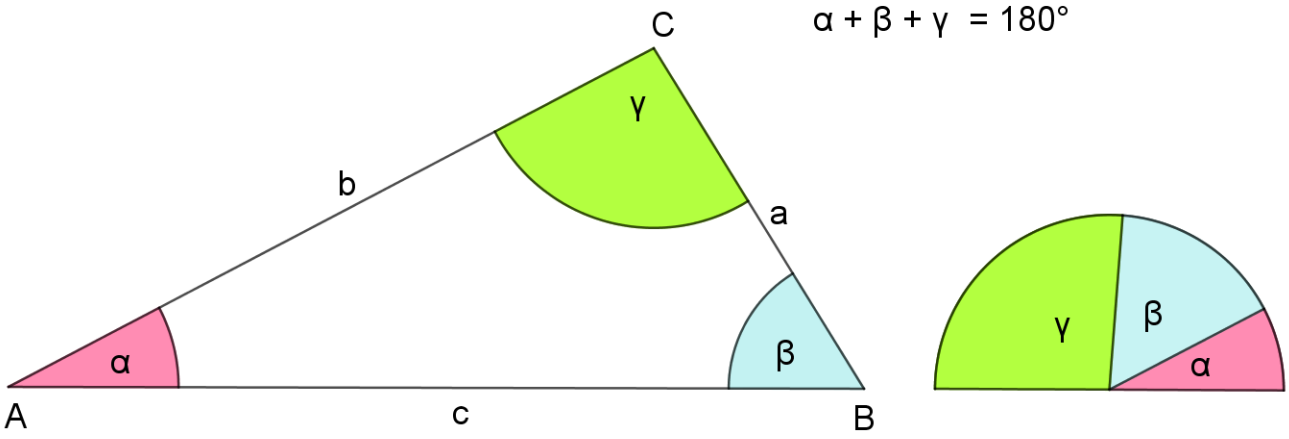
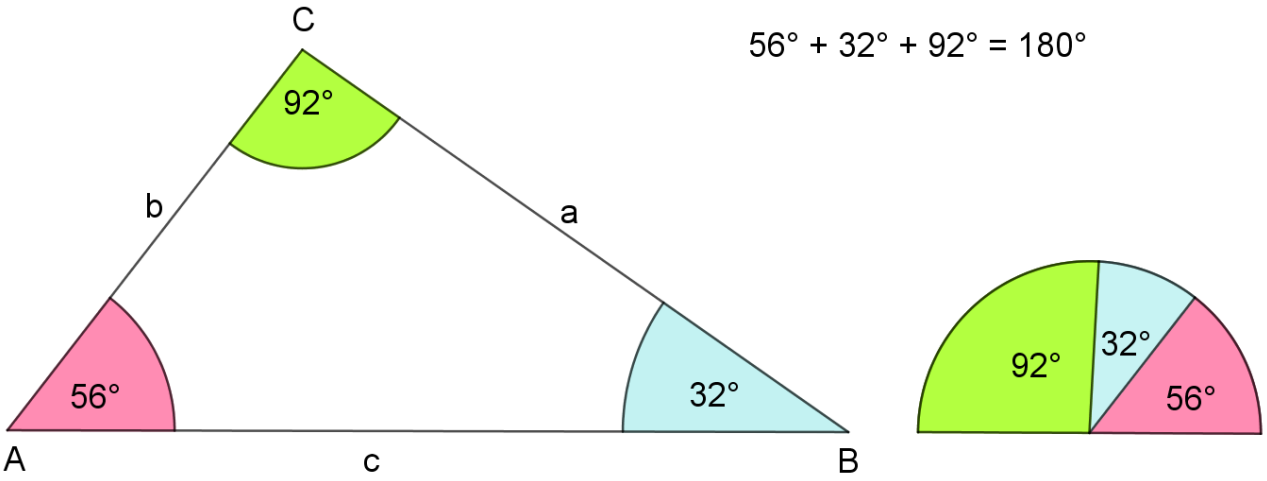
Uhly v trojuholníku

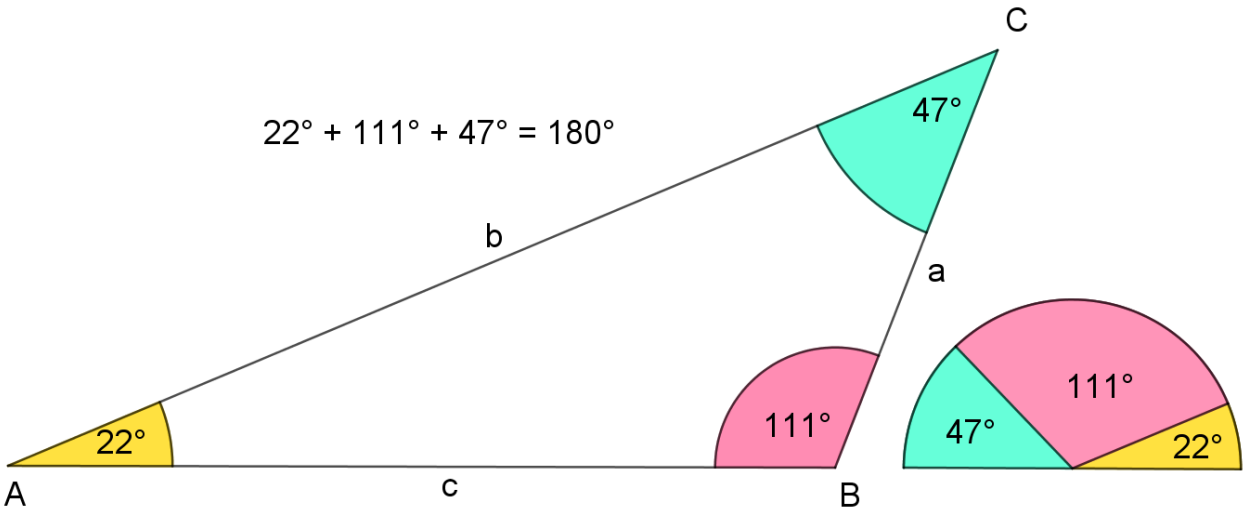
Vnútorné uhly trojuholníka

Súčet vnútorných uhlov v každom trojuholníku je **180°**



Napríklad





Vonkajšie uhly trojuholníka

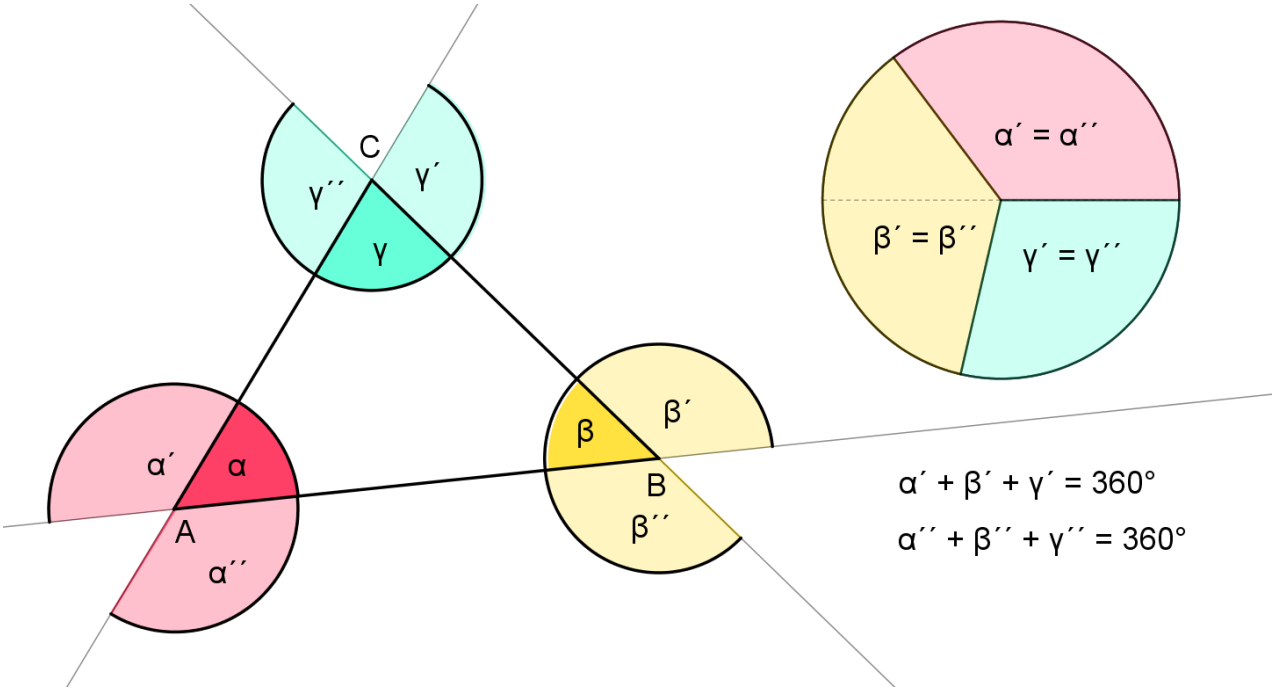
Pri každom vnútornom uhle trojuholníka ležia **dva vonkajšie uhly**, ktoré sú zhodné.

Súčet vnútorného a vonkajšie uhla je $180°$. Sú **navzájom susedné**.

Oba **vonkajšie uhly** pri každom vnútornom uhle trojuholníka sú **navzájom vrcholové**.

(napr. $\alpha' = \alpha''$)

Súčet vonkajších uhlov je $360°$



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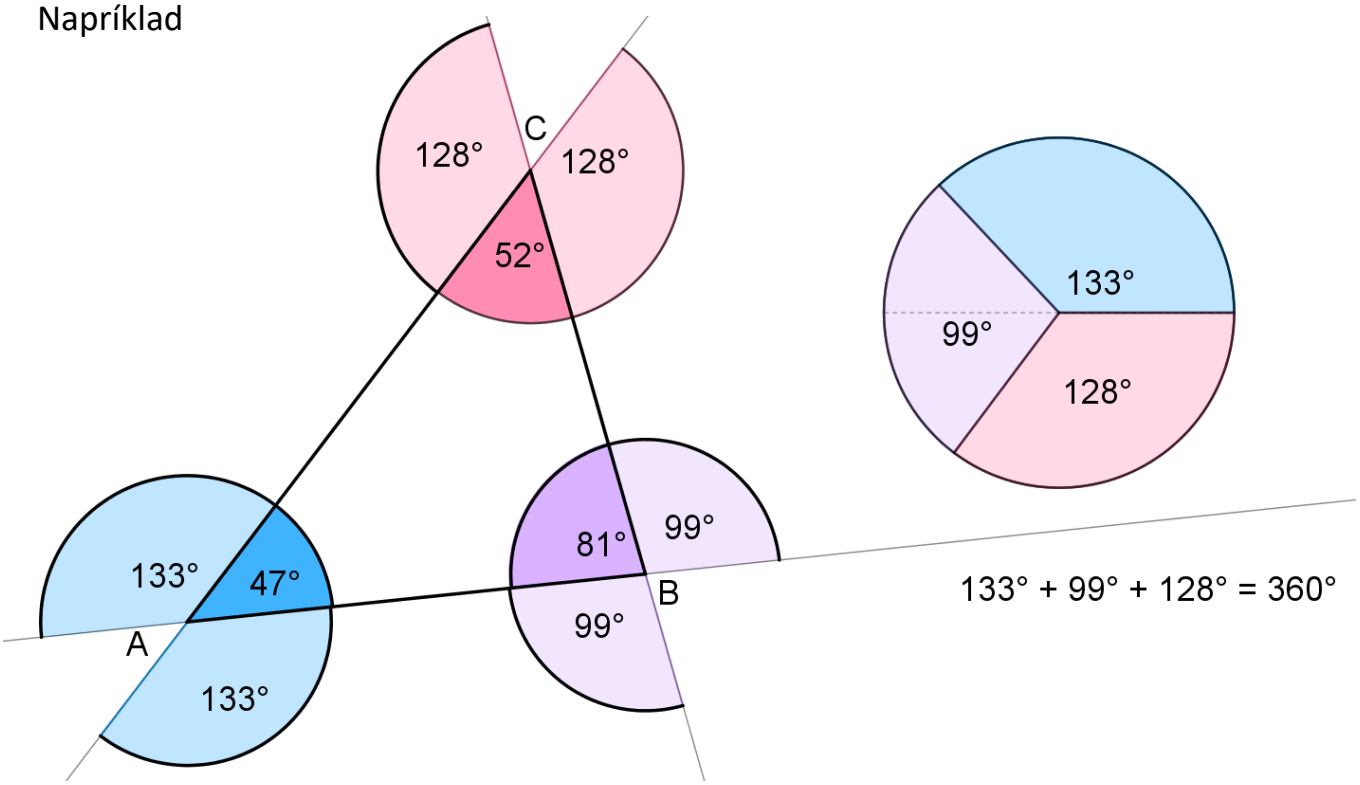
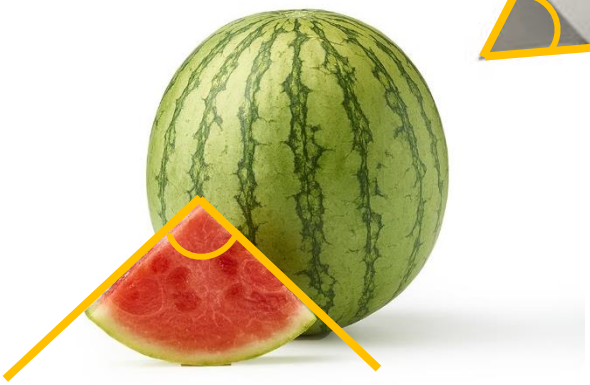
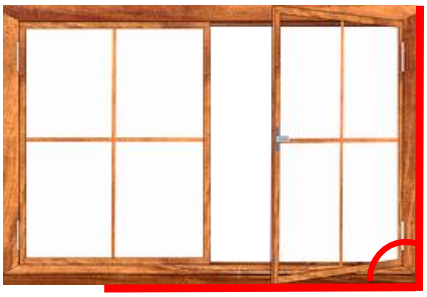


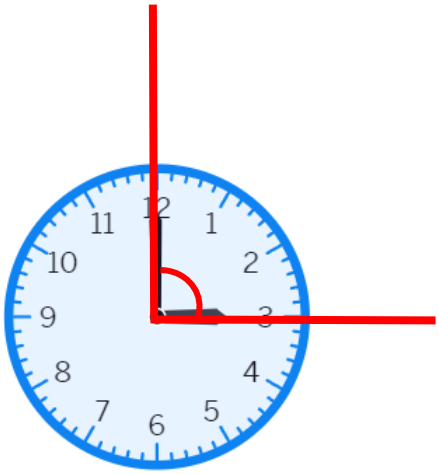
Uhly rozdeľujeme na :

Ostrý uhol $\alpha < 90°$

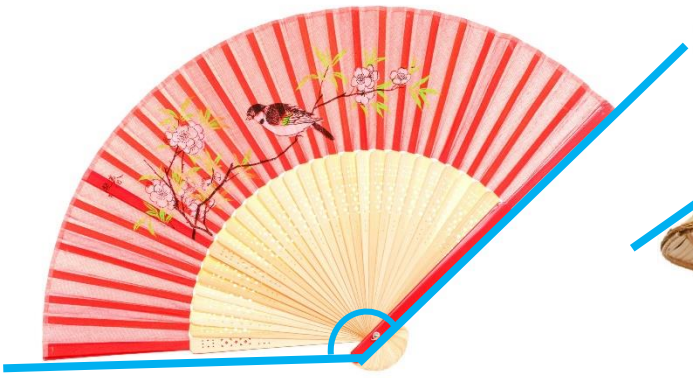


Pravý uhol $\alpha = 90°$



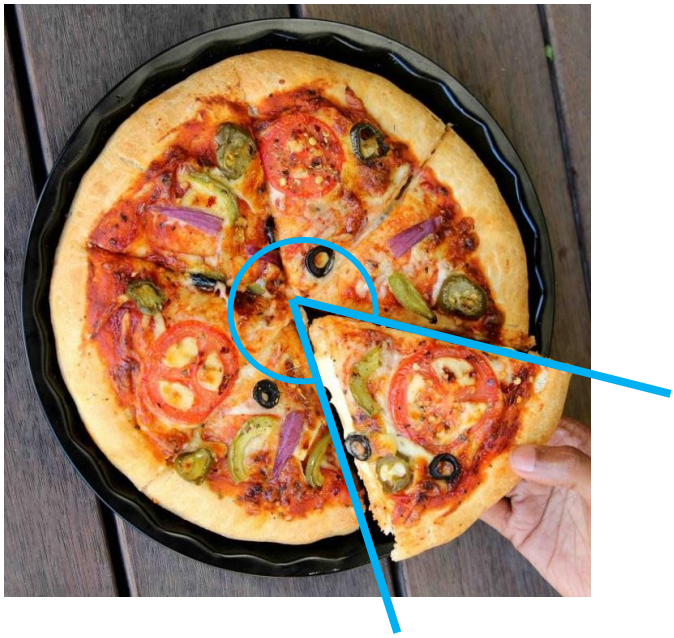


Tupý uhol $90° < \alpha < 180°$



Priamy uhol $\alpha = 180°$

Uhol väčší ako priamy $180° < \alpha < 360°$



Ako označujeme uhol?

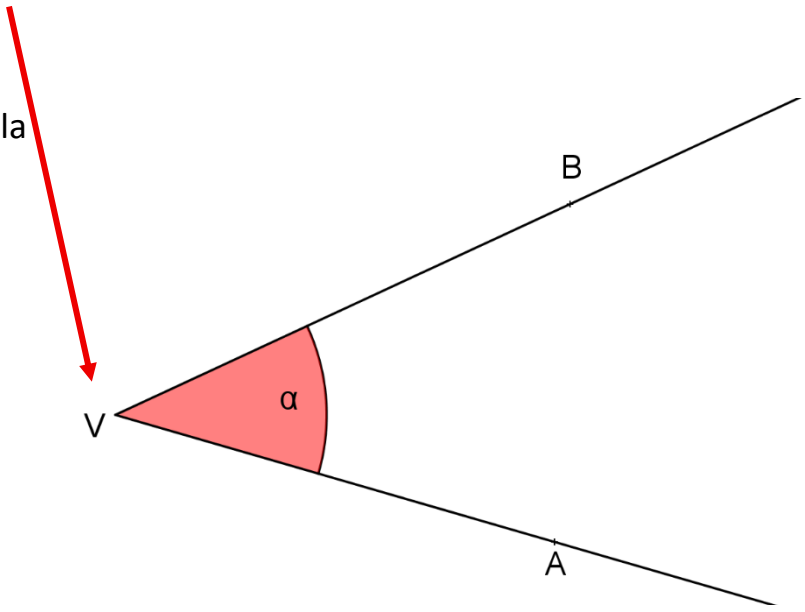
Na zostrojenie uhla potrebujeme **tri body**, ktoré neležia na jednej priamky

Na obrázku je uhol AVB. Zapisujeme ako $\sphericalangle AVB$.

Na označenie uhla môžeme použiť aj písmená gréckej abecedy $\alpha, \beta, \gamma, \delta, \varepsilon, \ldots$

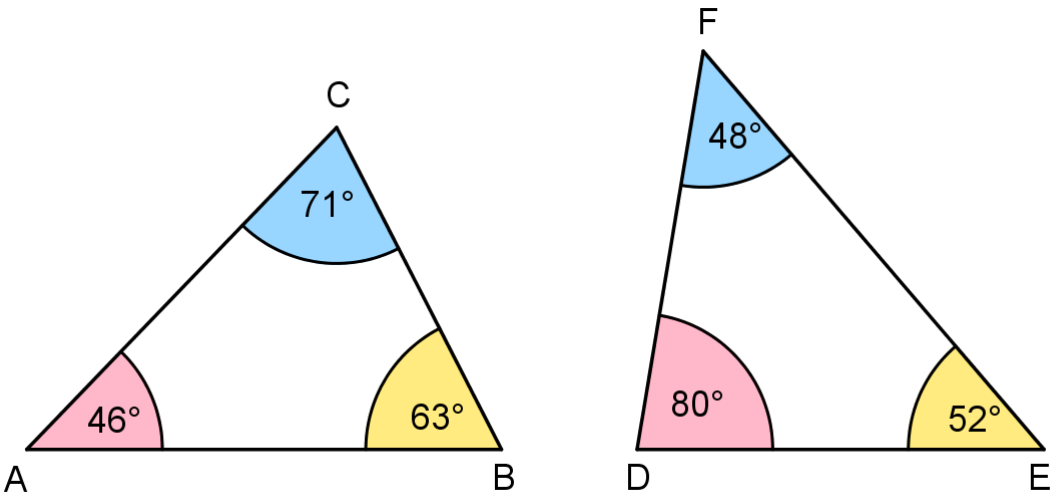
Pozor ! Prostredné písmeno $\sphericalangle A\boldsymbol{V}B$ označuje bod, ktorý je vrcholom uhla.

Polpriamky $\overrightarrow{VA}$, $\overrightarrow{VB}$ sú ramená uhla

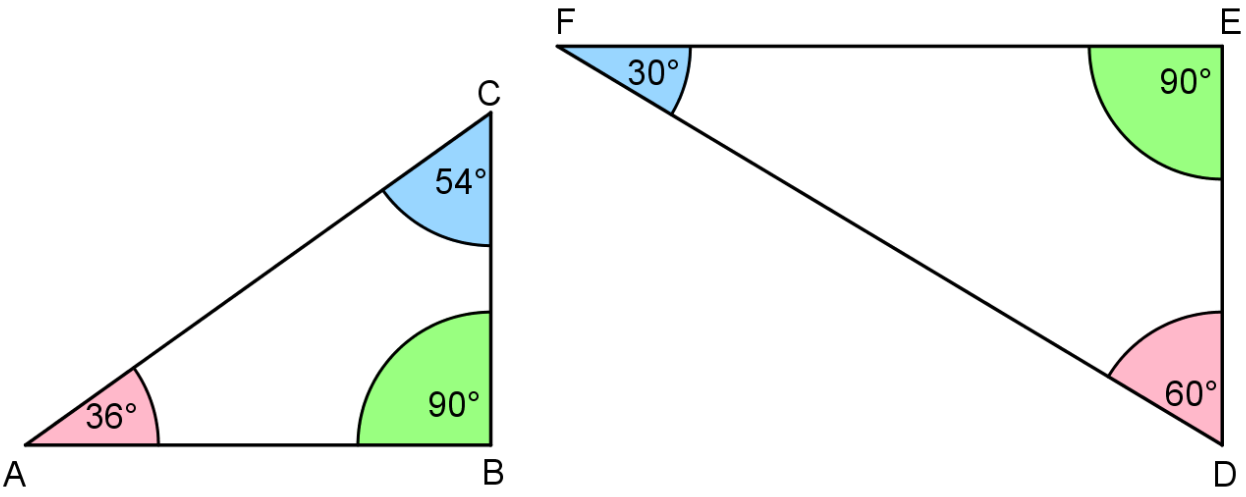


Trojuholník môže byť :

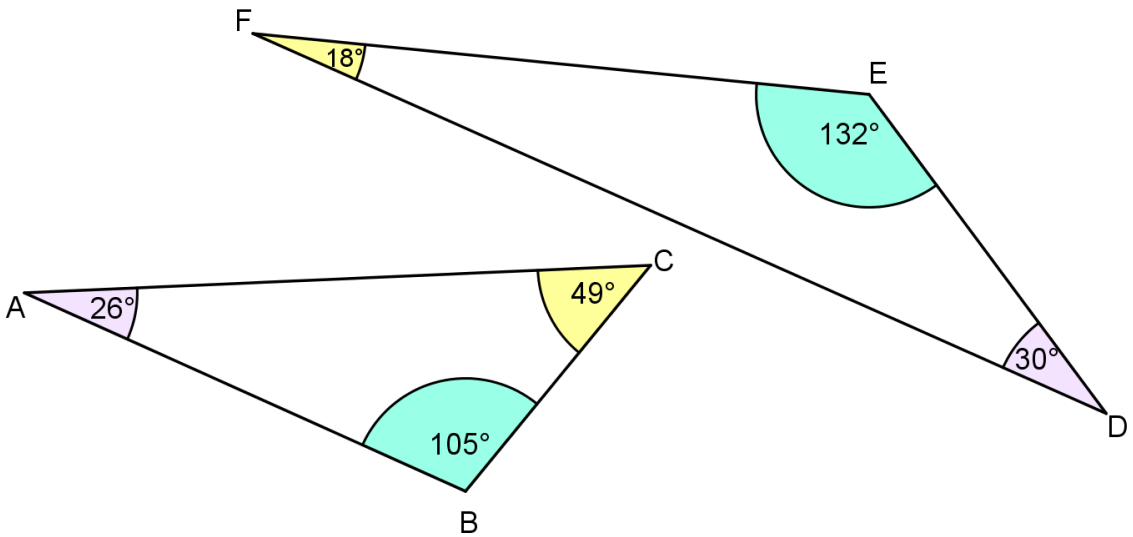
- **Ostrouhlý** – má všetky uhly ostré



- **Pravouhlý** – jeden uhol pravý a dva ostré



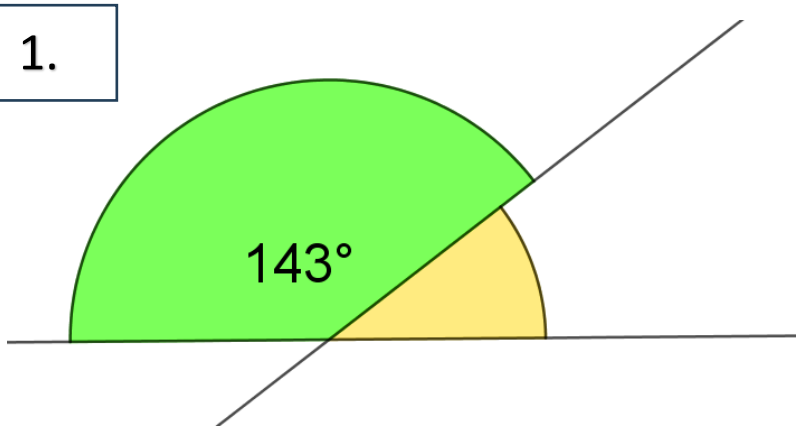
- **Tupouhlý** – jeden uhol tupý a dva ostré



Pár zvedavých otázok ☺

- Koľko najviac pravých uhlov môže mať jeden trojuholník?
- Môže mať jeden trojuholník jeden uhol ostrý, jeden pravý a jeden tupý?
- Koľko najmenej a koľko najviac ostrých uhlov môže mať jeden trojuholník?

1.



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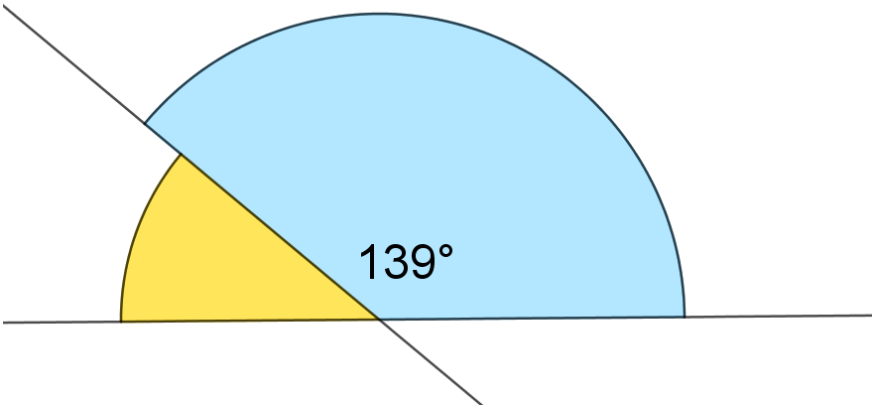

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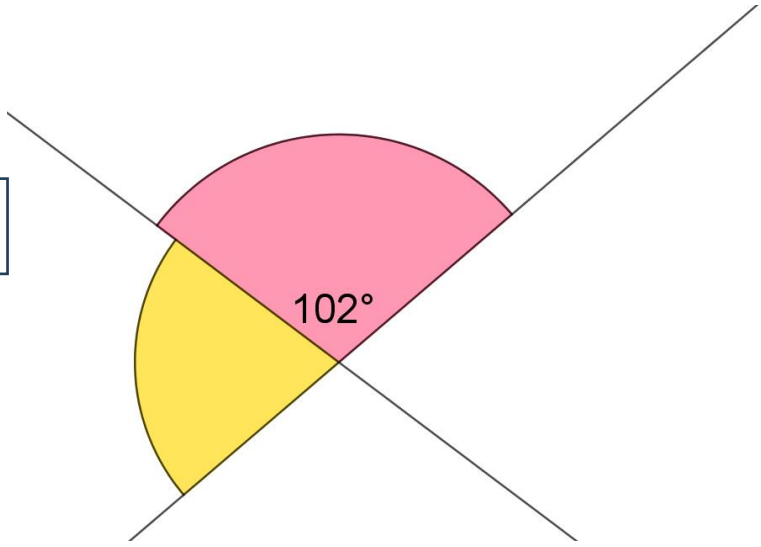

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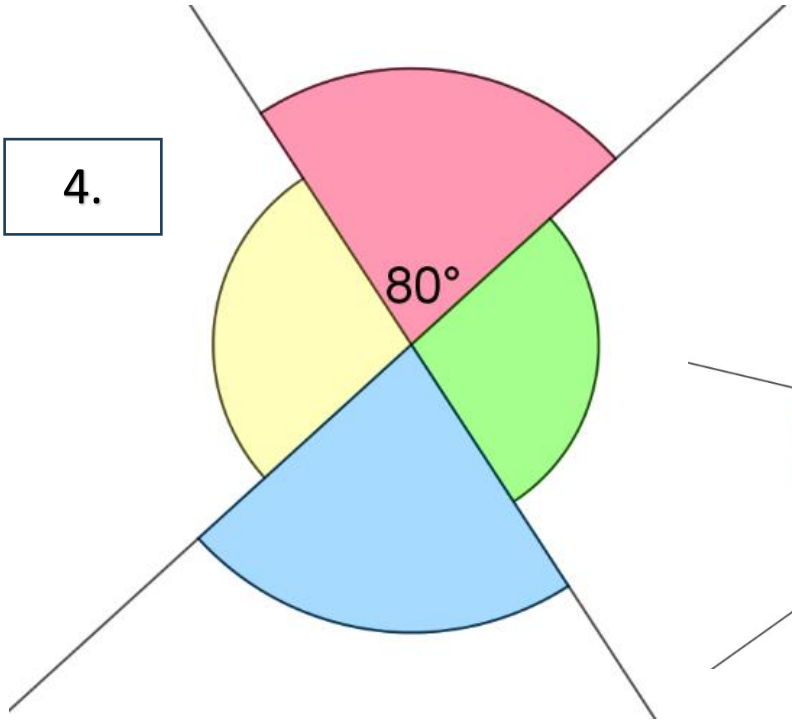

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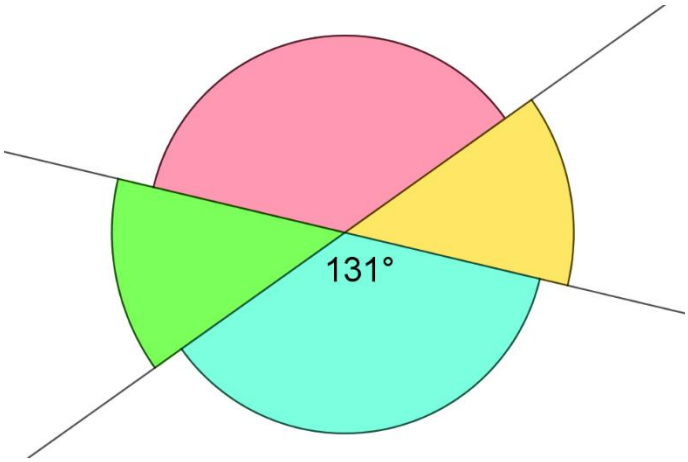

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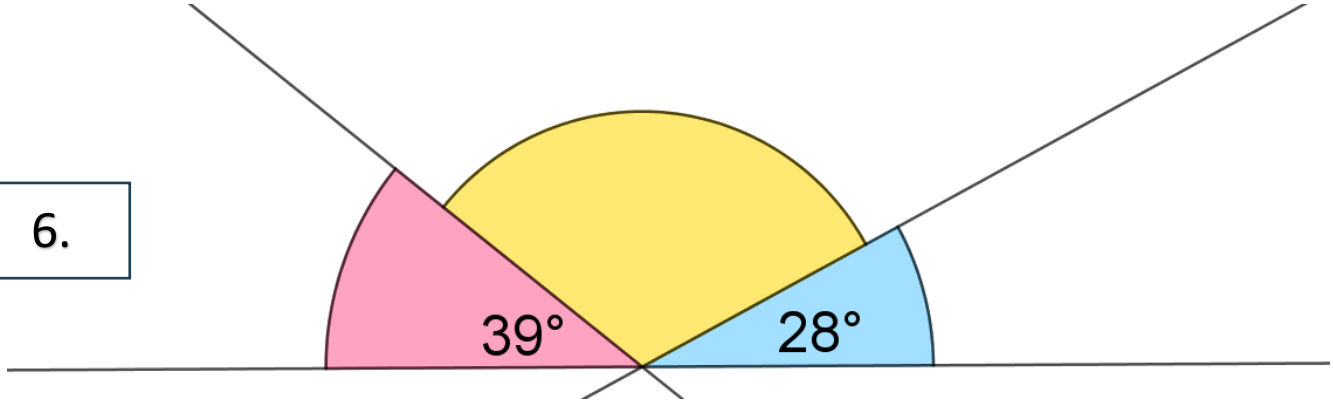

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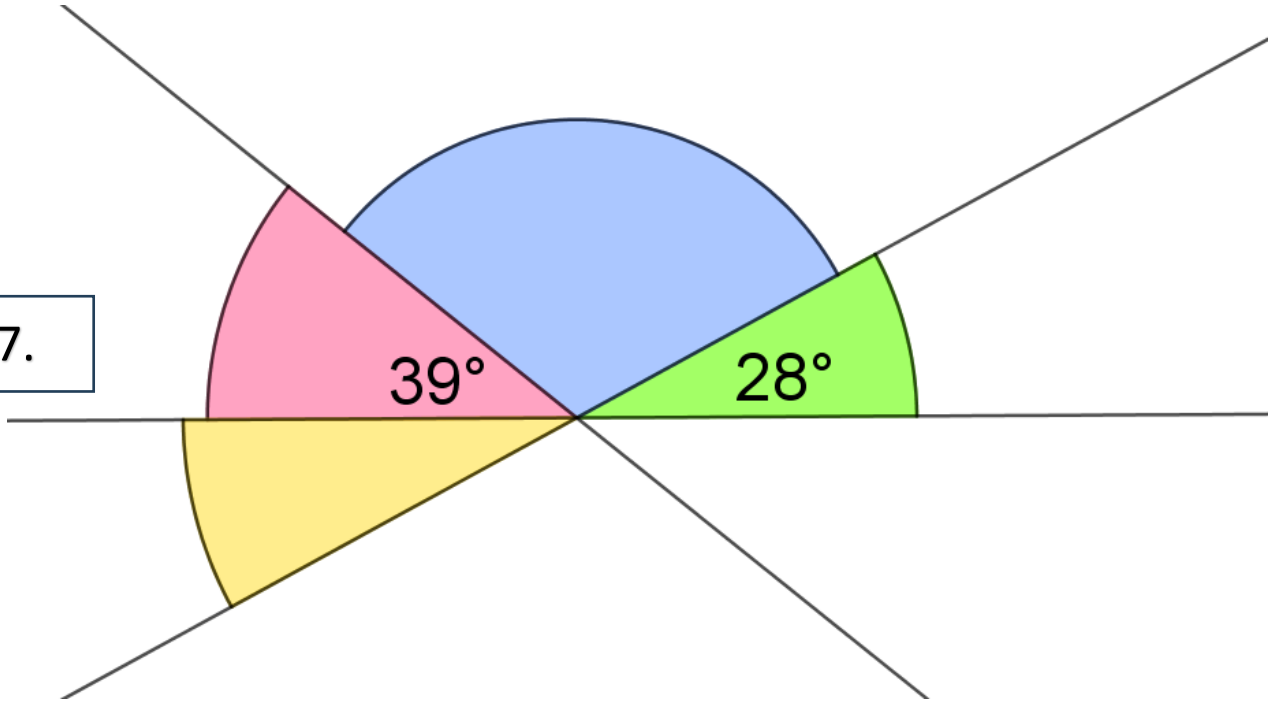

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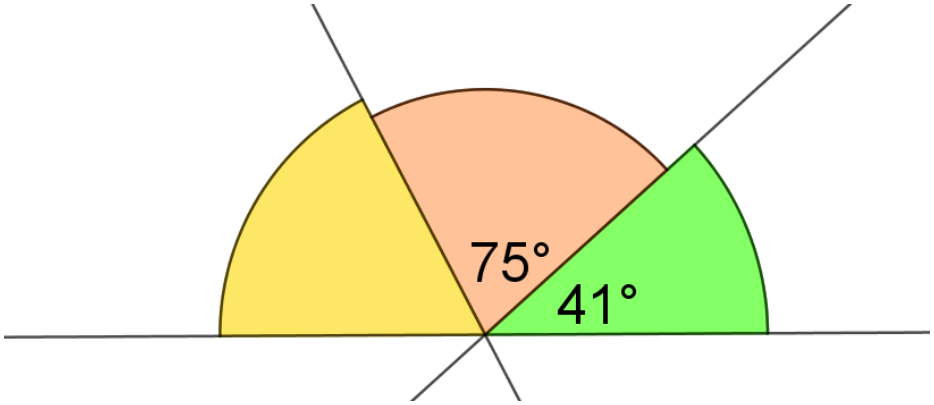

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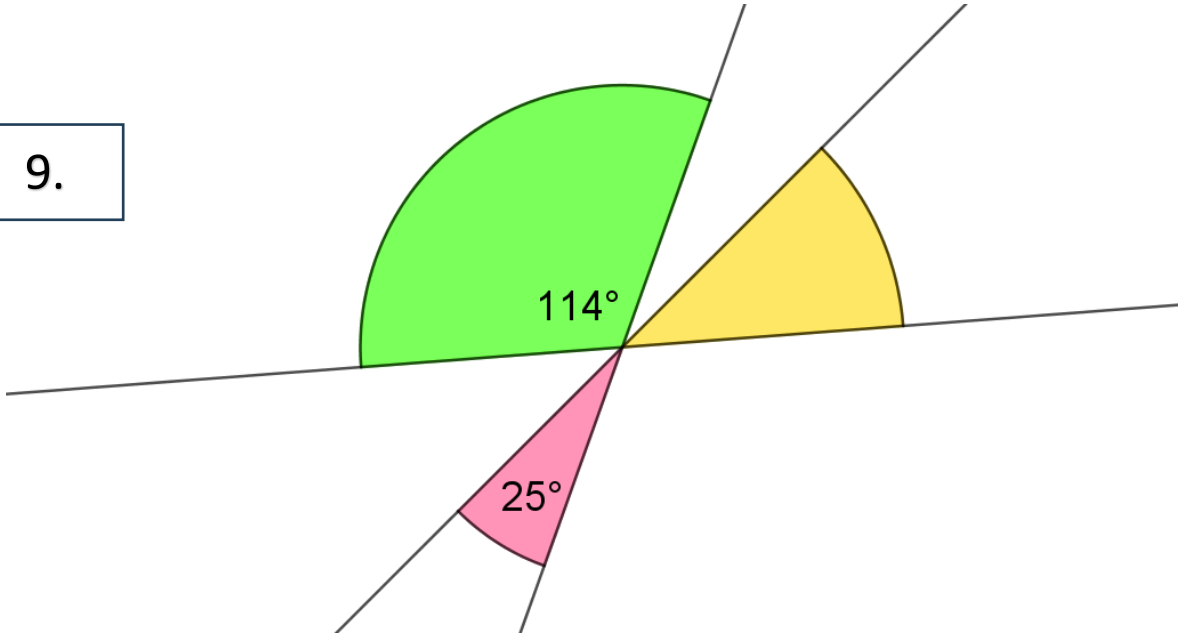

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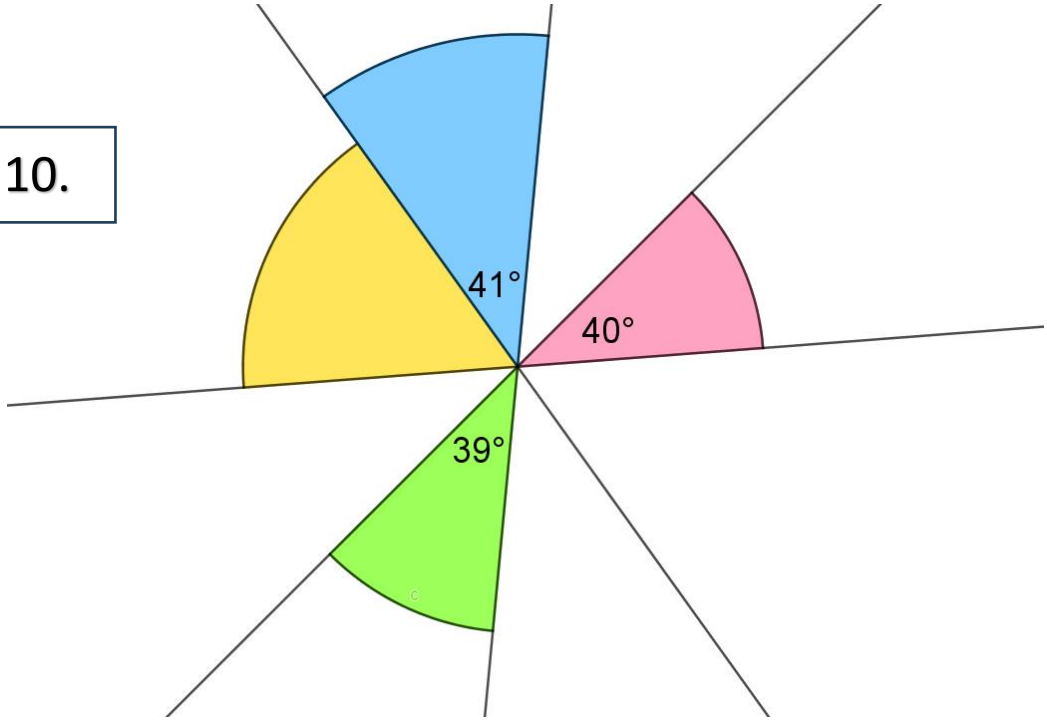

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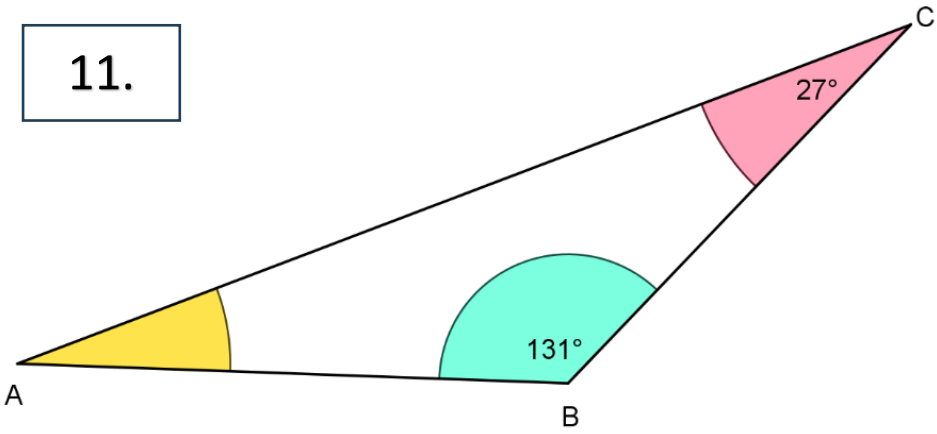

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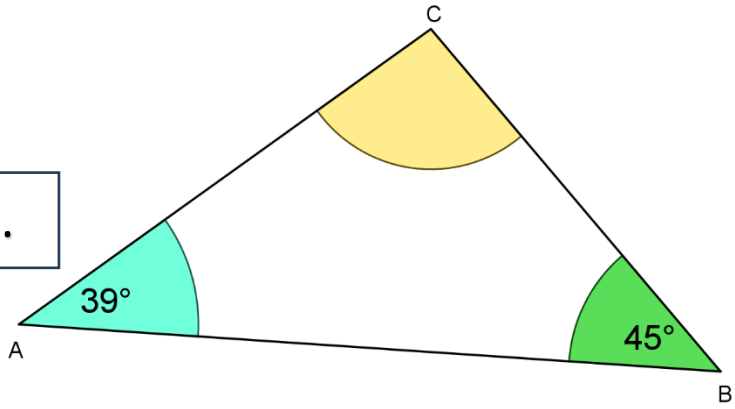

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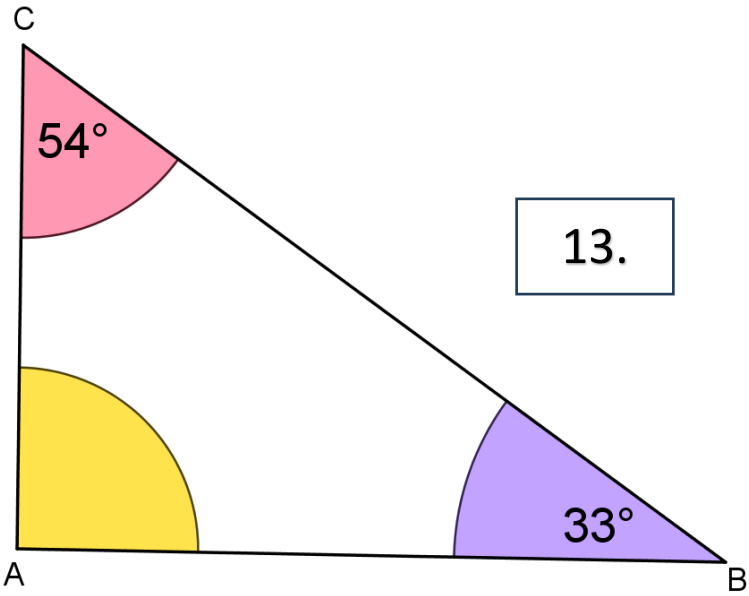

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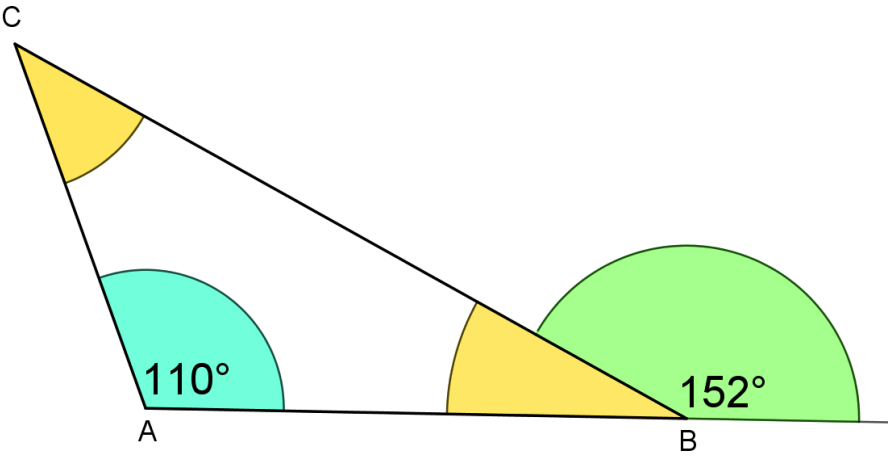

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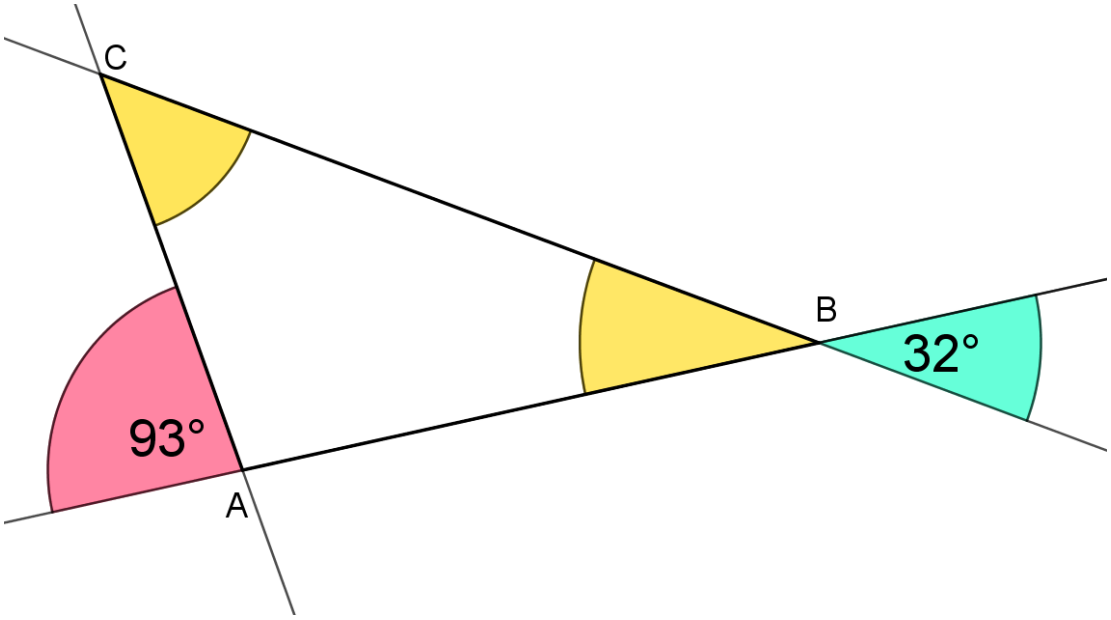

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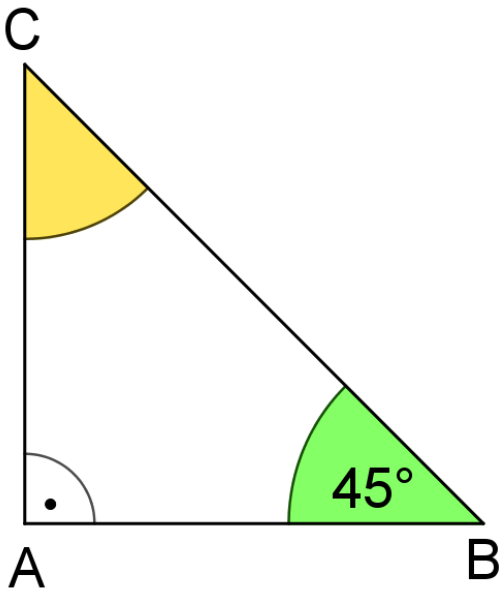
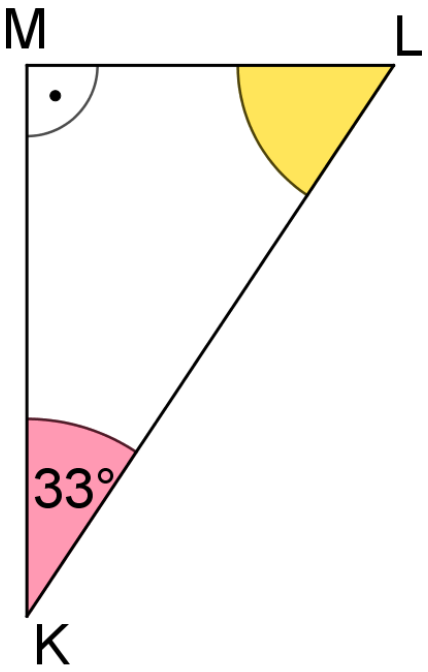
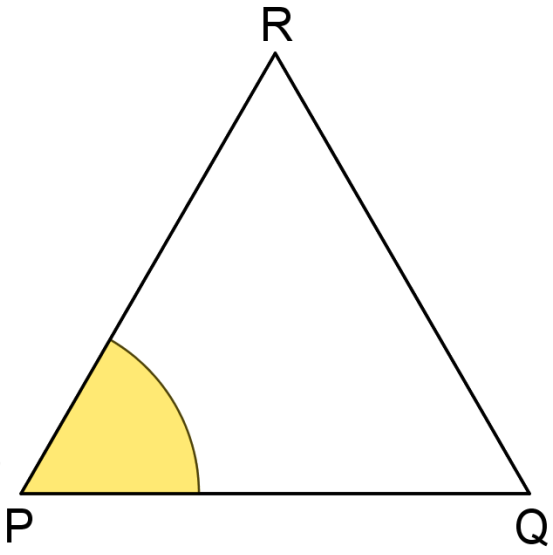


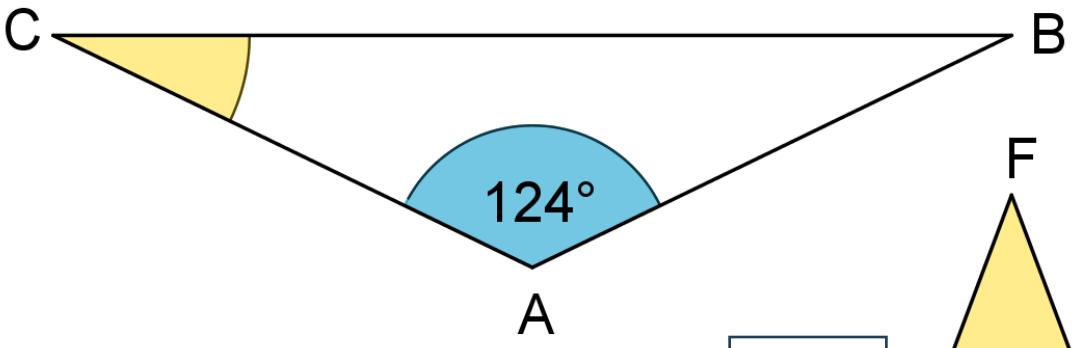


17.

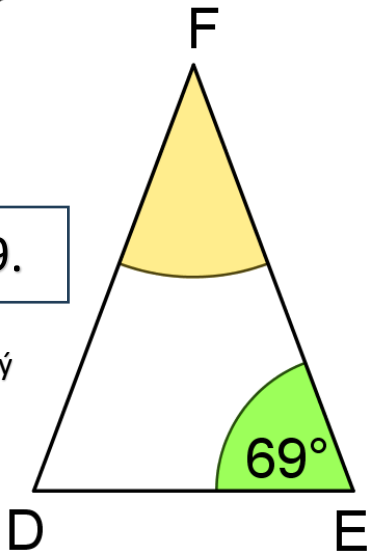
Trojuholník PQR je rovnostranný



18. Trojuholník ABC je rovnoramenný



19. Trojuholník DEF je rovnoramenný



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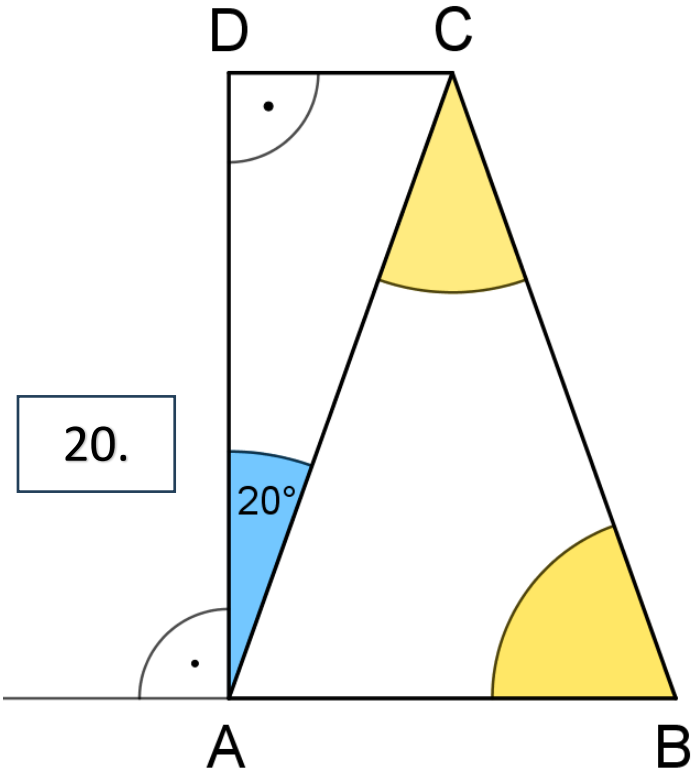
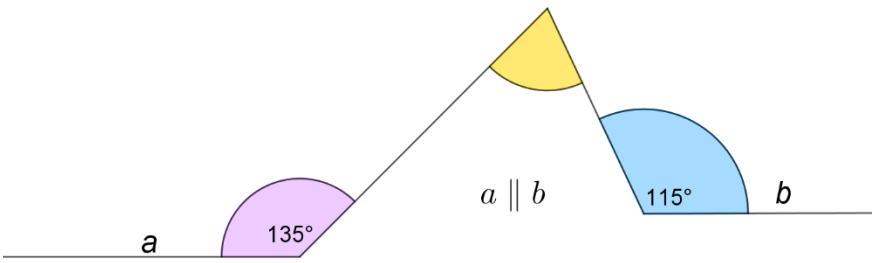


Trojuholník ABC je rovnoramenný

21.



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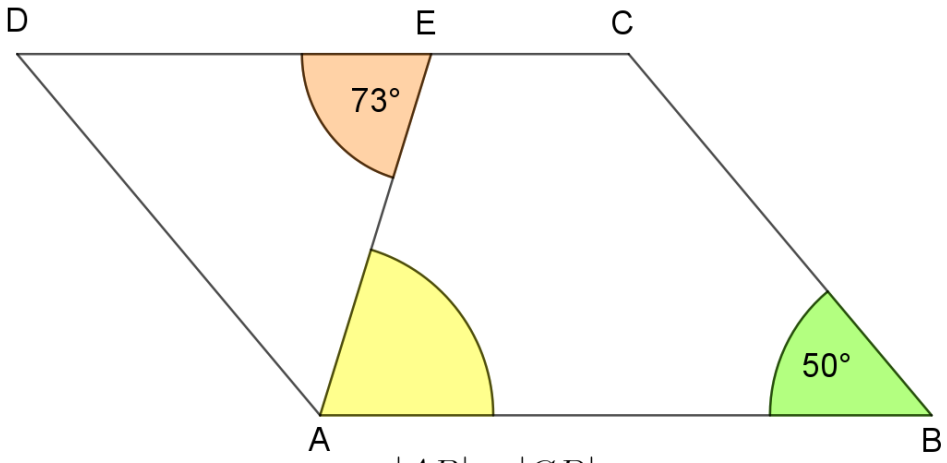
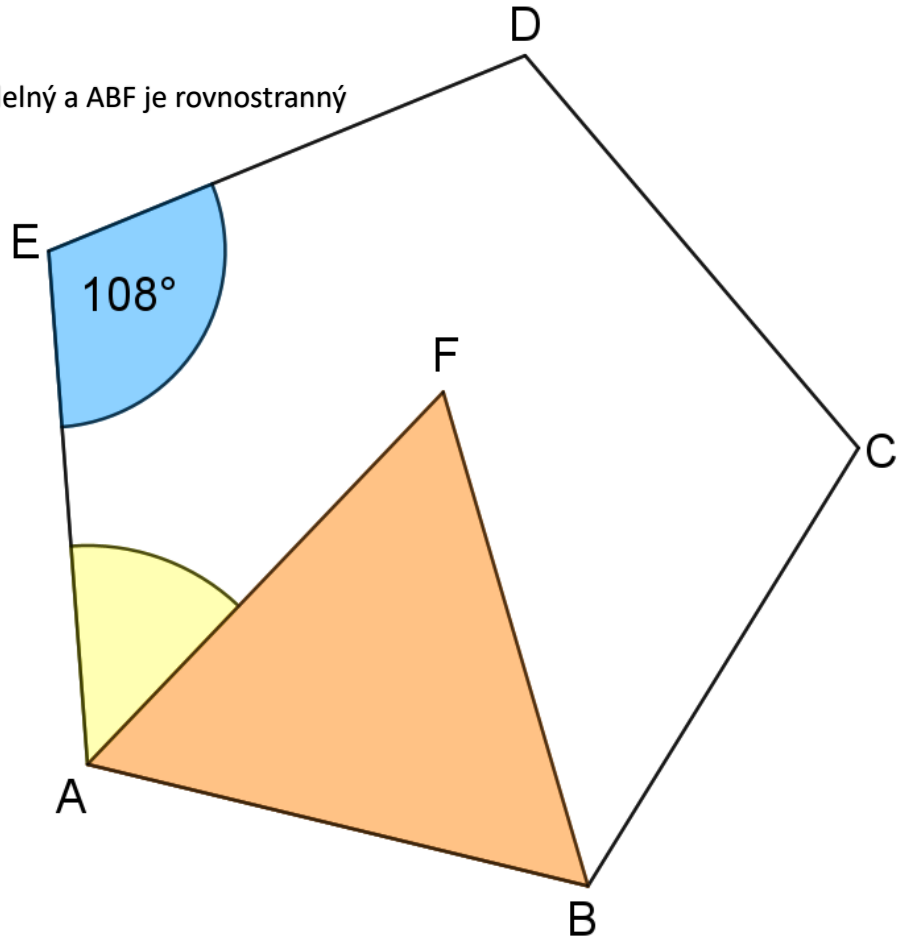


$$|AB| = |CD|$$

$$|BC| = |AD|$$

23.

Päťuholník $ABCDE$ je pravidelný a ABF je rovnostranný



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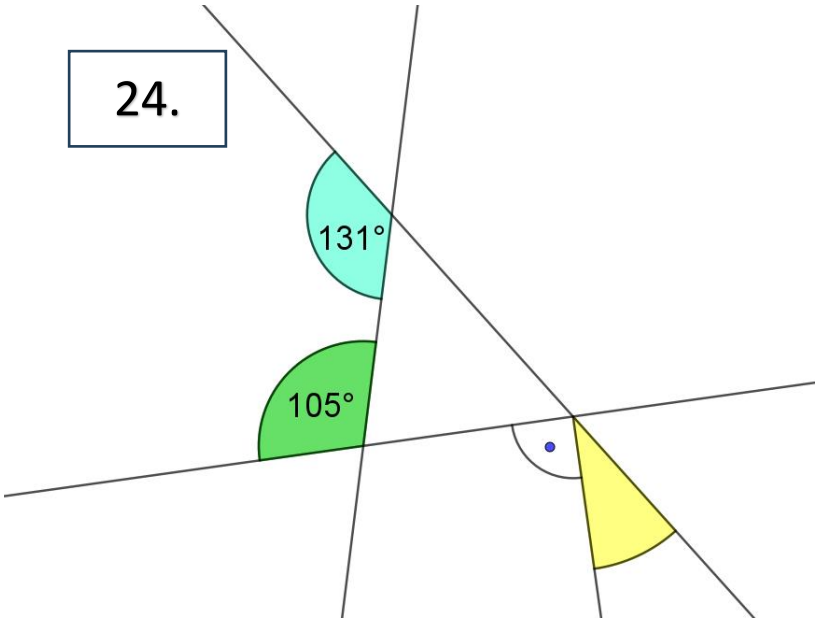

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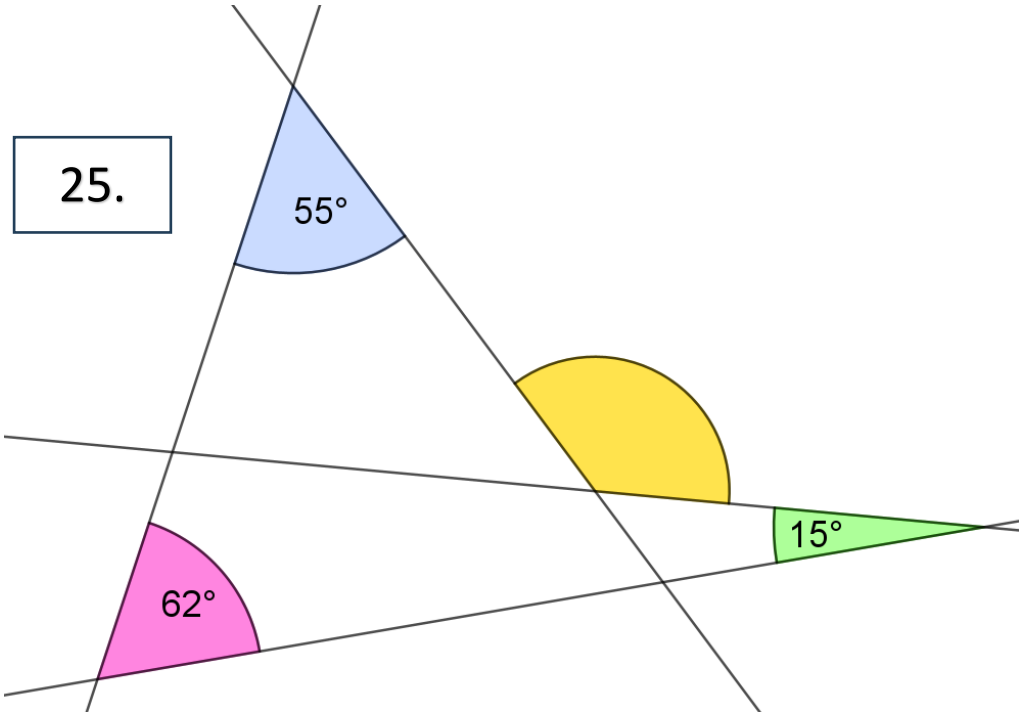

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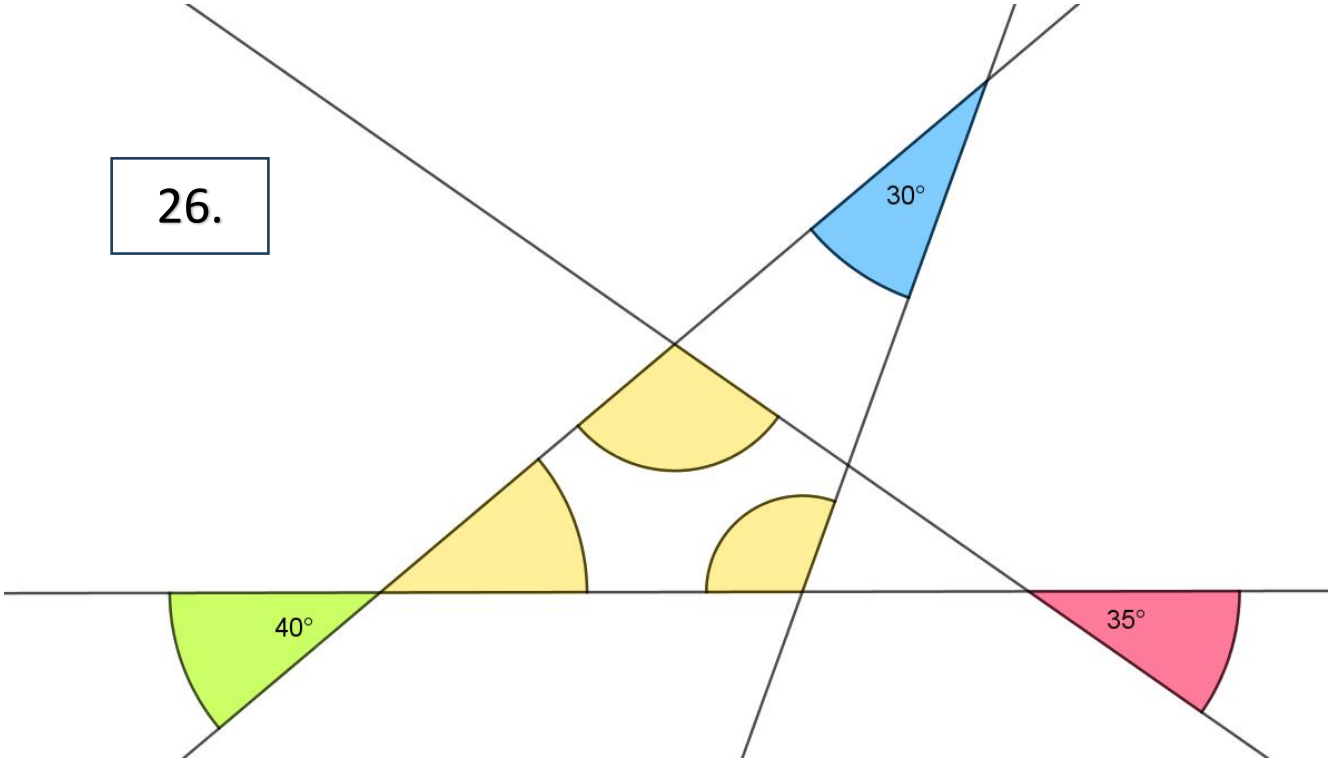

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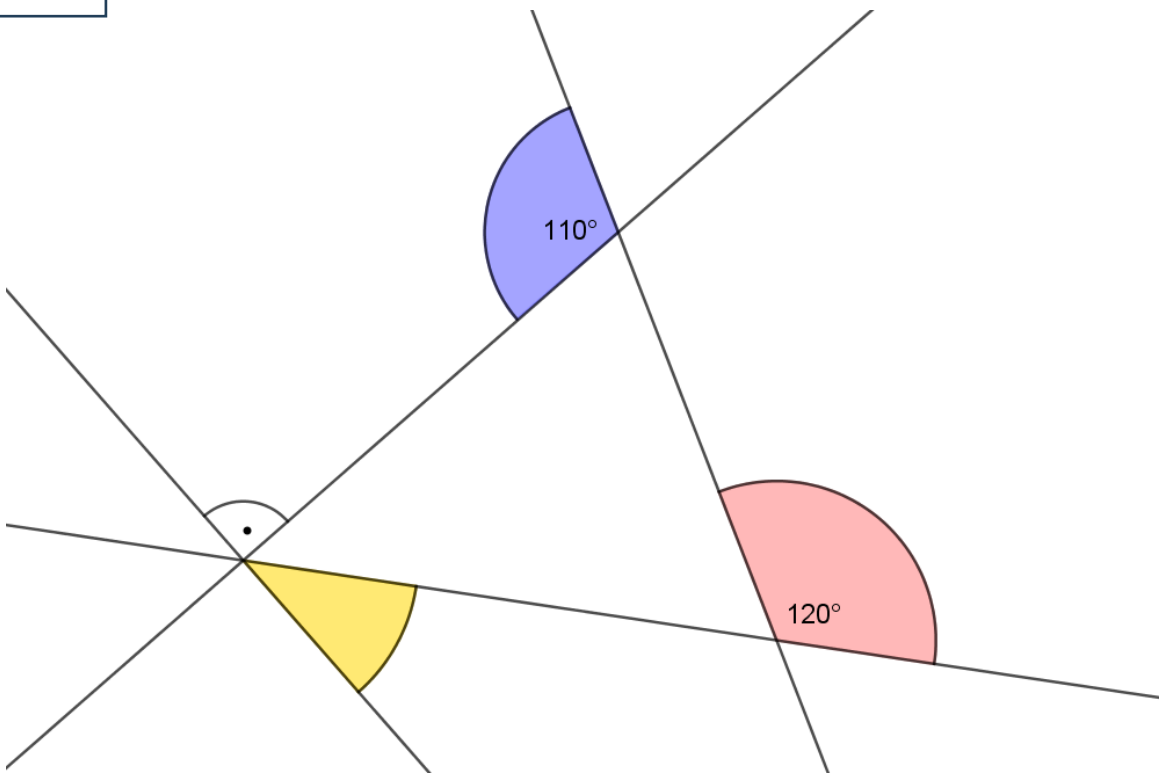

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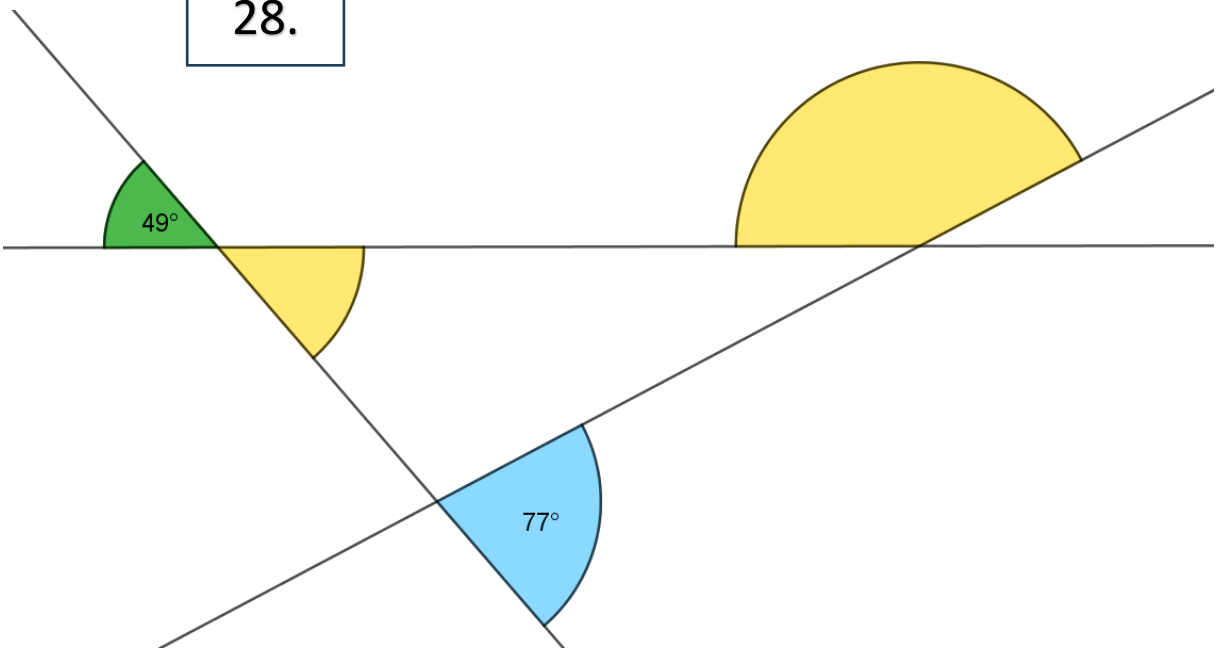

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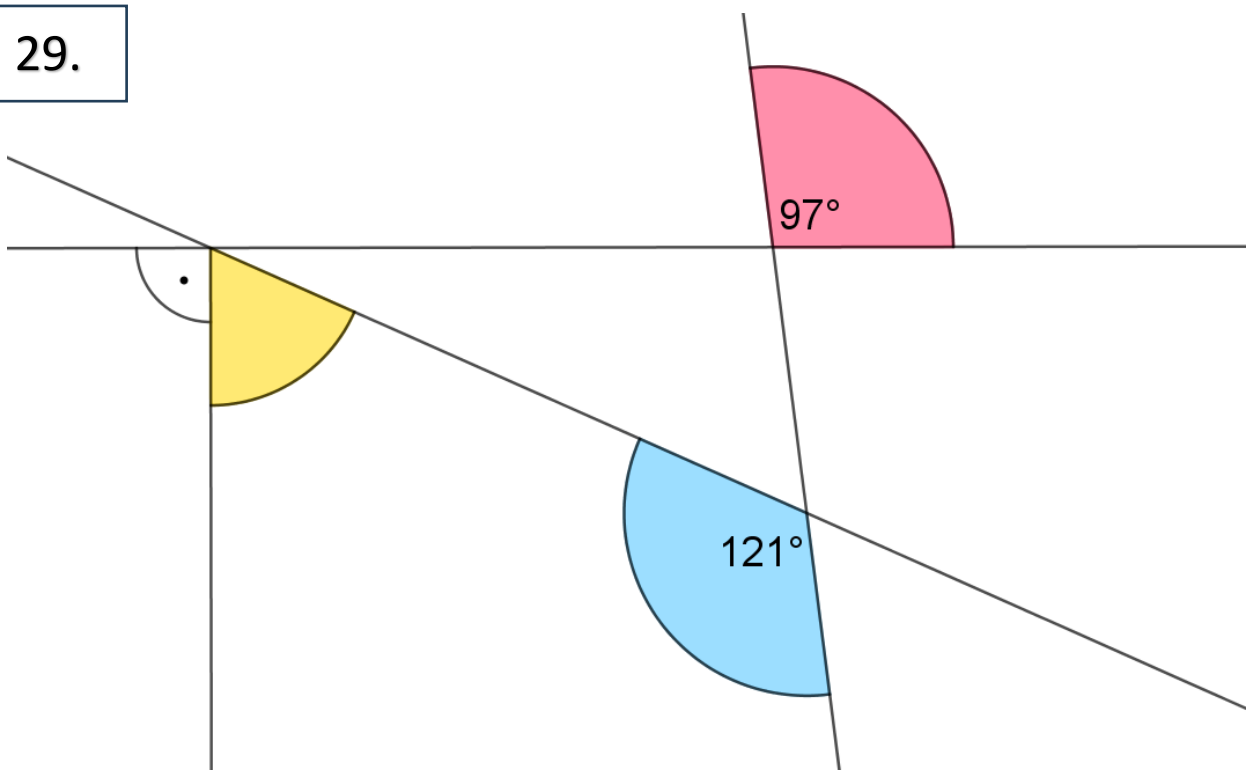

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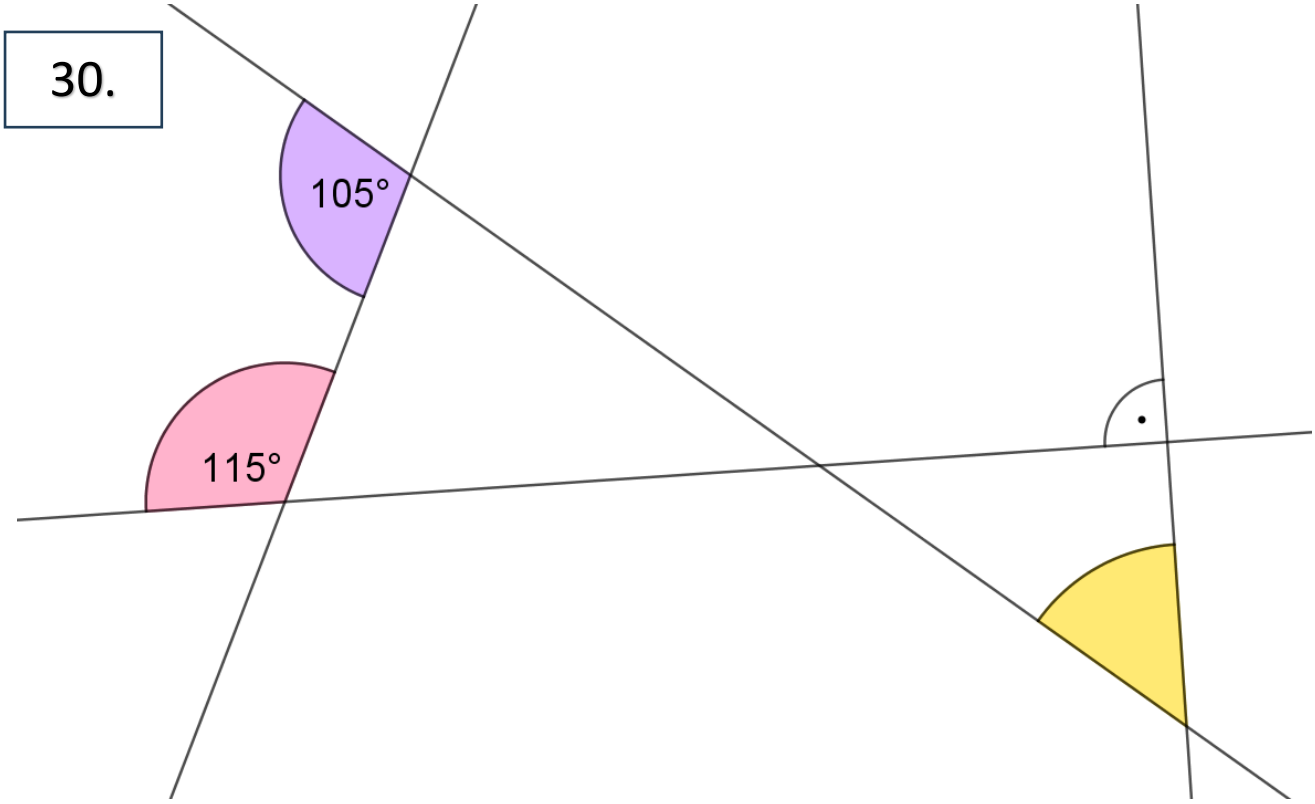

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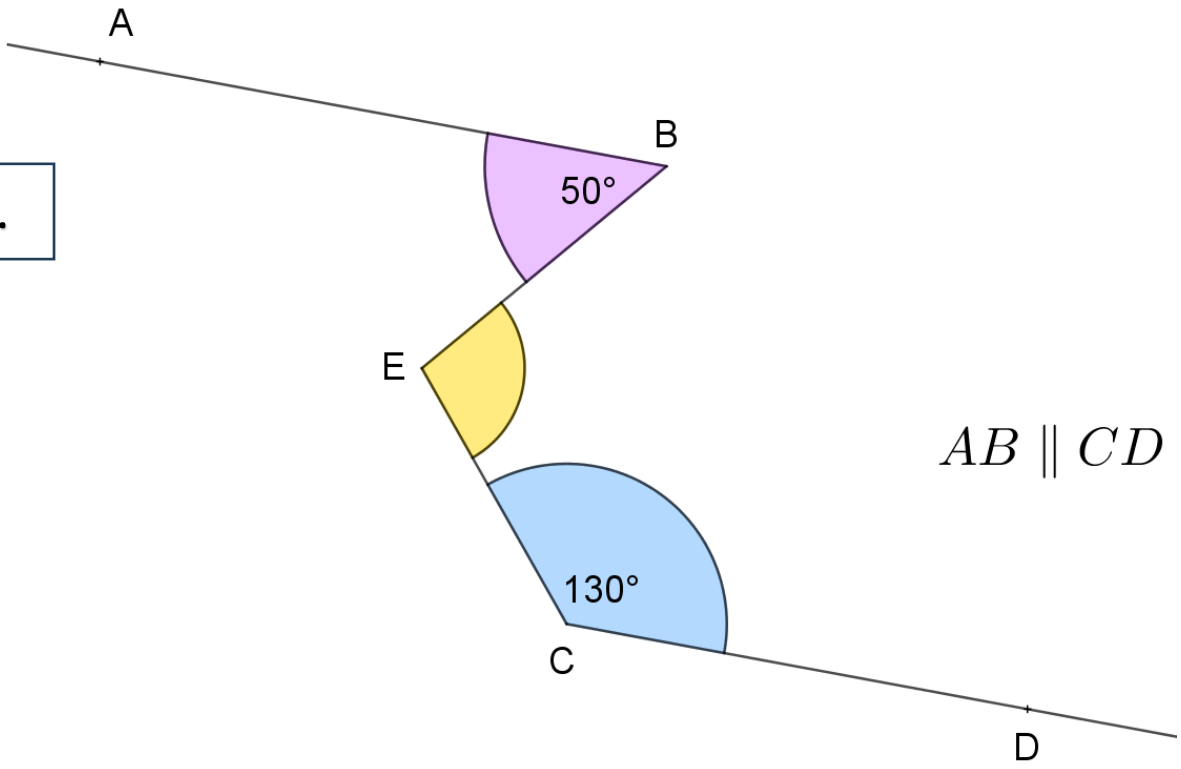
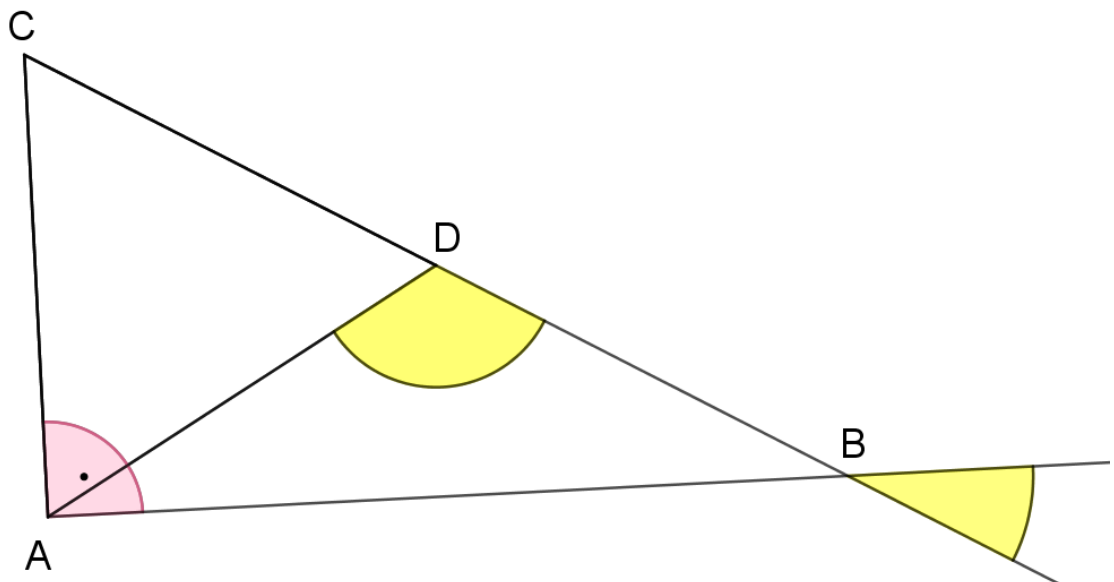


$AB \parallel CD$

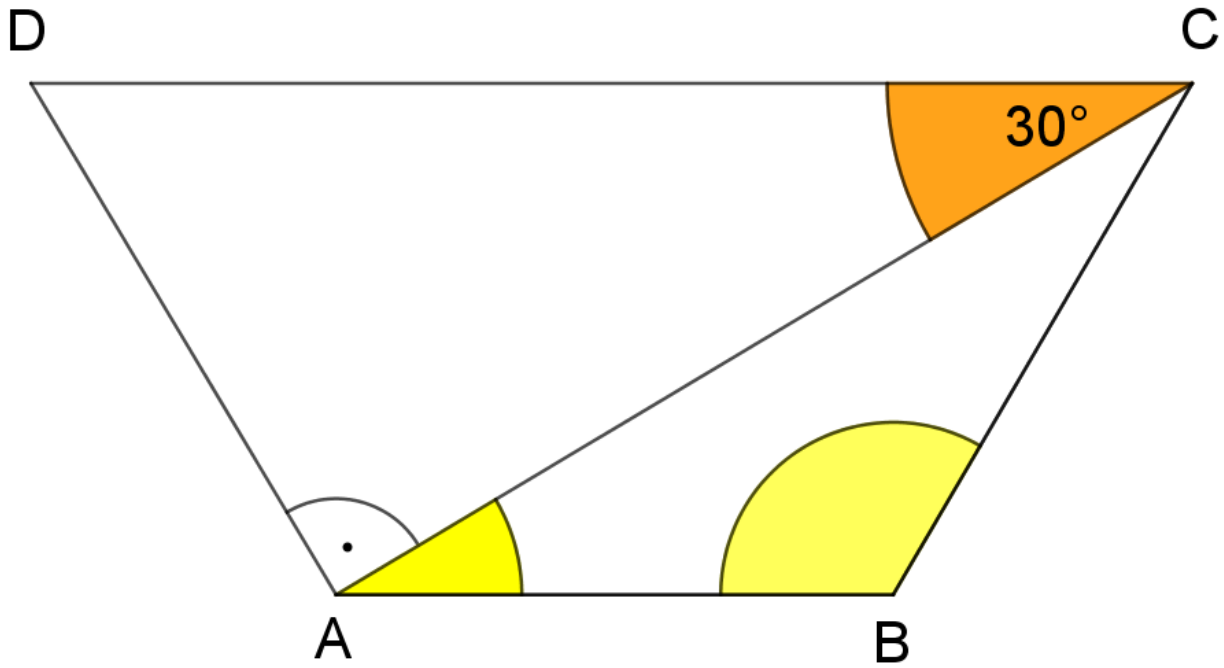
32.



$$|AD| = |DC| = |CA|$$

33.

Lichobežník $ABCD$ je rovnoramenný



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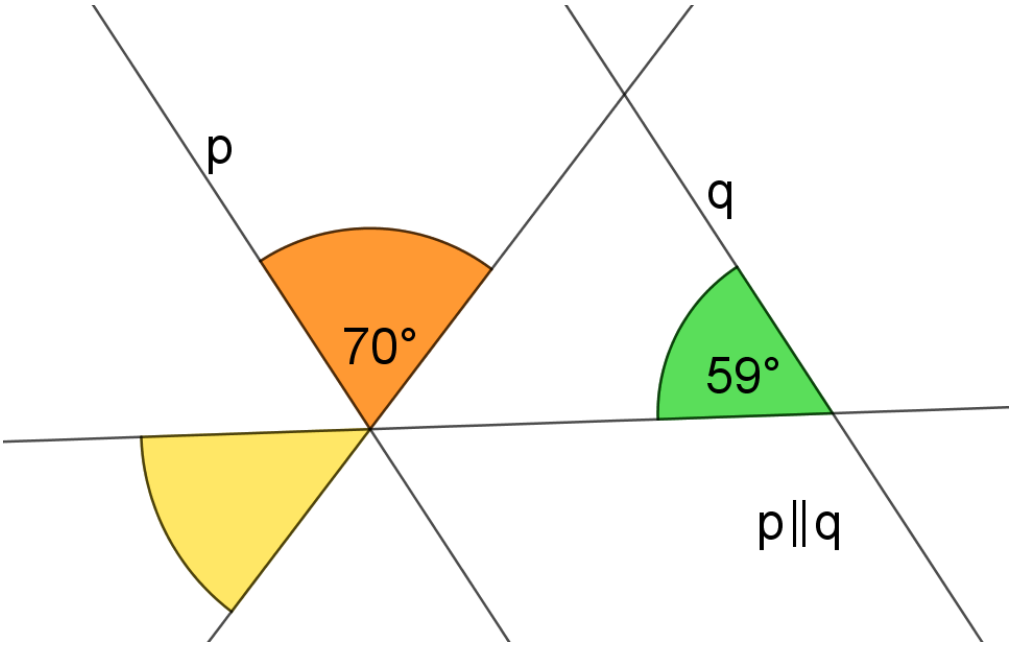

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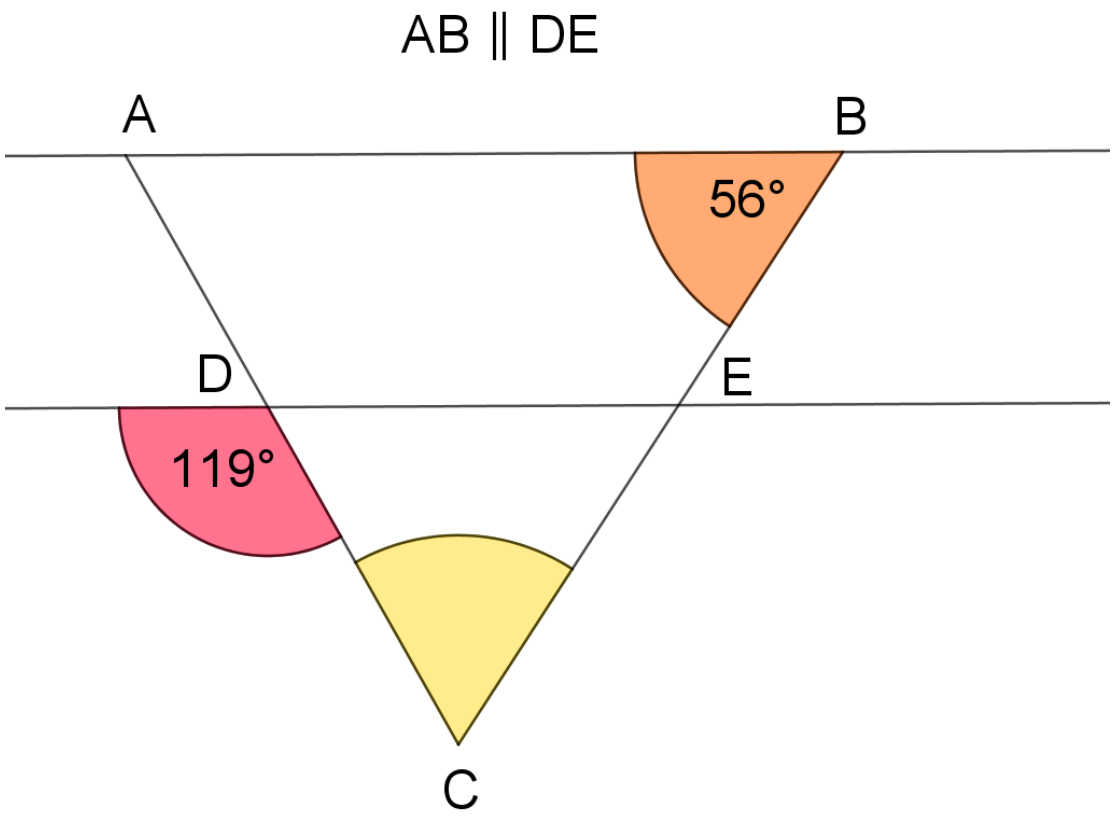

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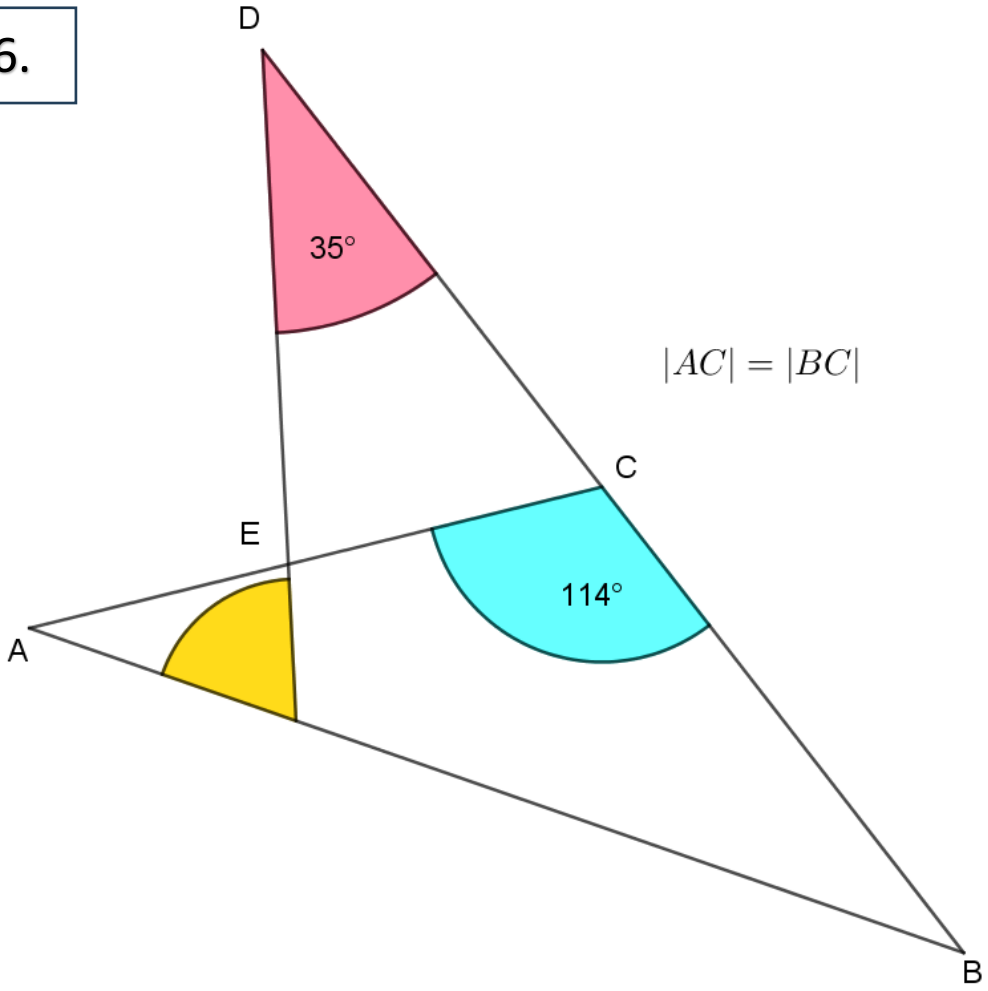

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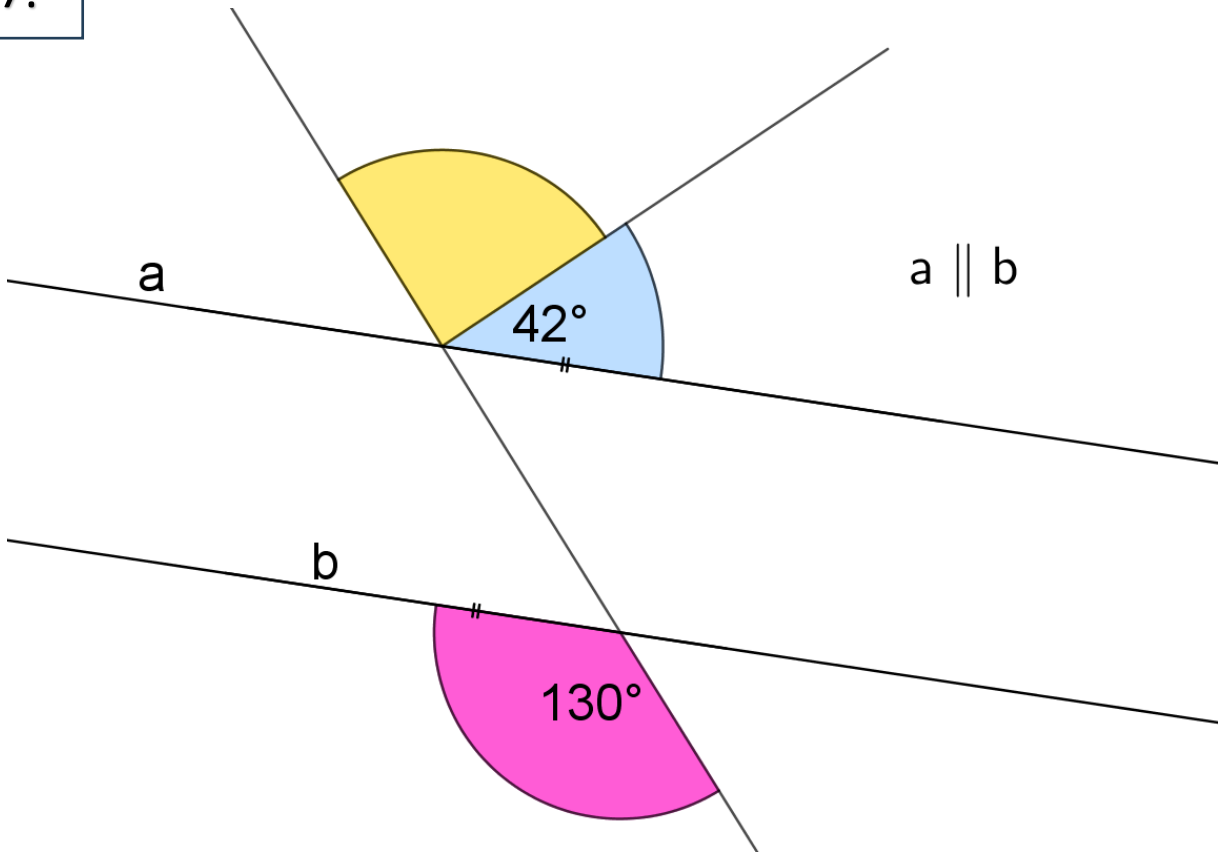

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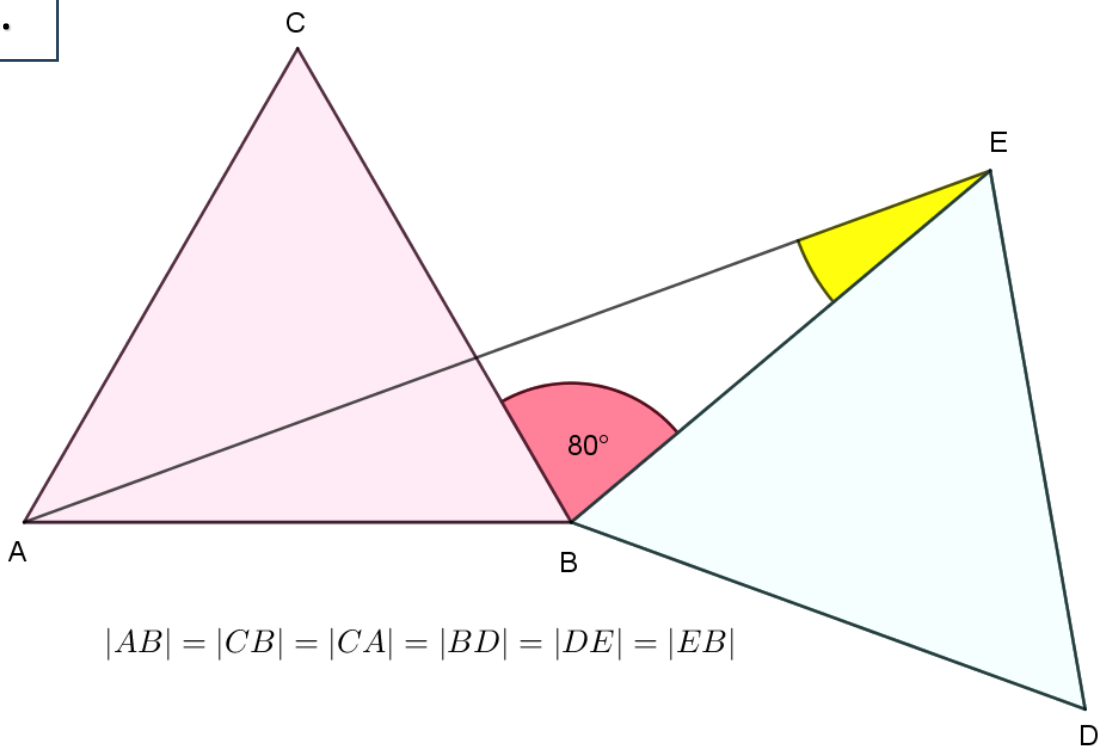
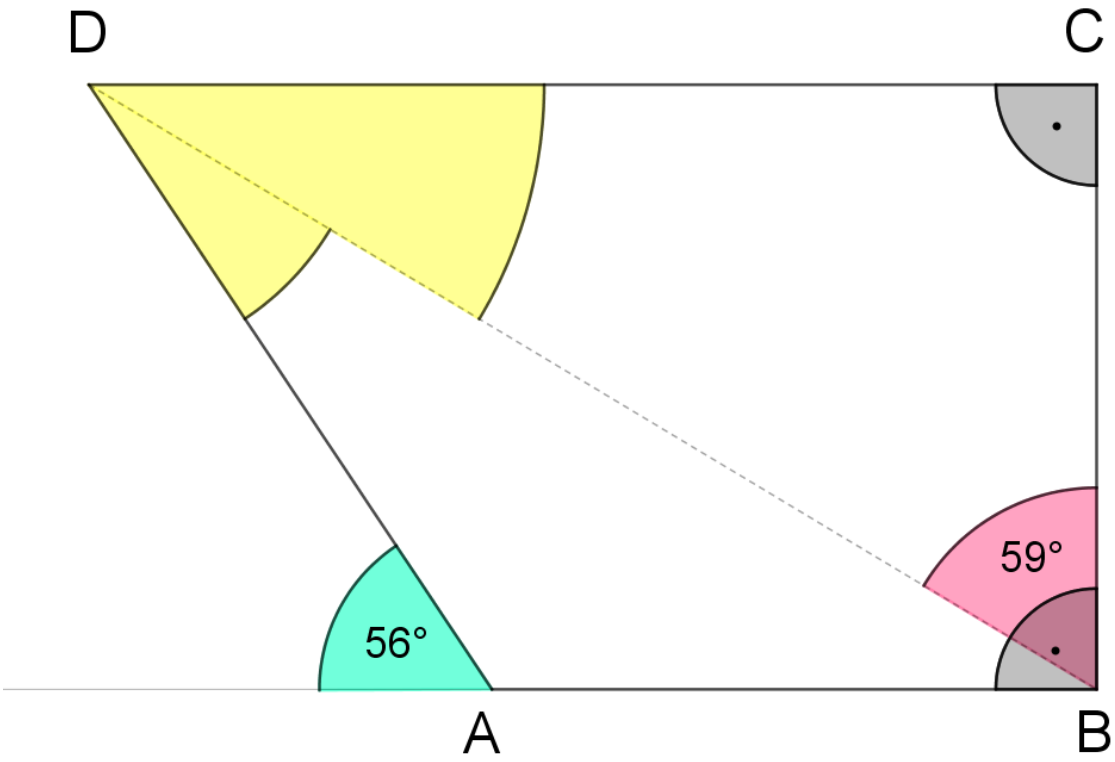


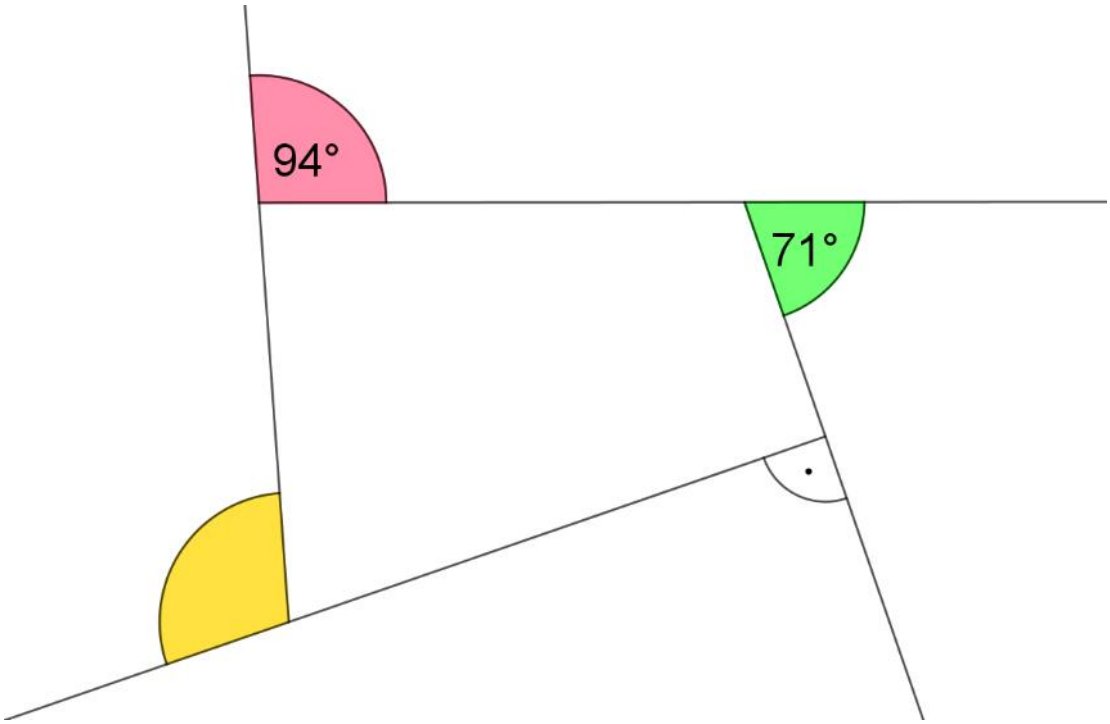
$$|AB| = |CB| = |CA| = |BD| = |DE| = |EB|$$

39.

Lichobežník $ABCD$



40.



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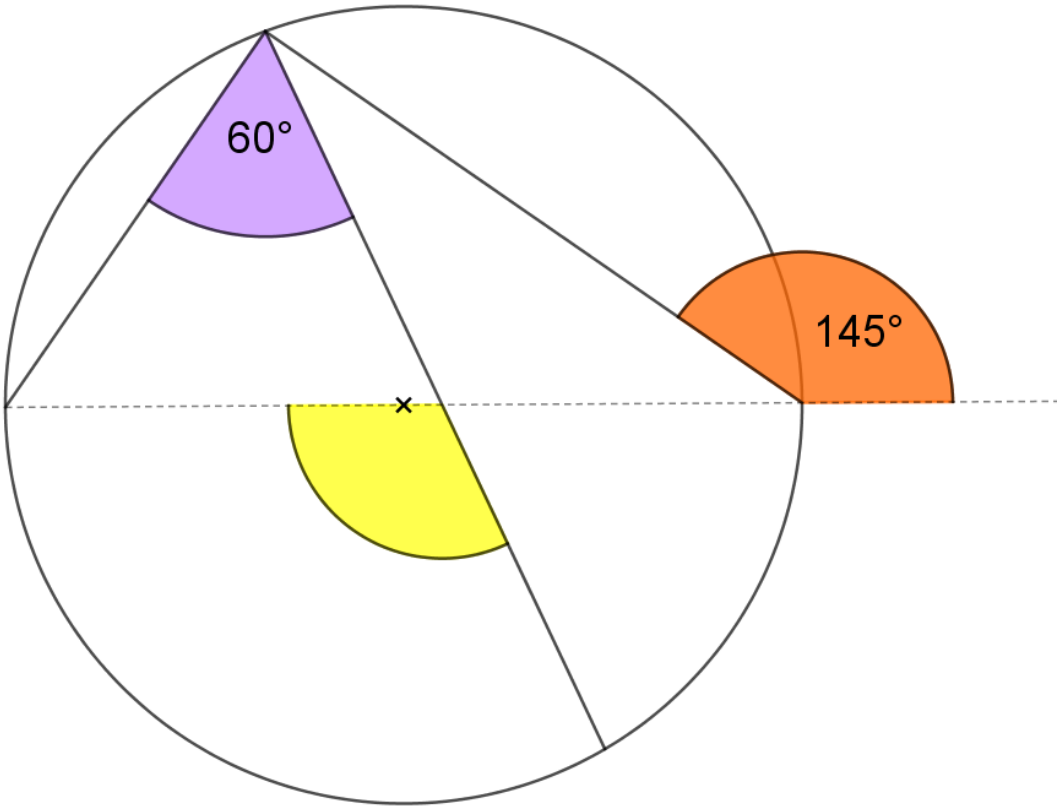
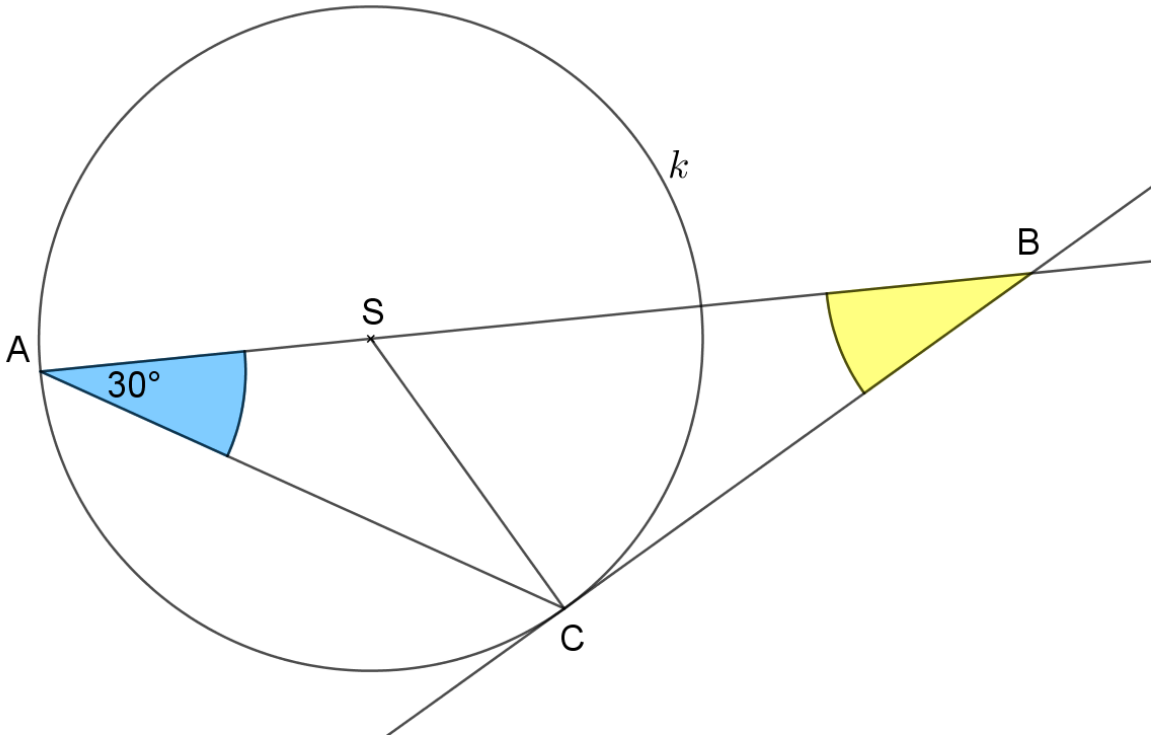


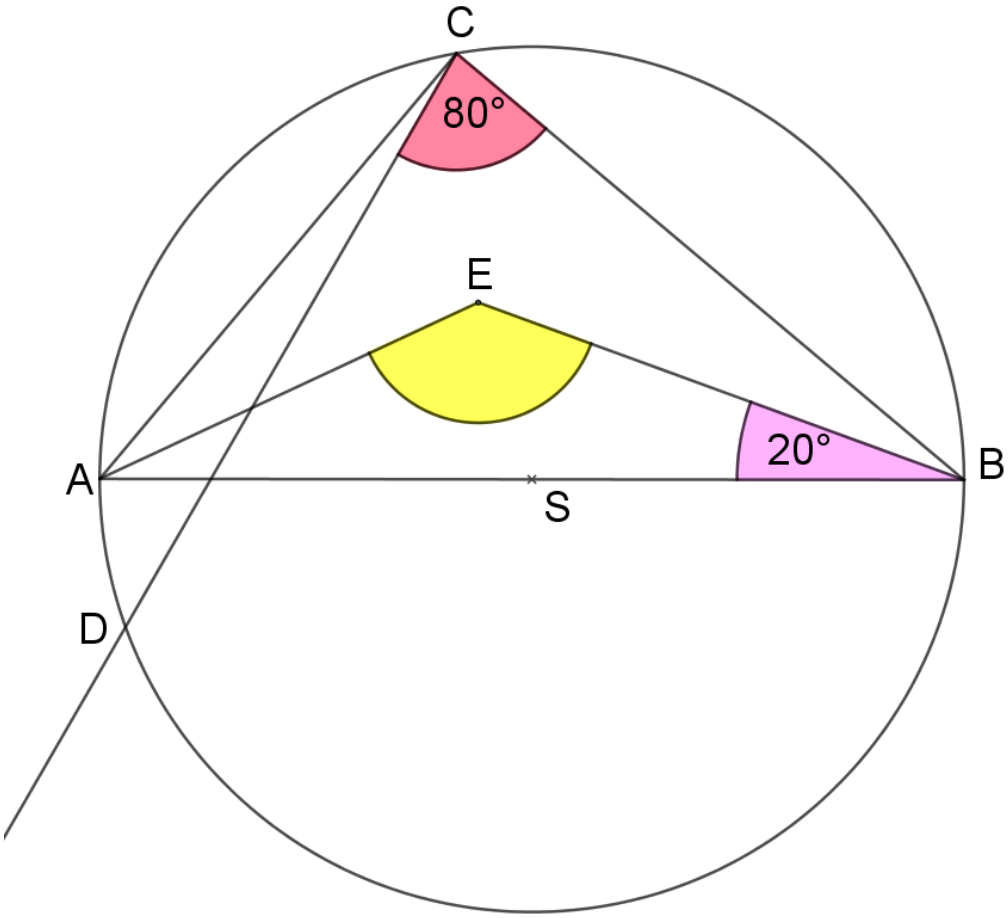
42.

BC je dotyčnica ku kružnici k



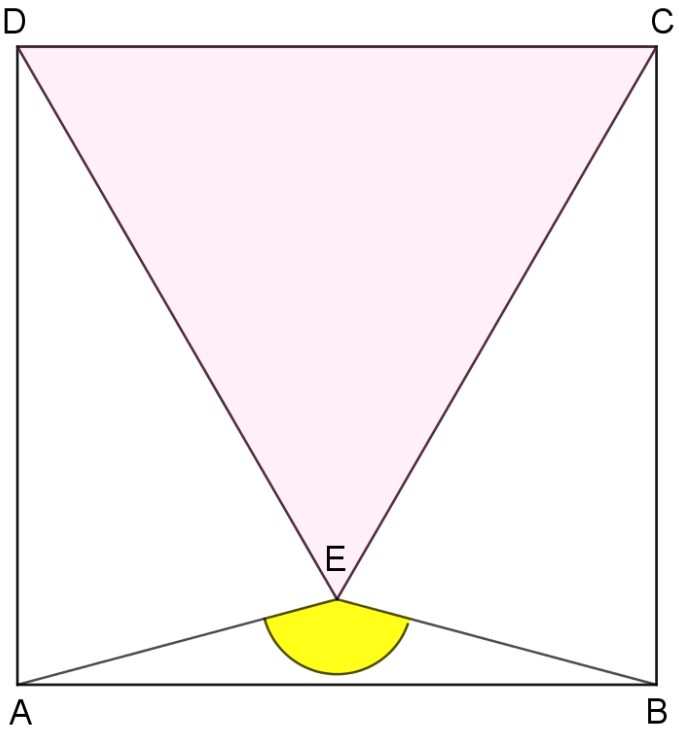
43.

Bod E je stred kružnice vpísanej trojuholníku ABC



Trojuholník ECD je rovnostranný, $ABCD$ je štvorec a $|DA| = |DE|$

44.



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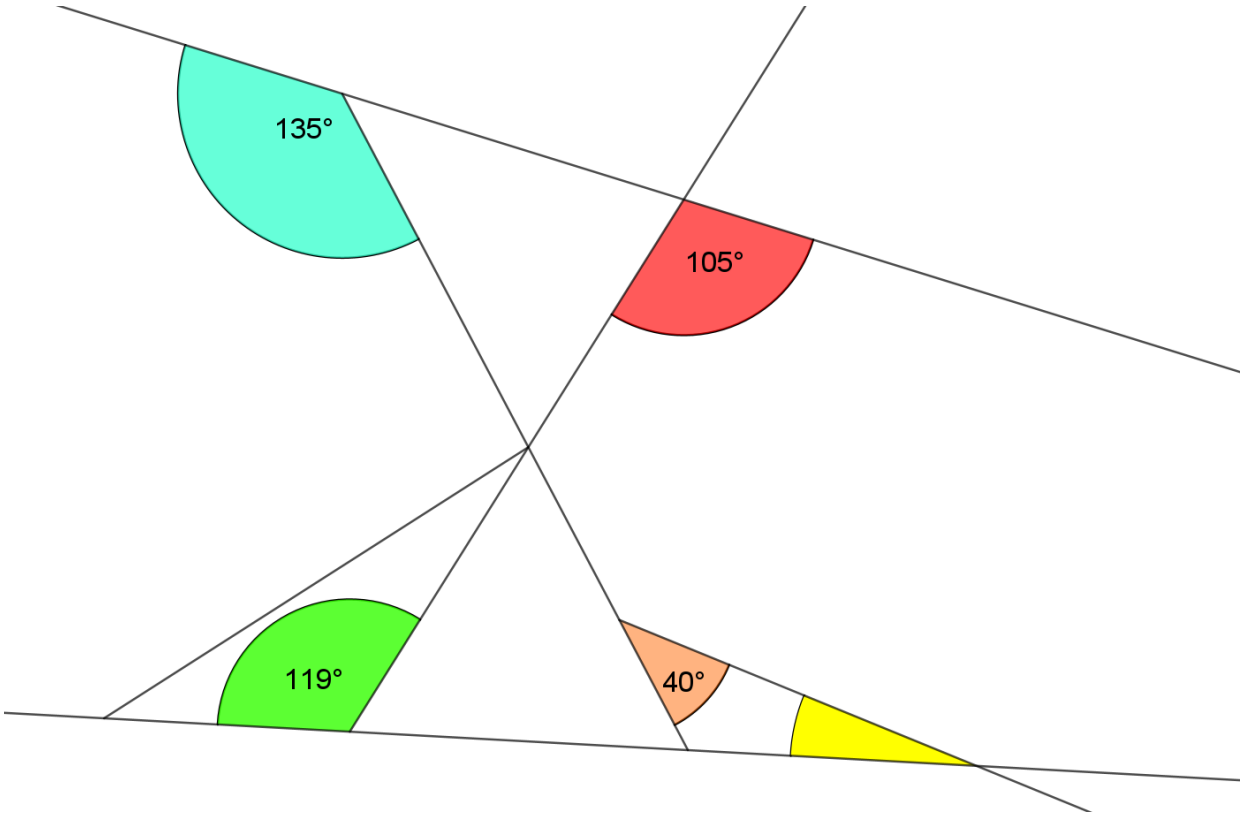

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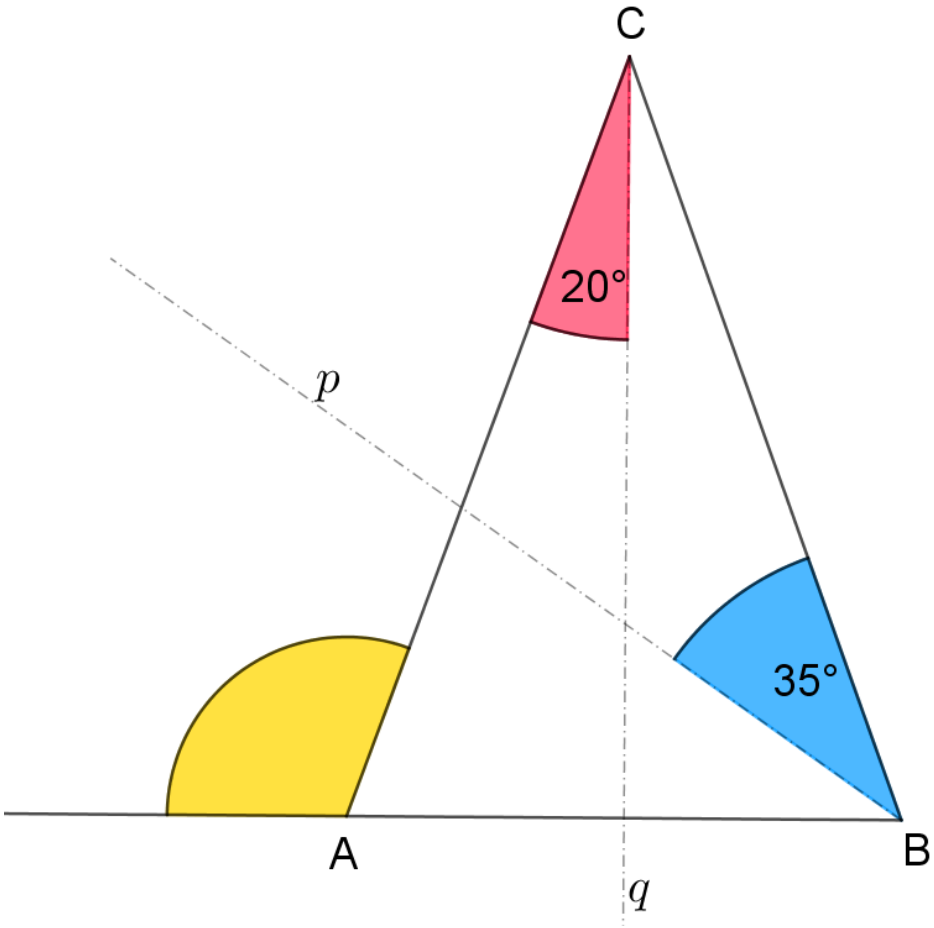
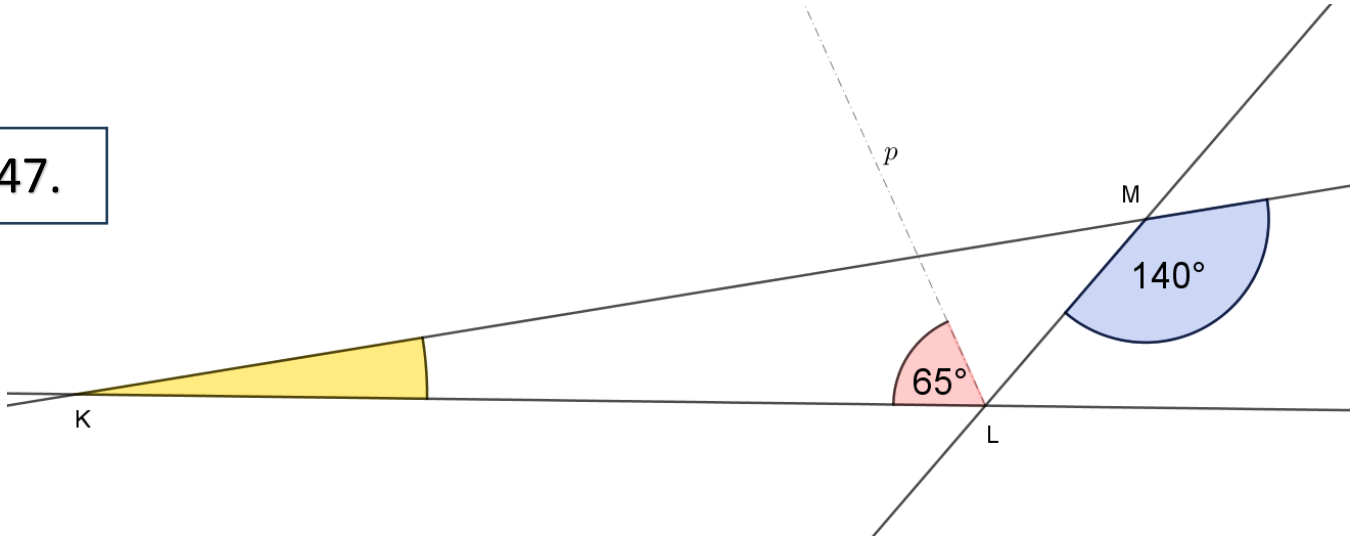


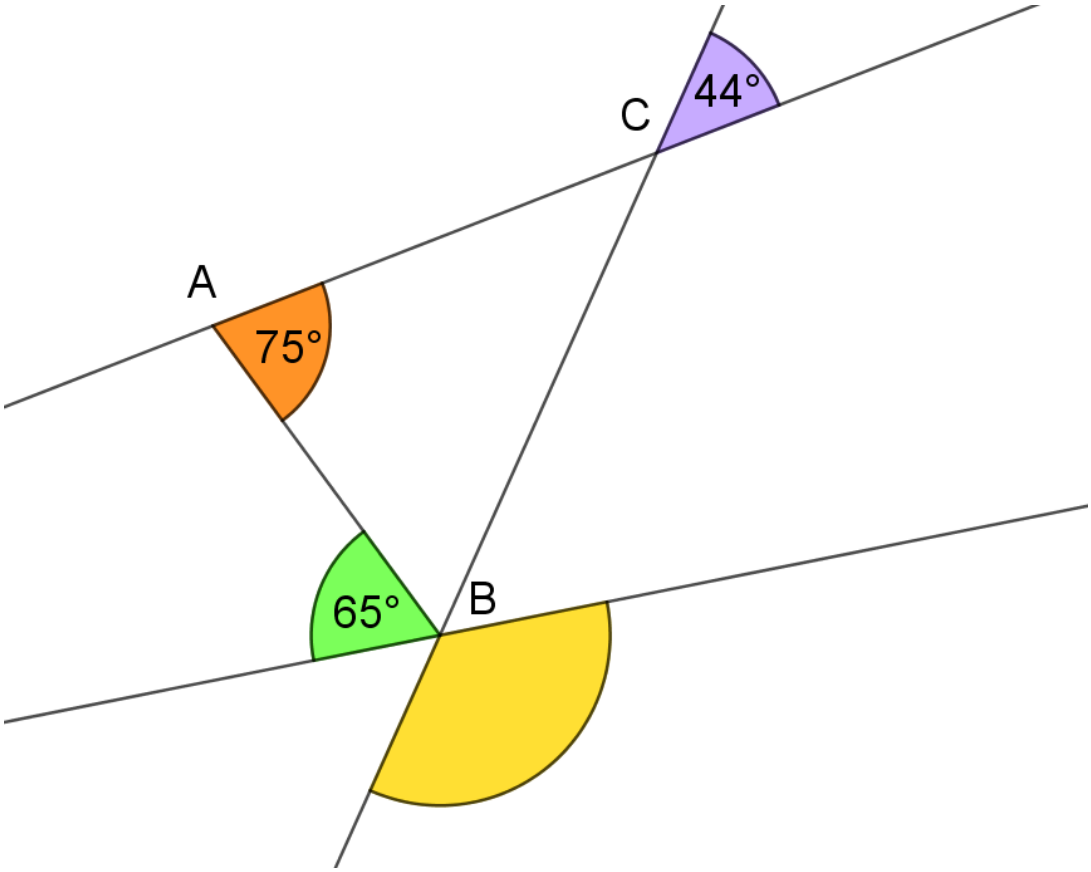
Polpriamky p je os uhla $\sphericalangle ABC$ a polpriamka q je os uhla $\sphericalangle BCA$

47.

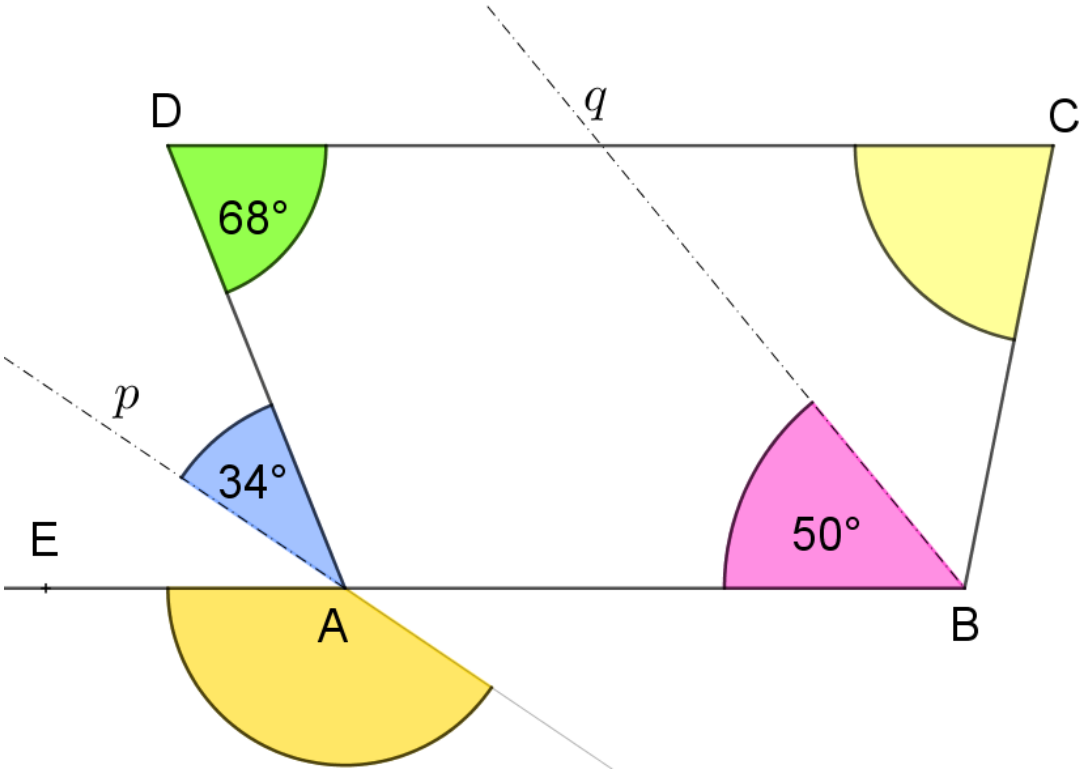


Polpriamka p je os uhla $\sphericalangle KLM$

48.



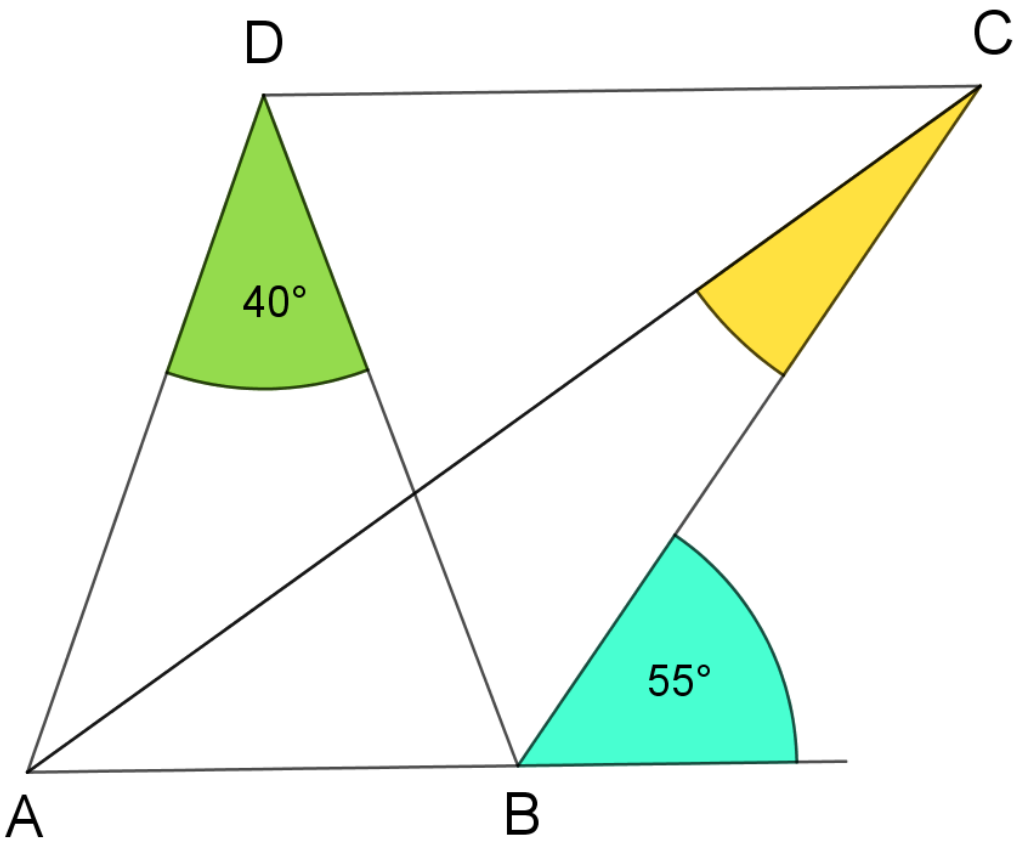
49.



V lichobežníku $ABCD$ je polpriamka q os uhla $\sphericalangle ABC$ a polpriamky p os uhla $\sphericalangle EAD$

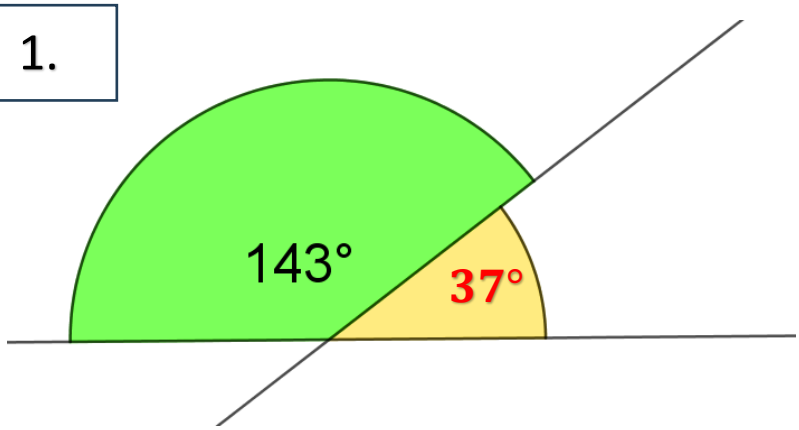
50.

$|AD| = |DB| = |DC|$ a $AB \parallel CD$



Riešenie

1.



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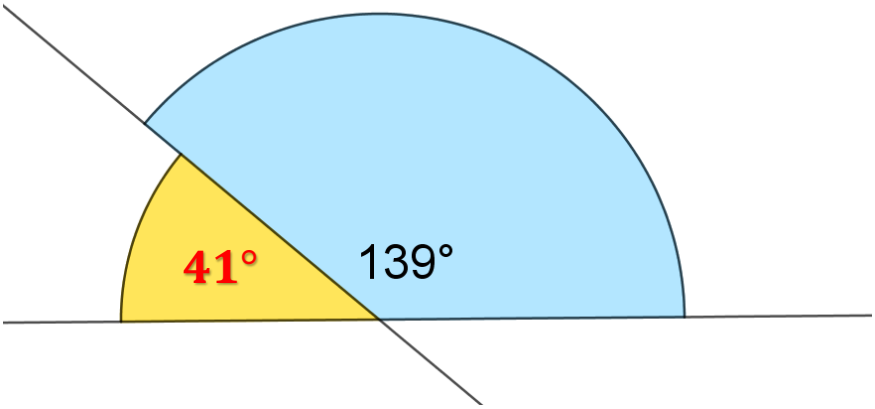

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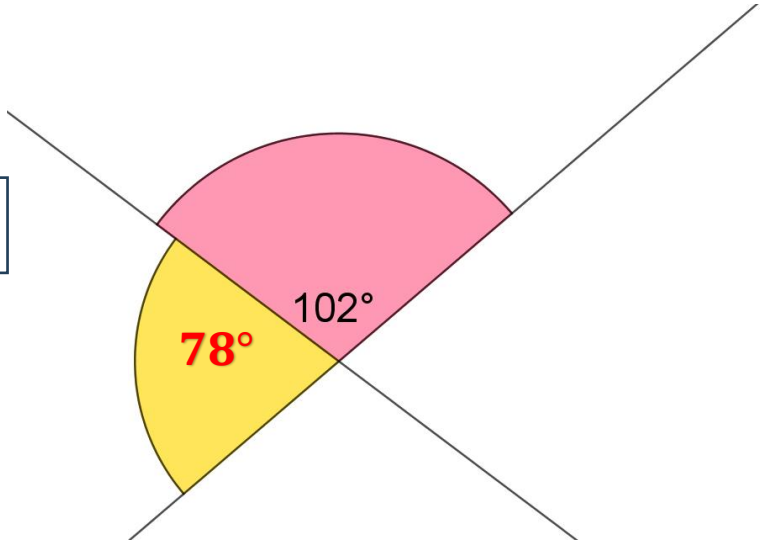

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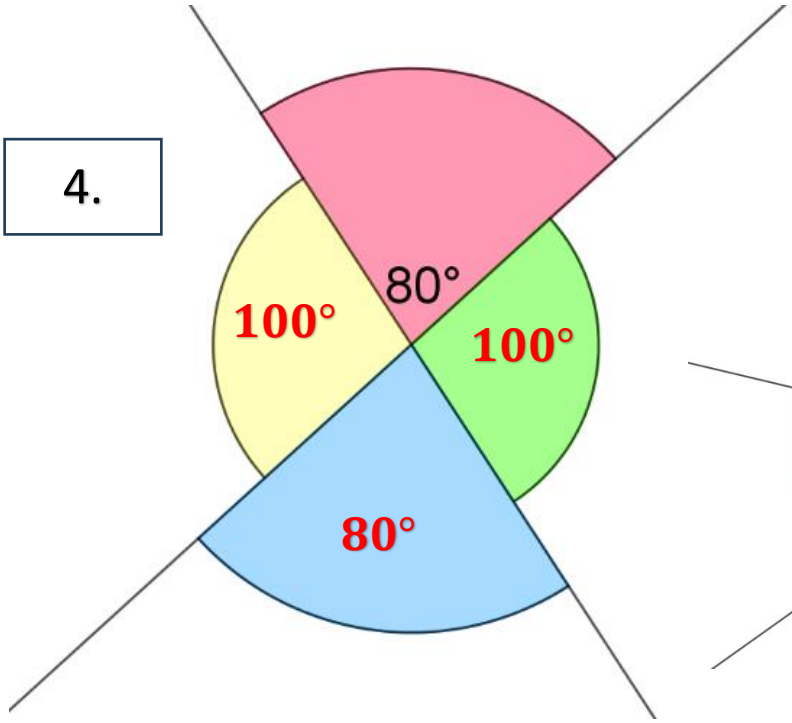

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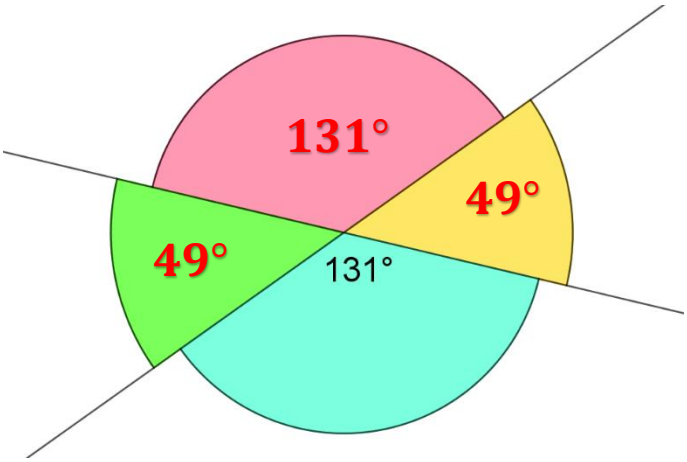

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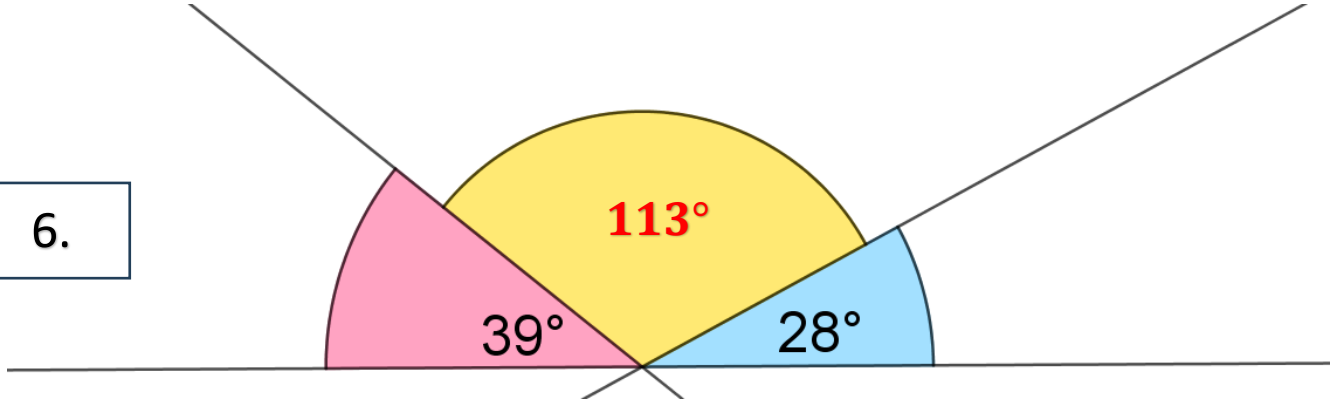

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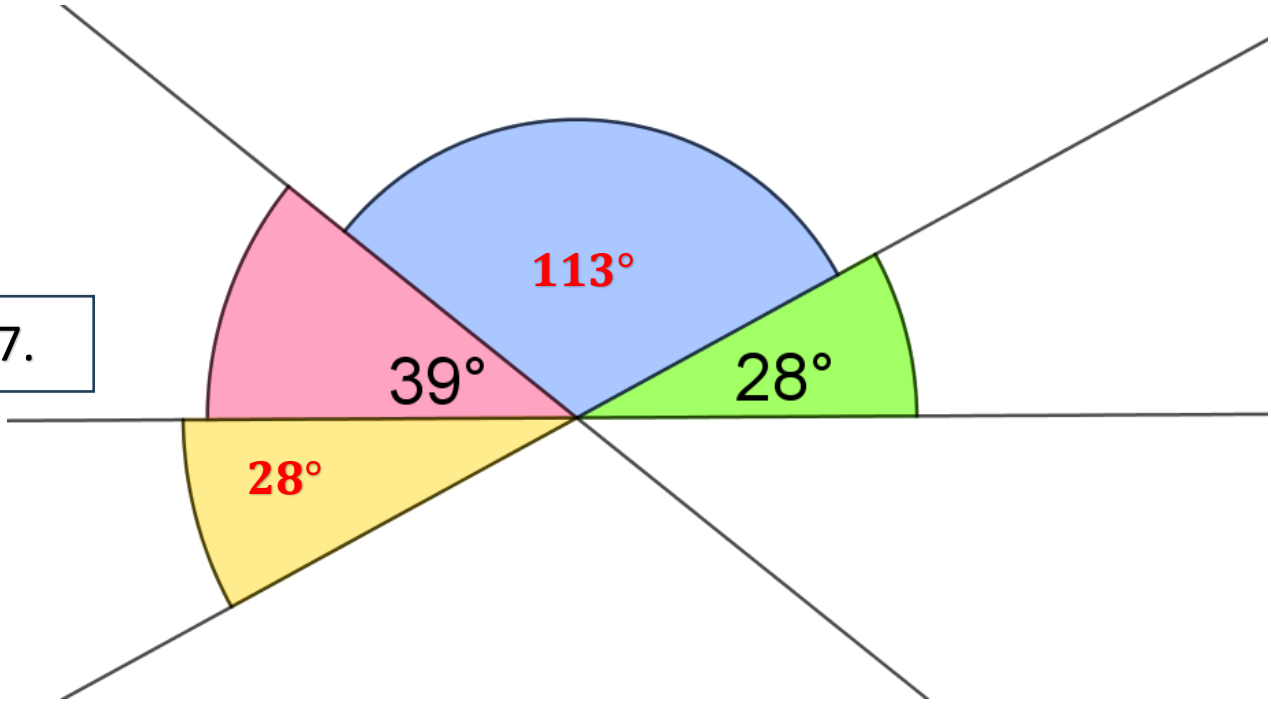

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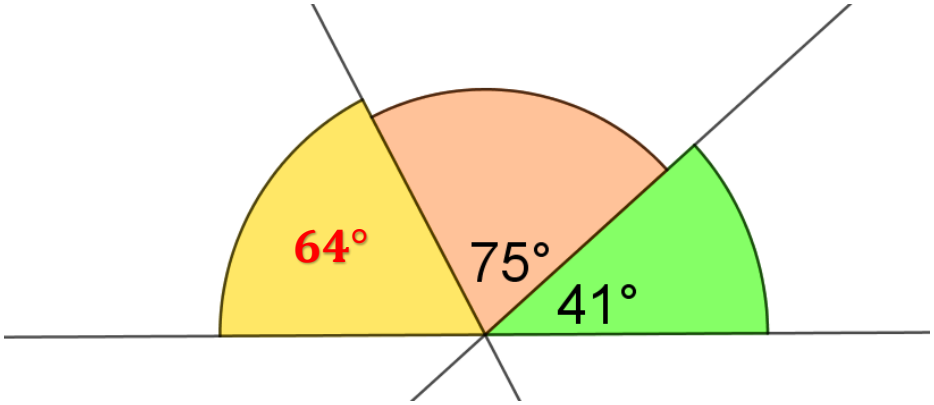

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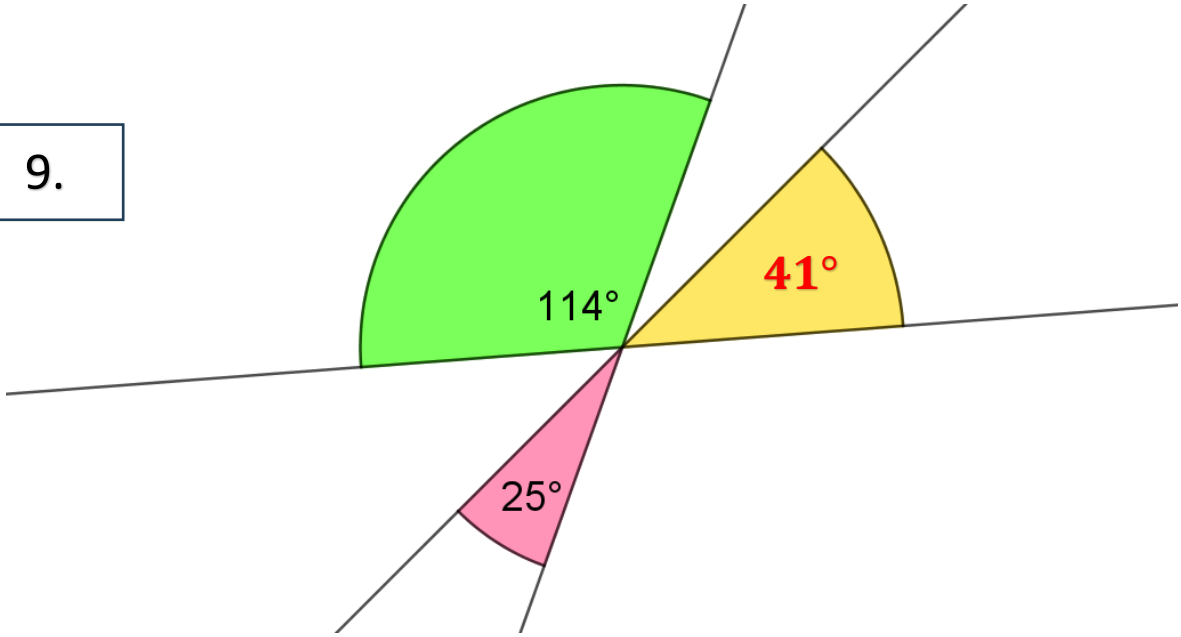

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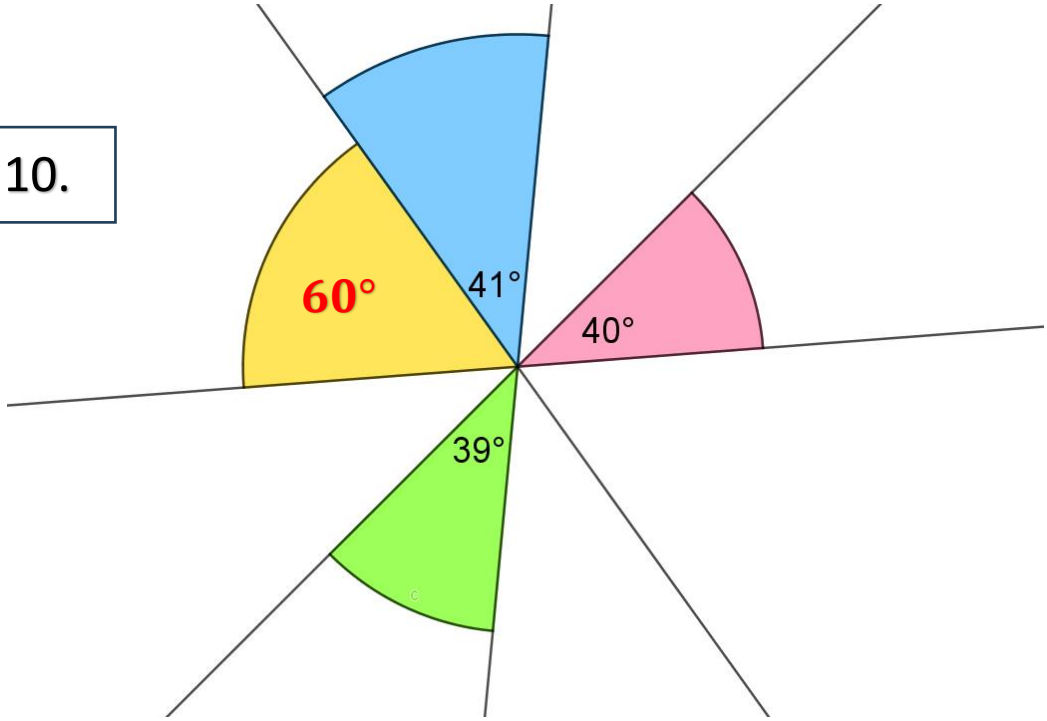

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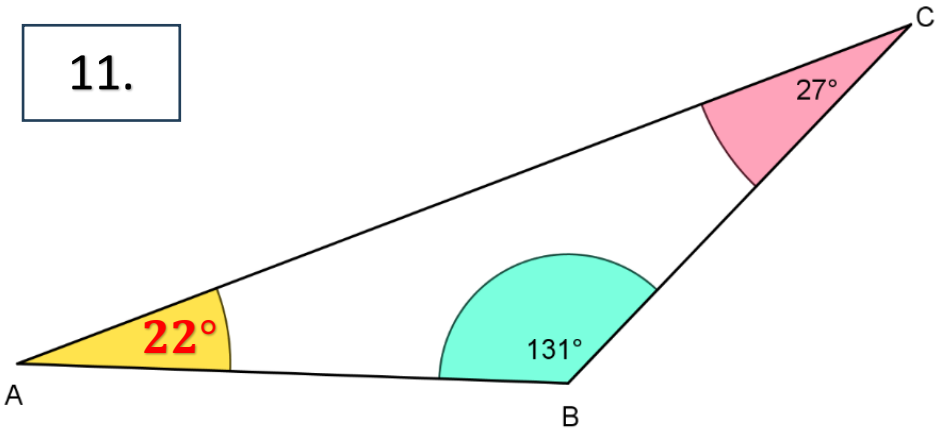

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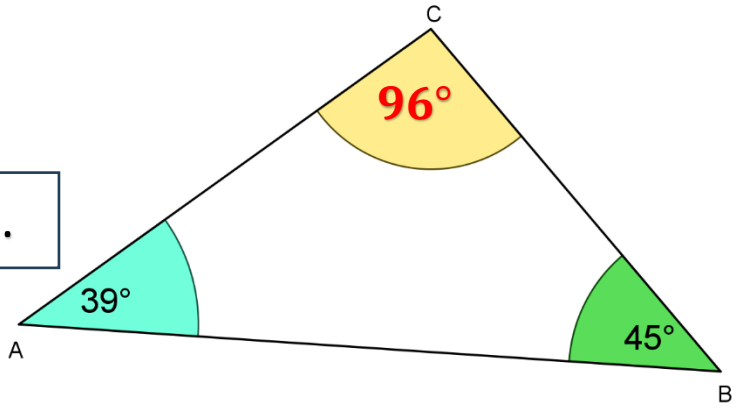

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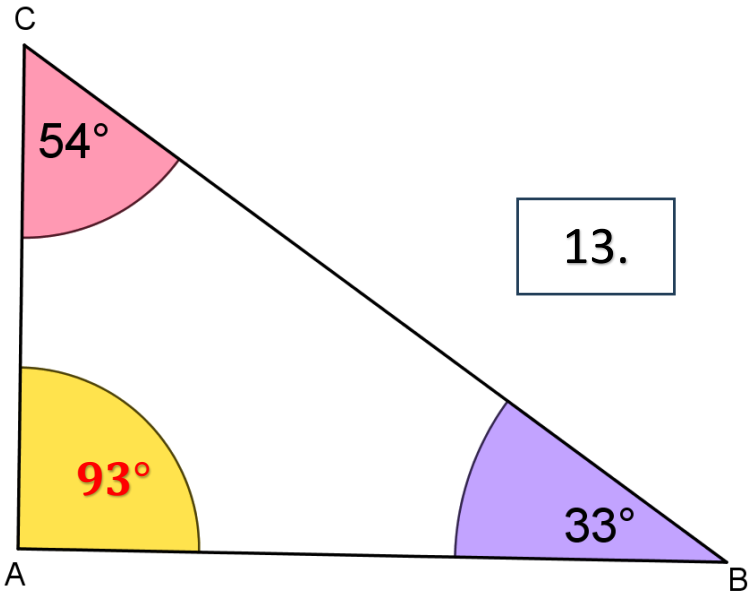

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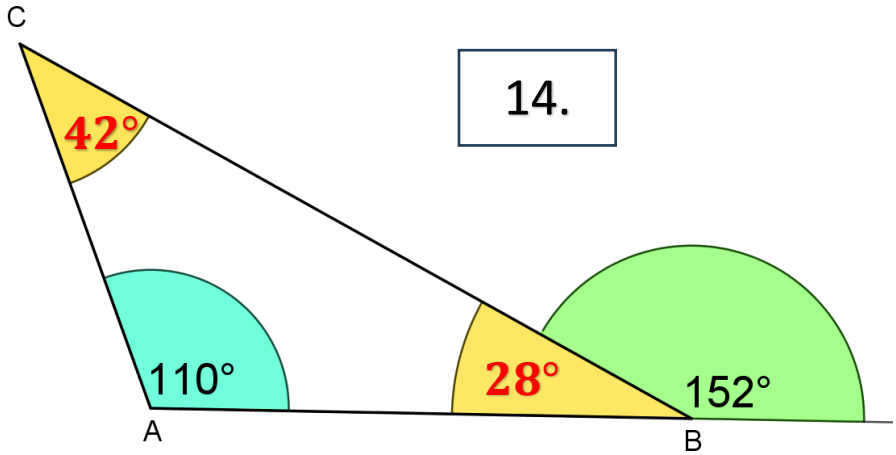

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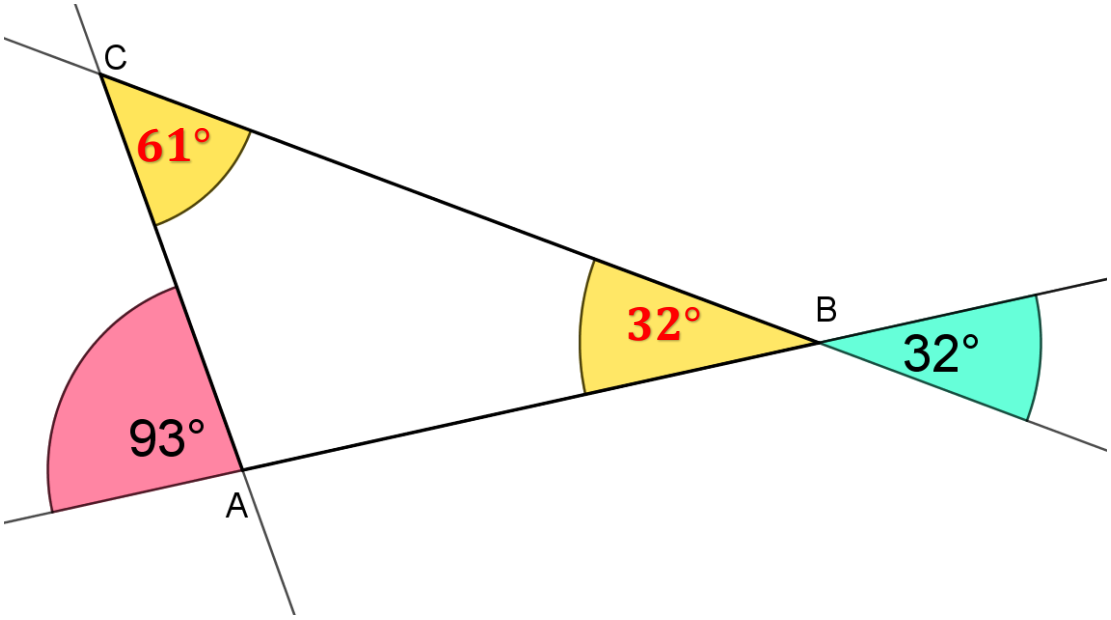

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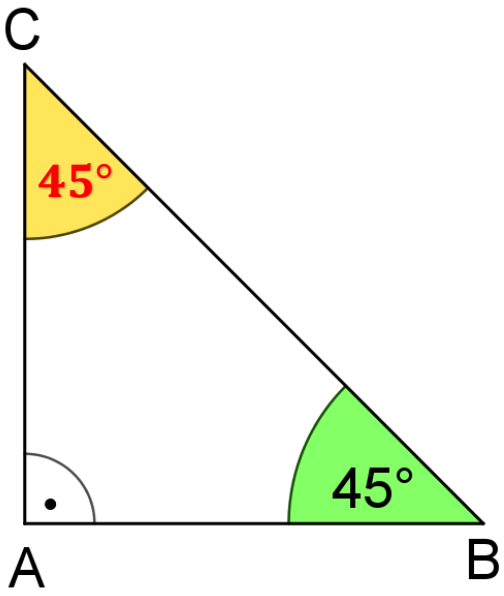
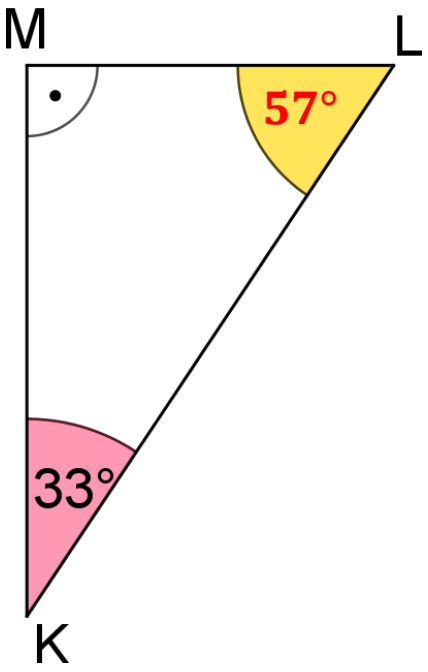
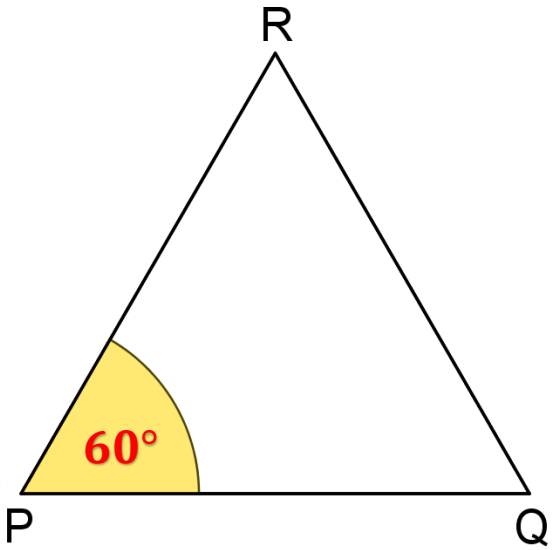


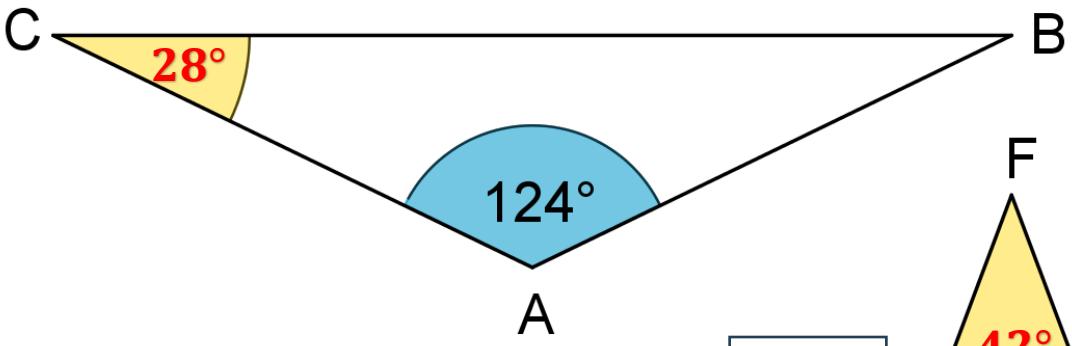


17.

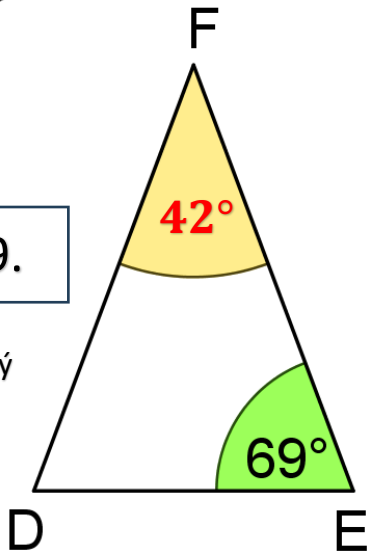
Trojuholník PQR je rovnostranný



18. Trojuholník ABC je rovnoramenný



19. Trojuholník DEF je rovnoramenný



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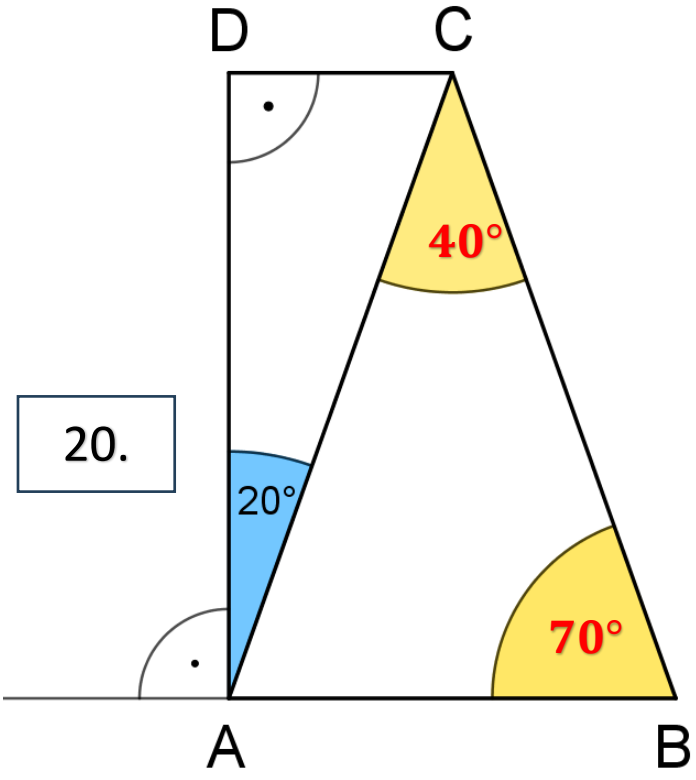
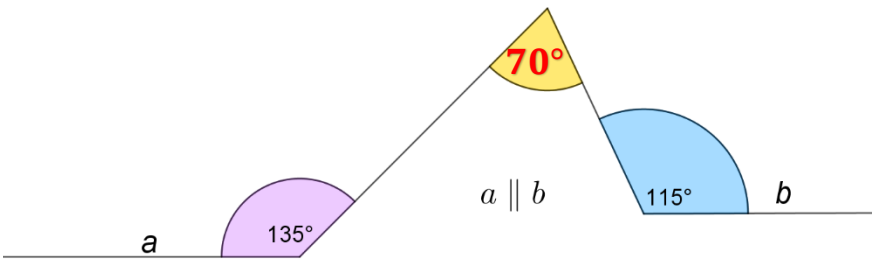


Trojuholník ABC je rovnoramenný

21.



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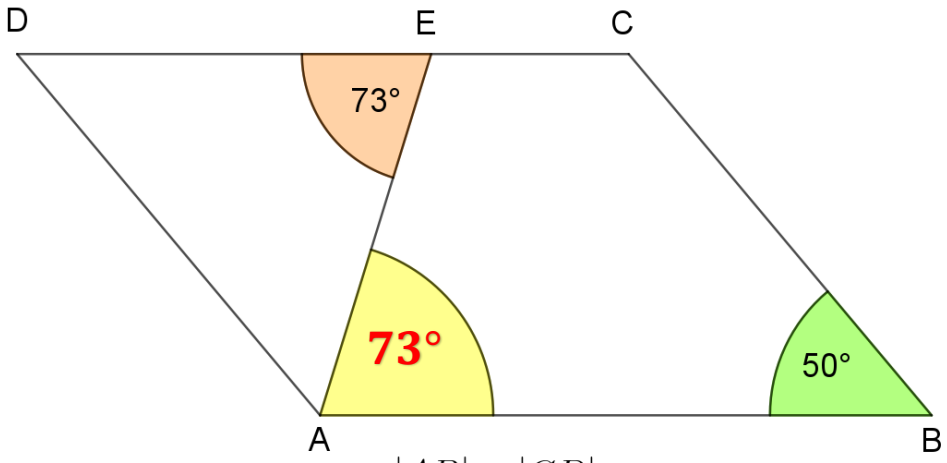
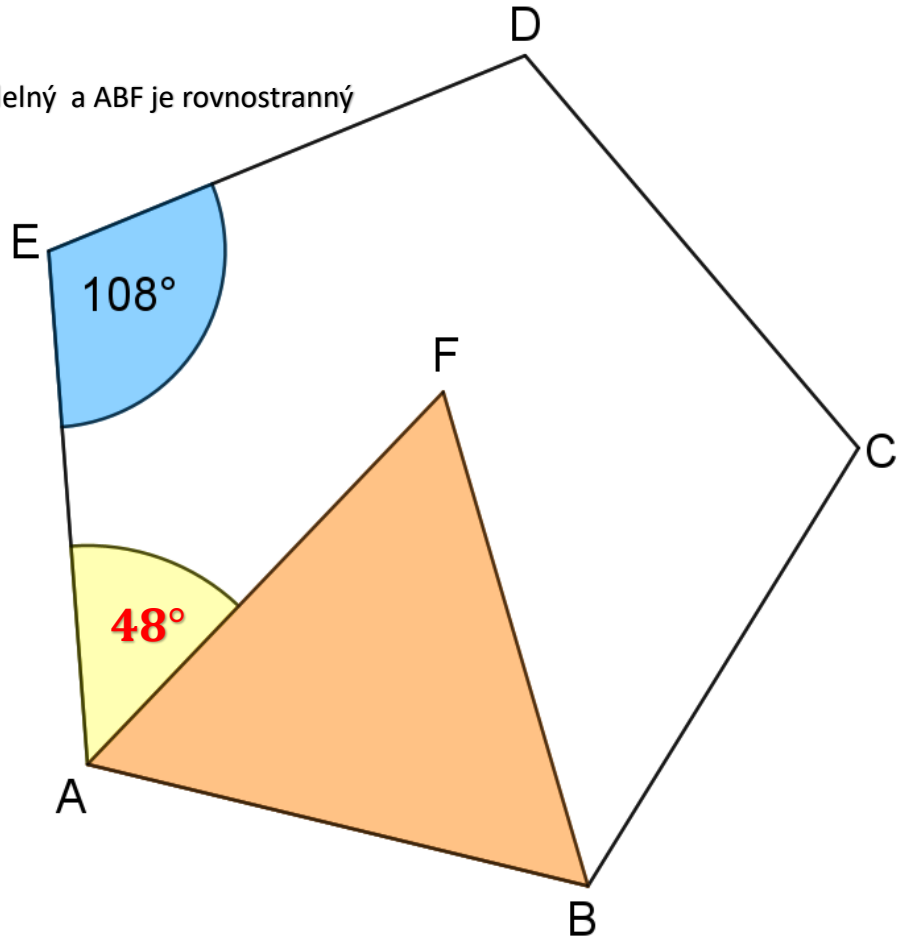


$$|AB| = |CD|$$

$$|BC| = |AD|$$

23.

Päťuholník $ABCDE$ je pravidelný a ABF je rovnostranný



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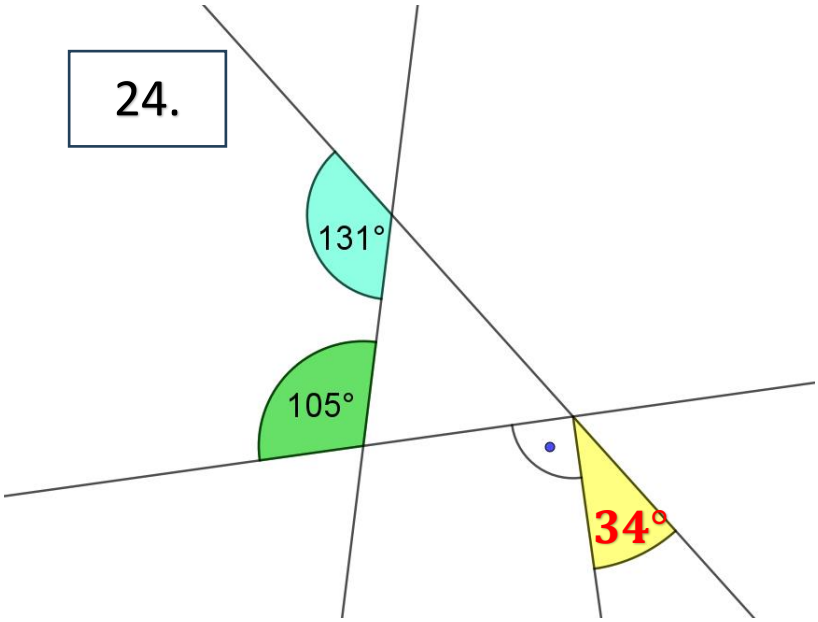

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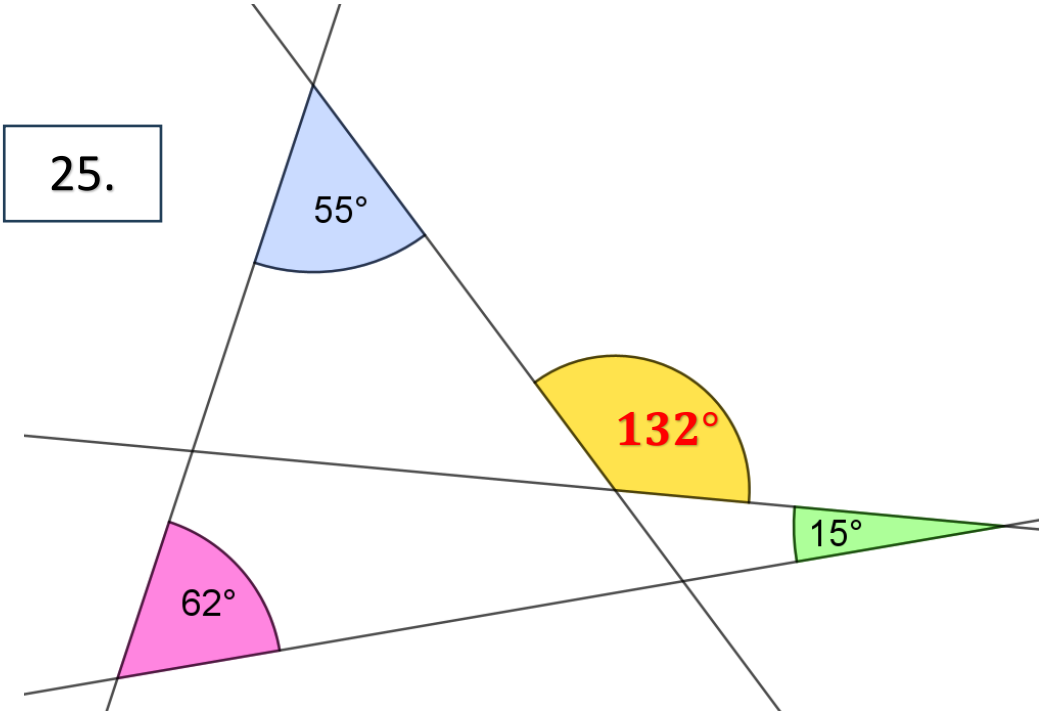

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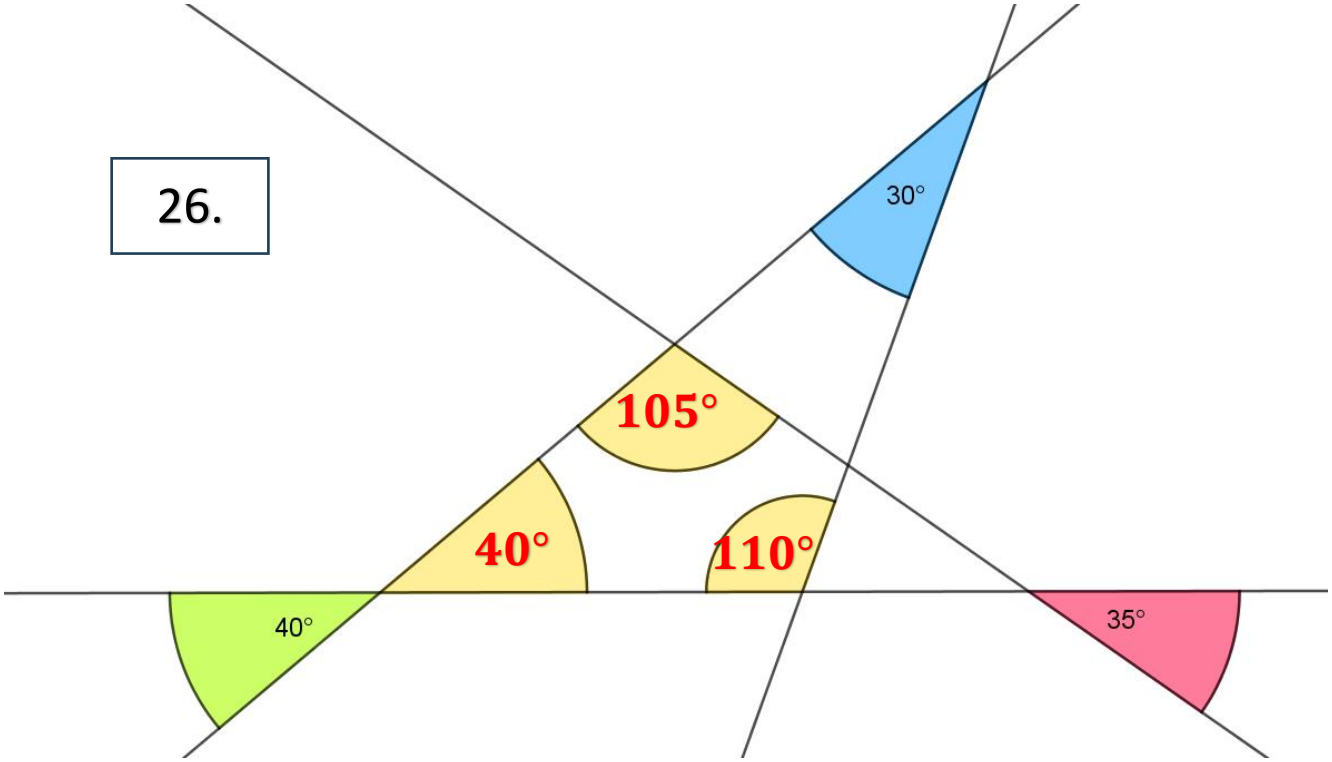

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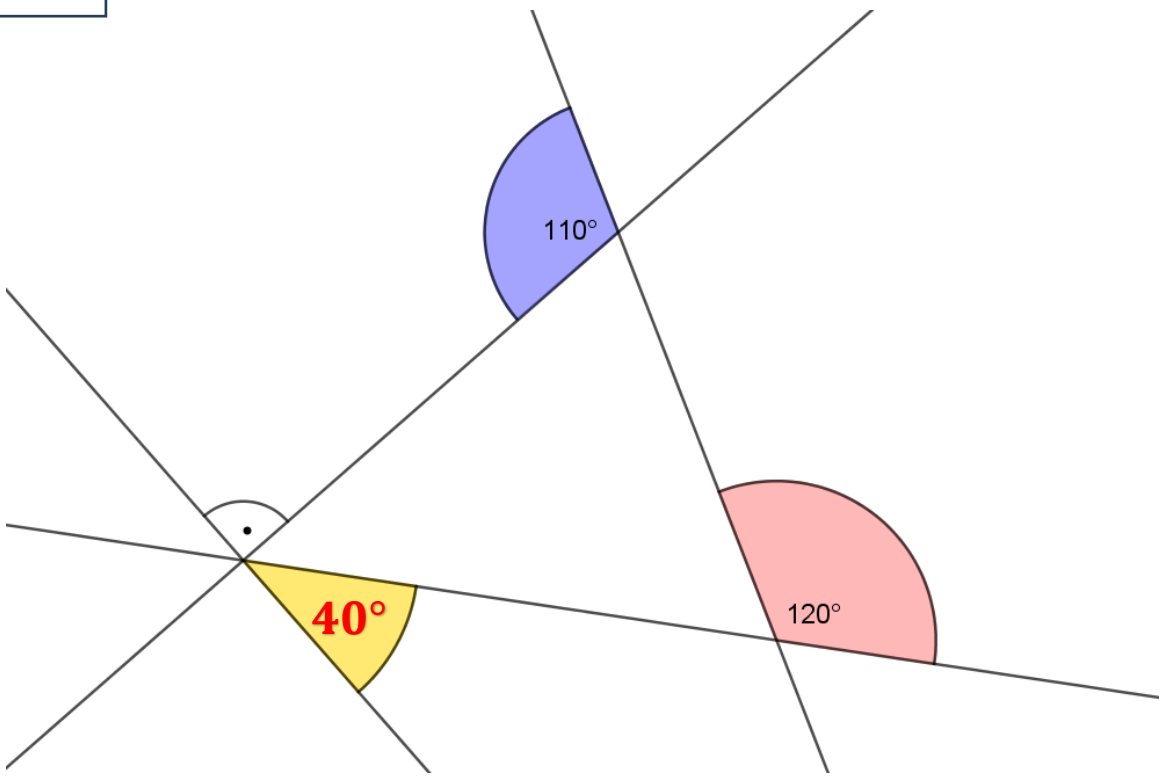

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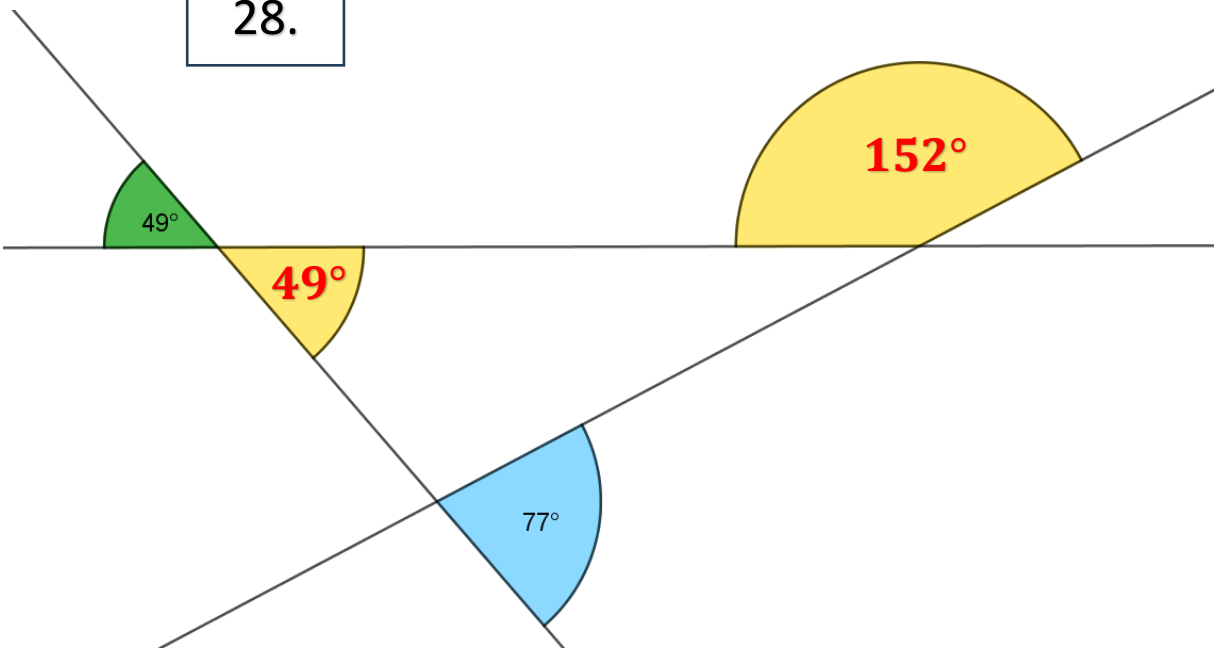

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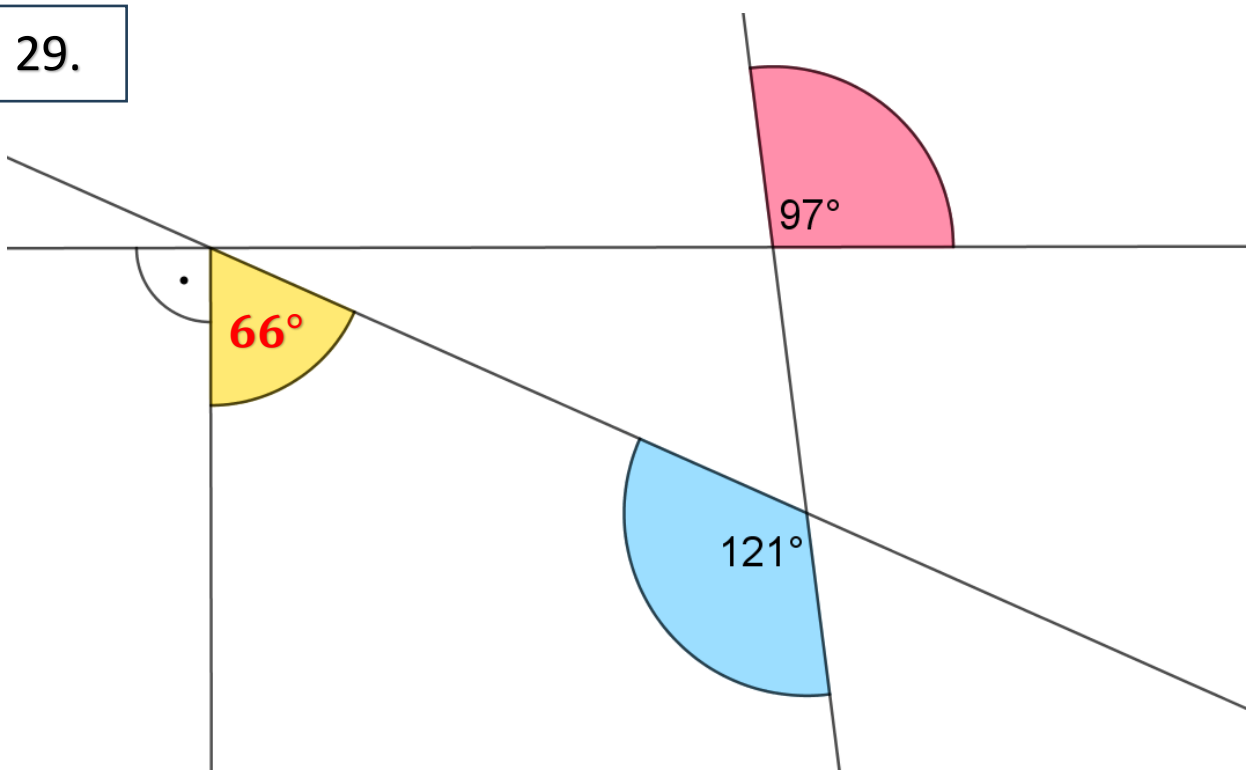

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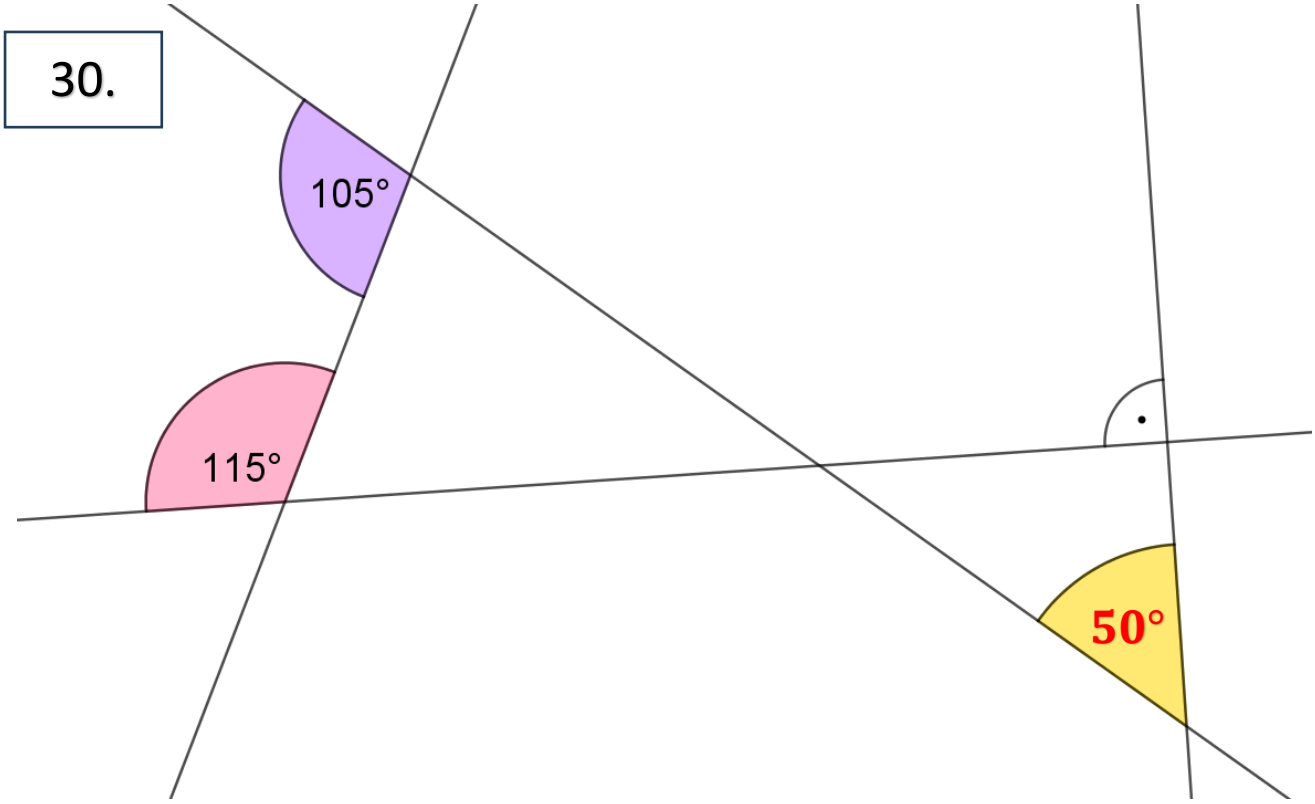

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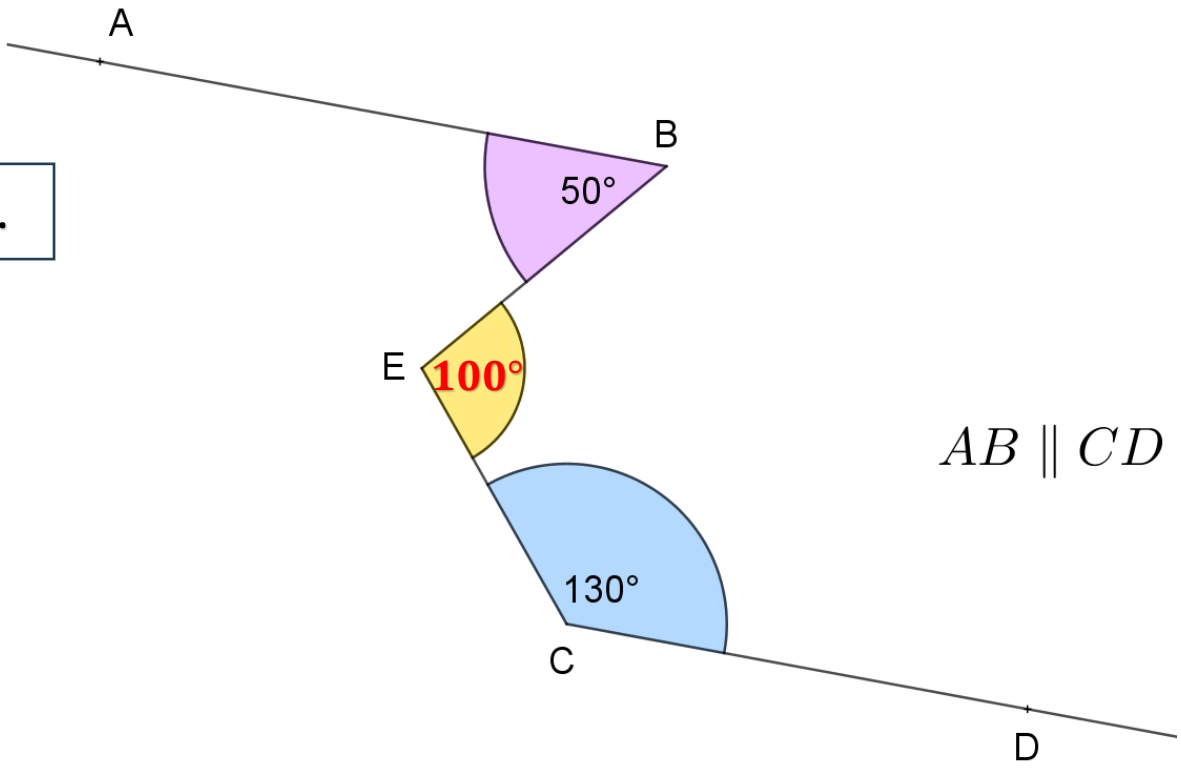
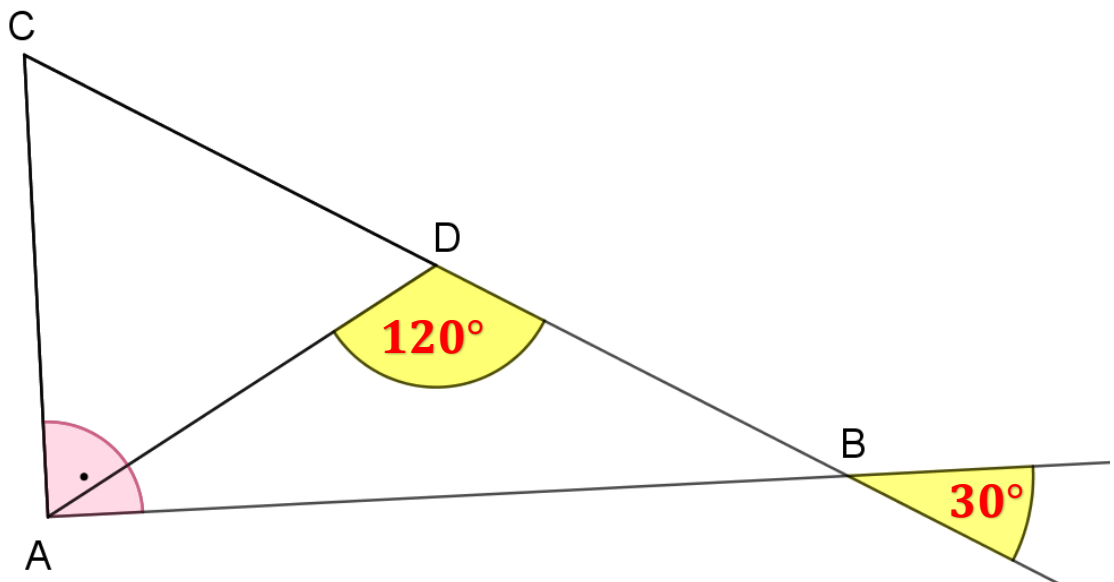


$AB \parallel CD$

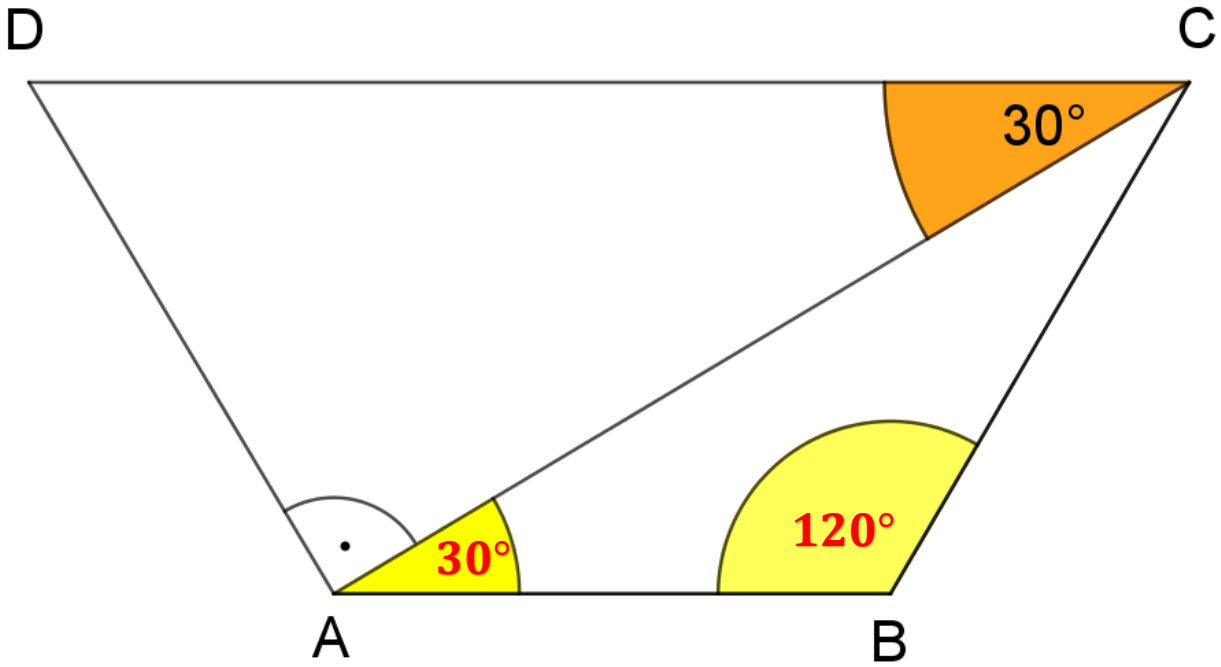
32.



$$|AD| = |DC| = |CA|$$

33.

Lichobežník $ABCD$ je rovnoramenný



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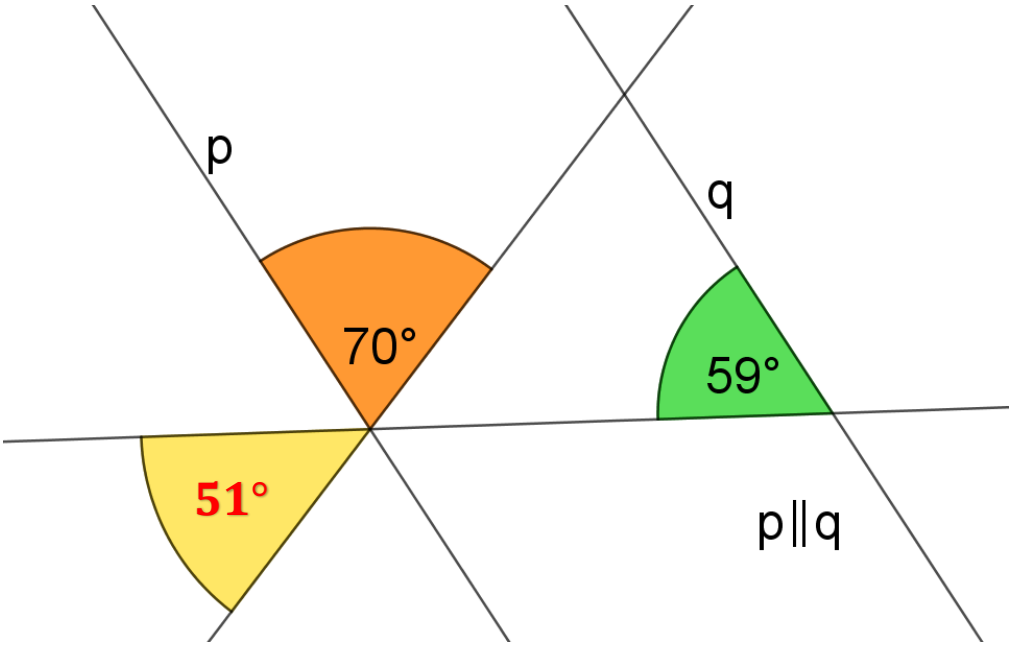

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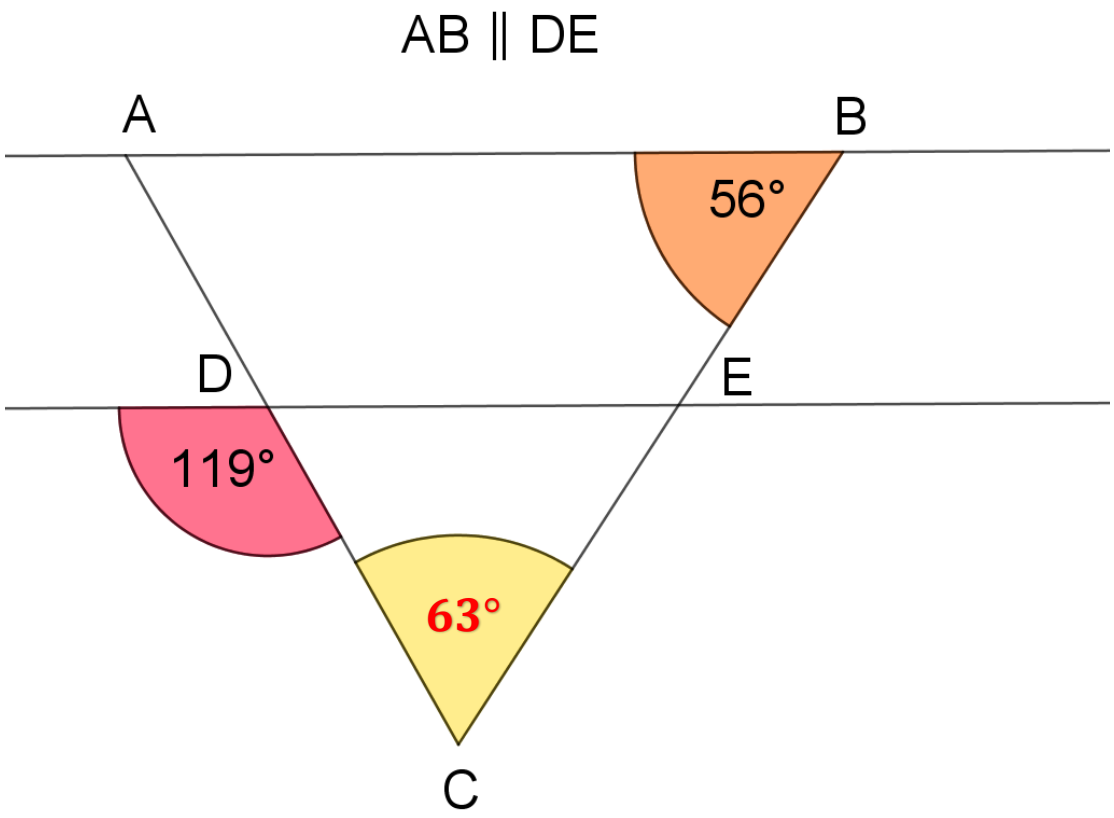

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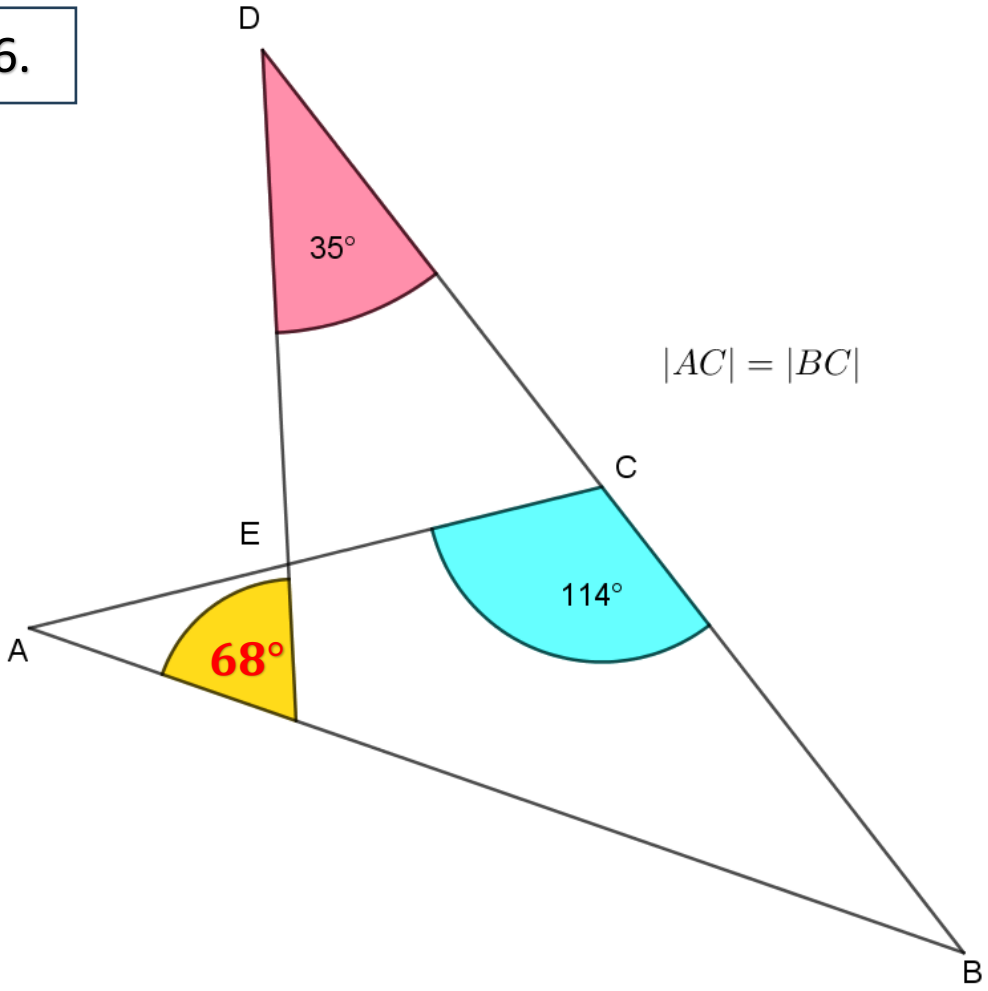

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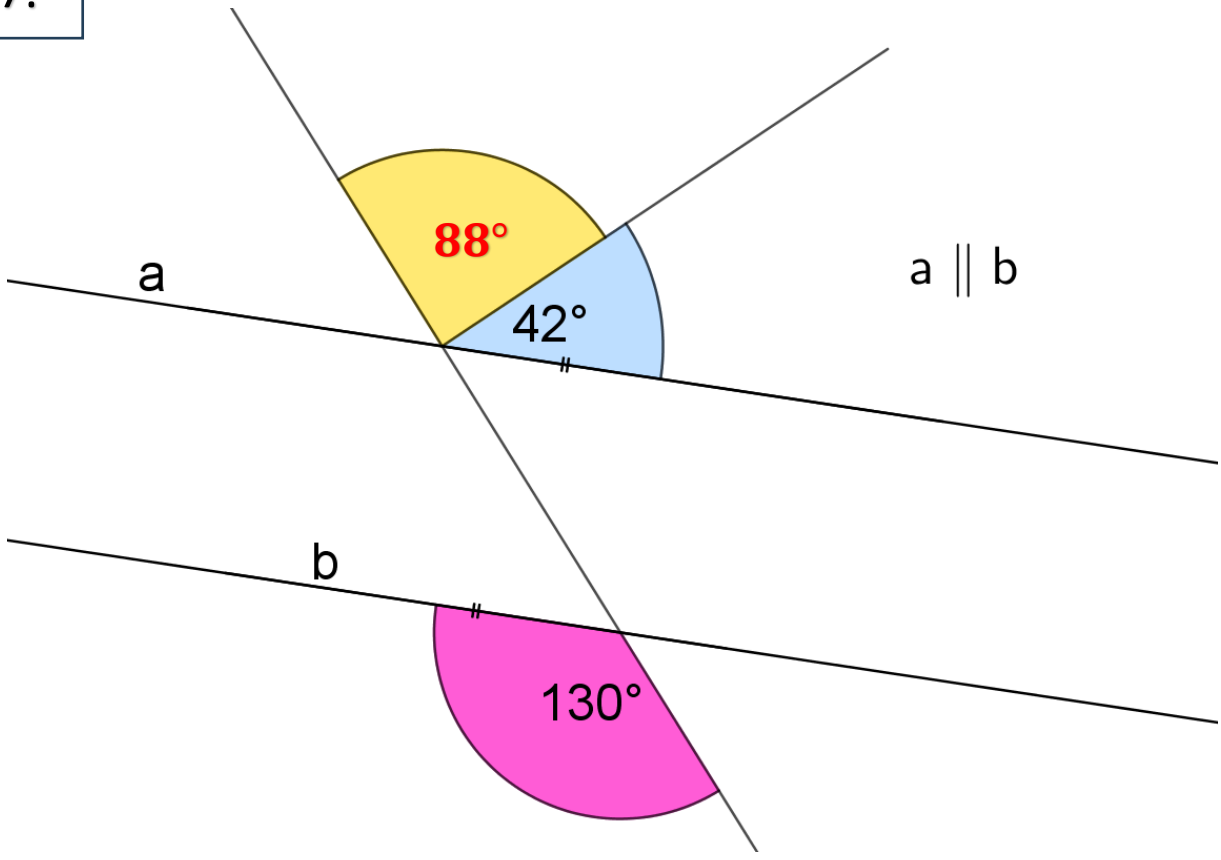
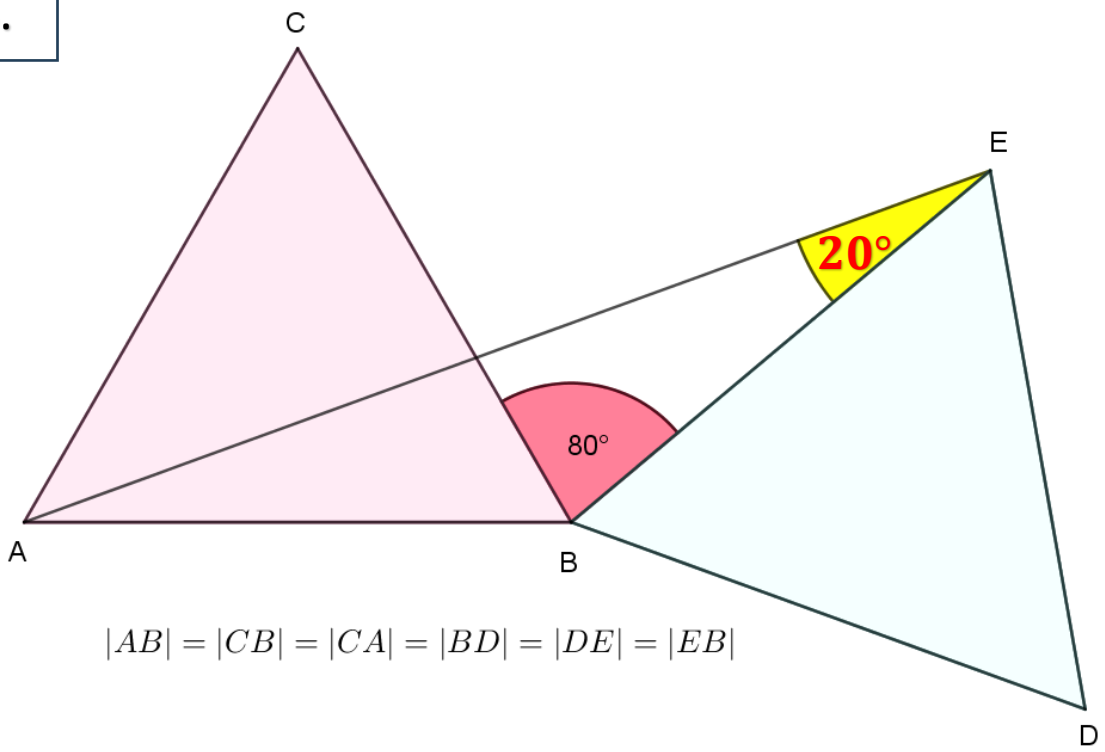


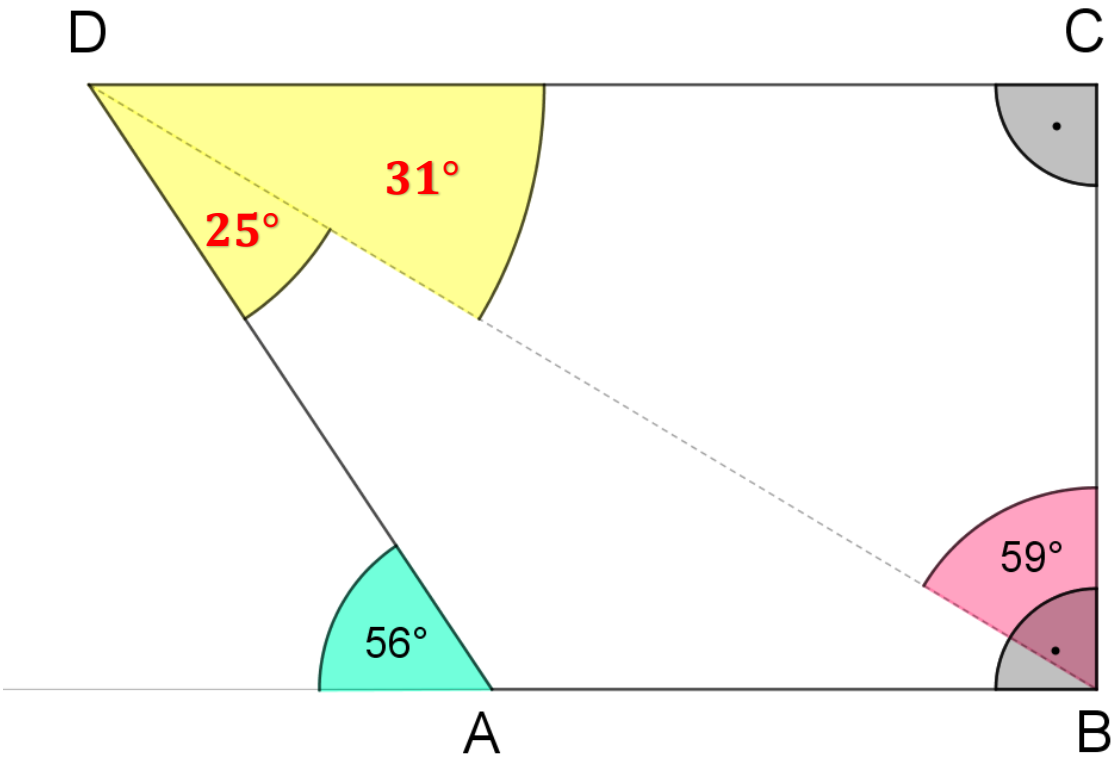
38.



$$|AB| = |CB| = |CA| = |BD| = |DE| = |EB|$$

39.

Lichobežník $ABCD$



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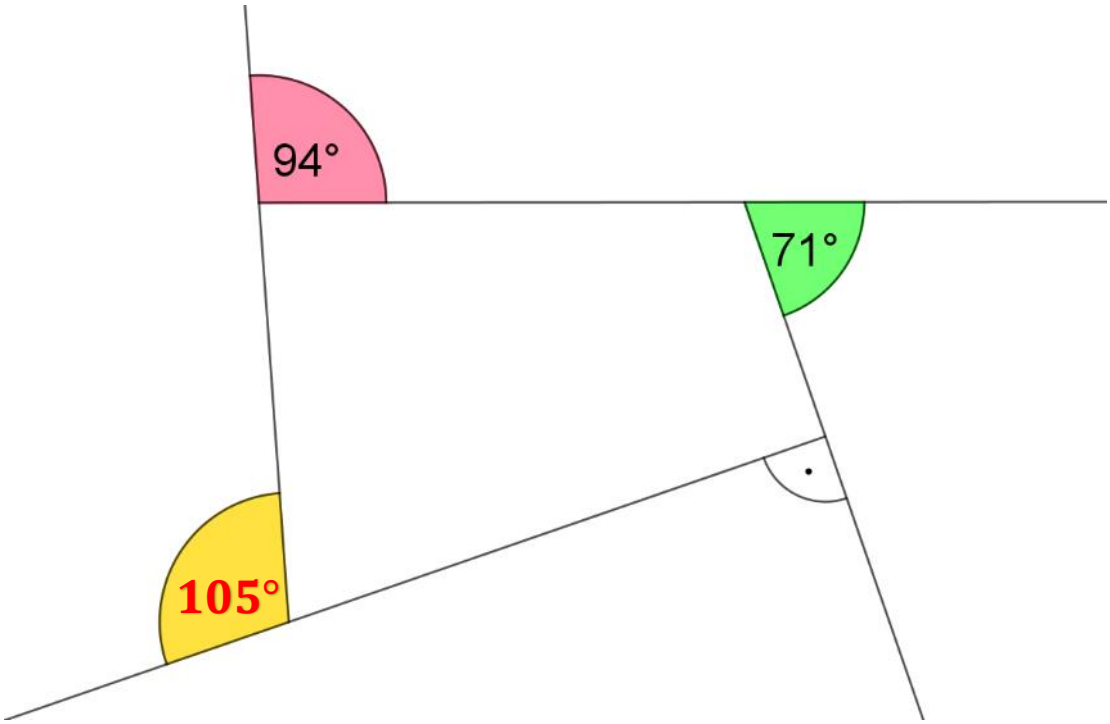

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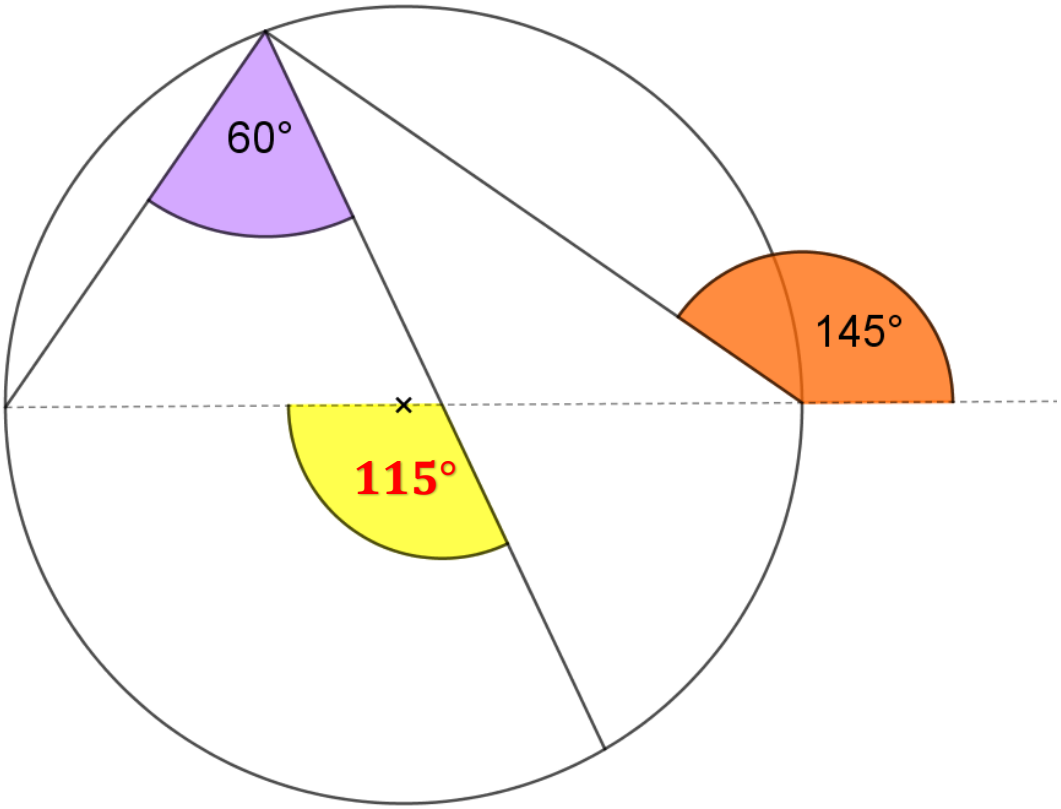
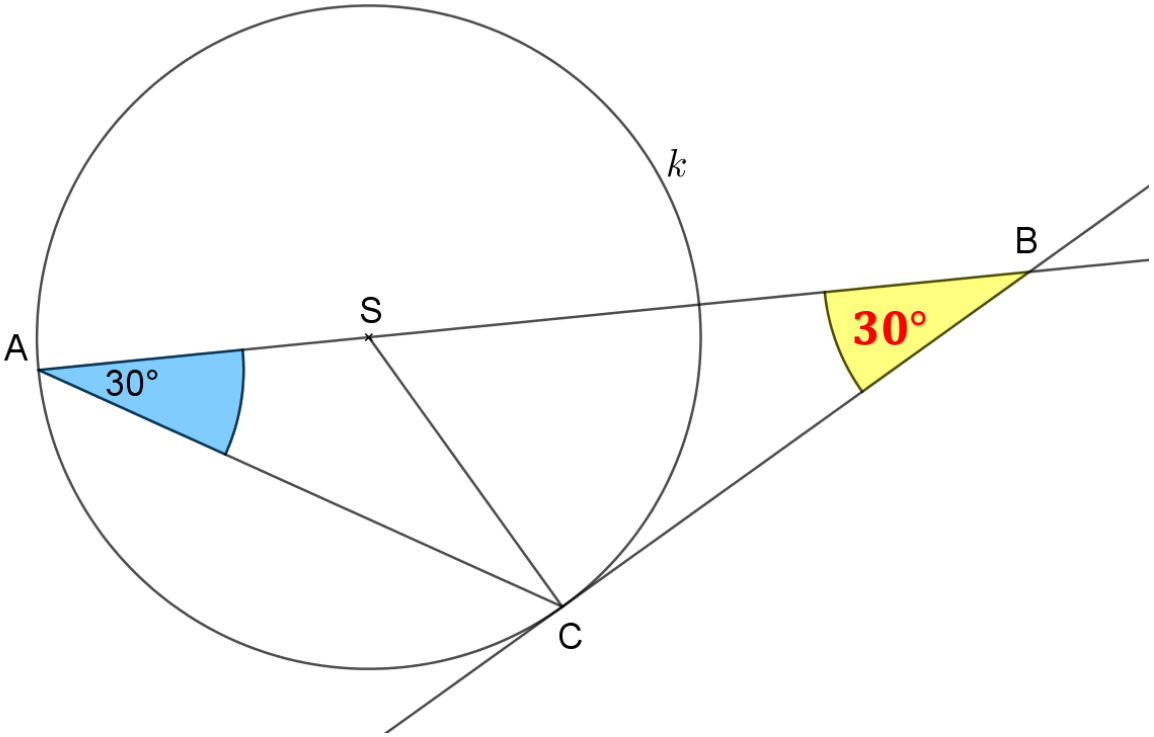


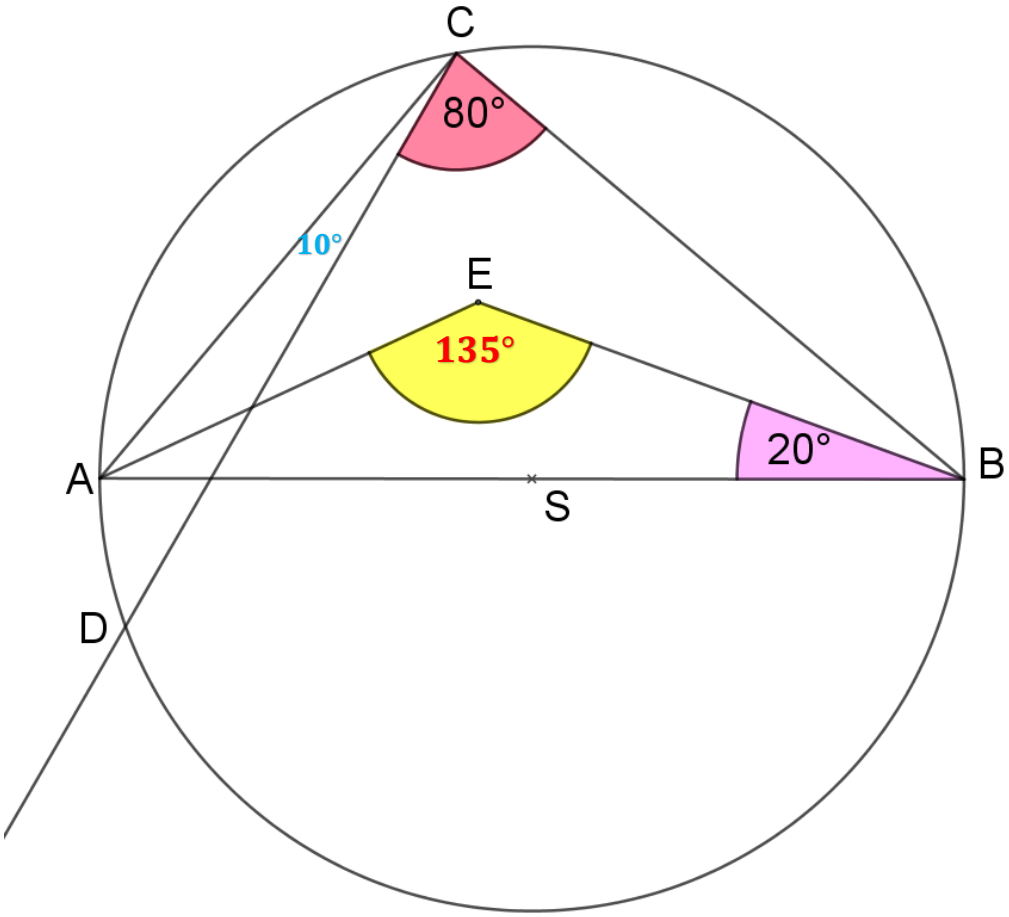
42.

BC je dotyčnica ku kružnici k



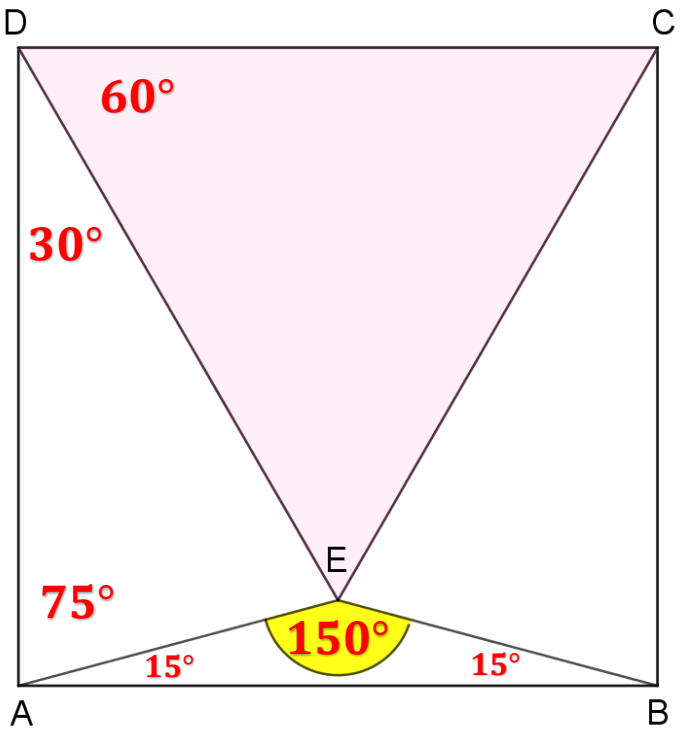
43.

Bod E je stred kružnice vpísanej trojuholníku ABC

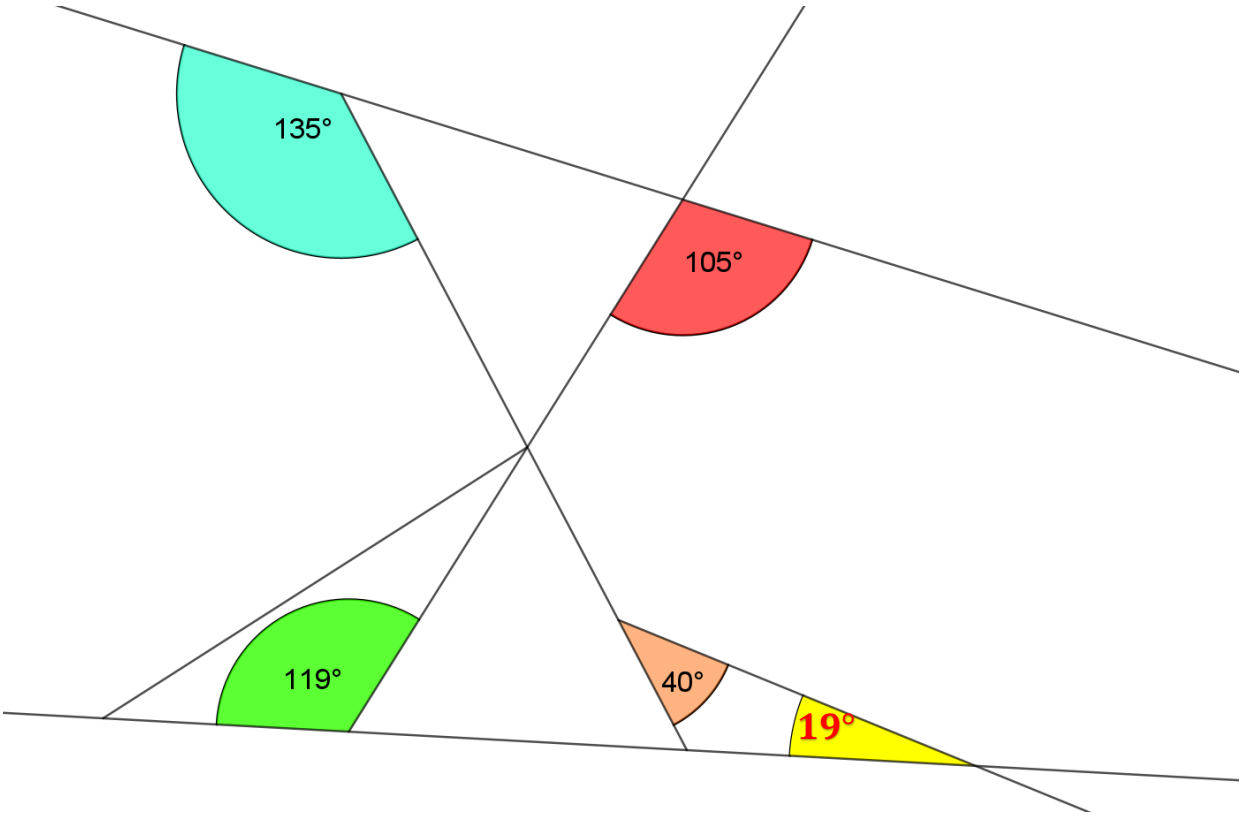


Trojuholník ECD je rovnostranný, $ABCD$ je štvorec a $|DA| = |DE|$

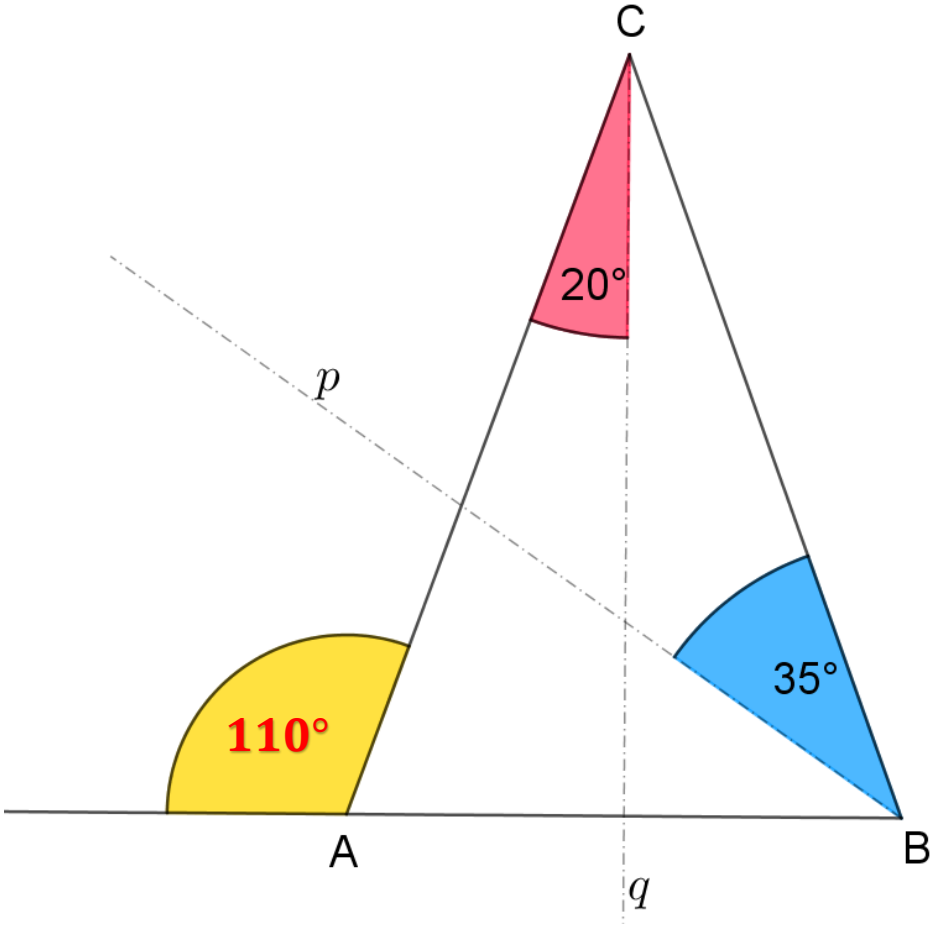
44.



45.

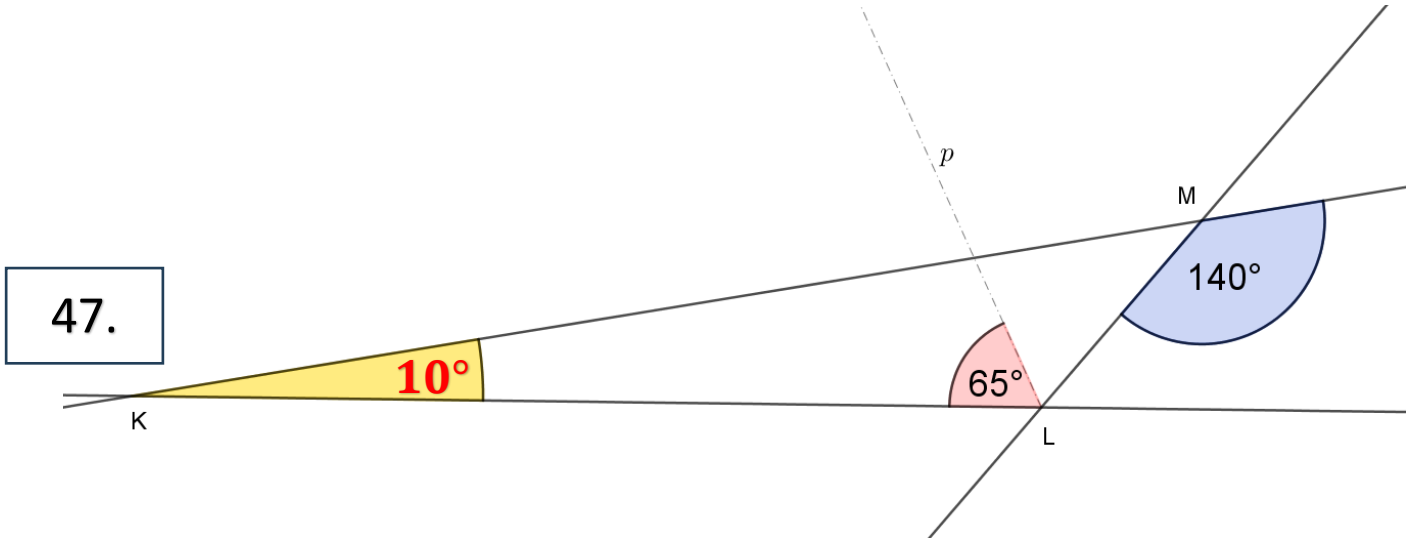


46.



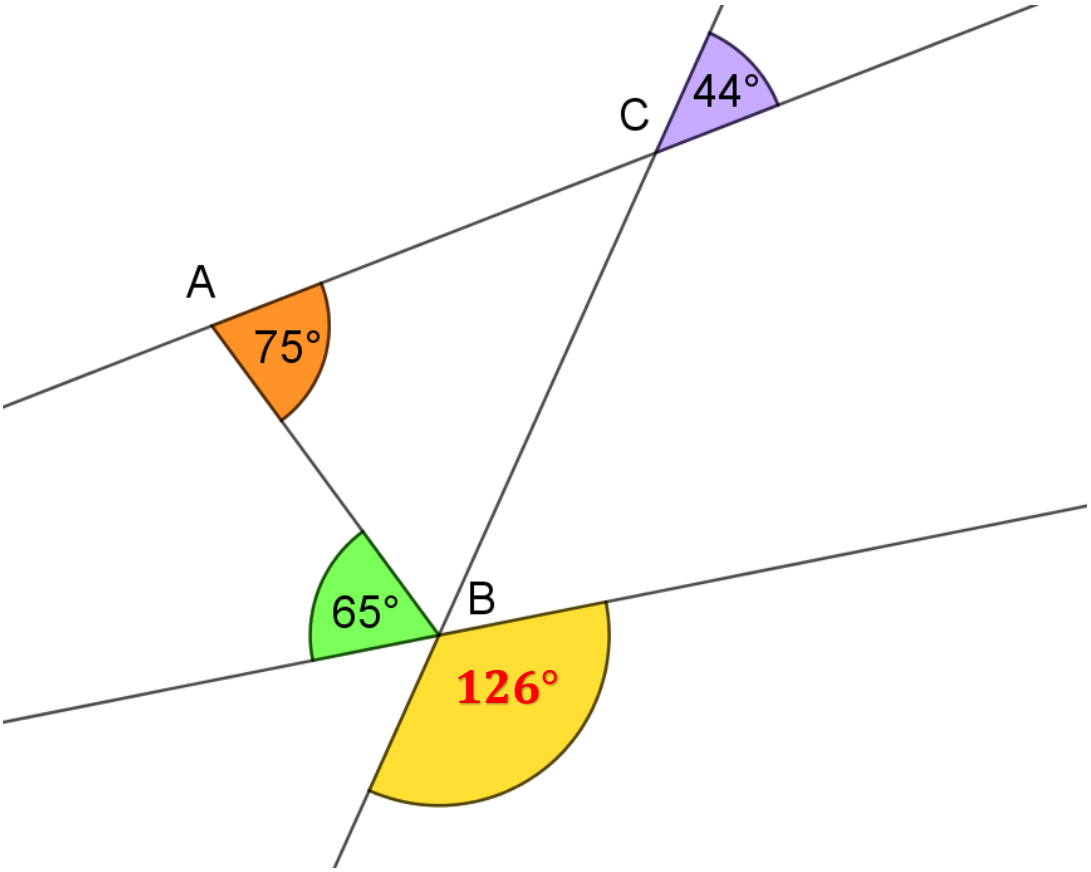
Polpriamky p je os uhla $\sphericalangle ABC$ a polpriamka q je os uhla $\sphericalangle BCA$

47.

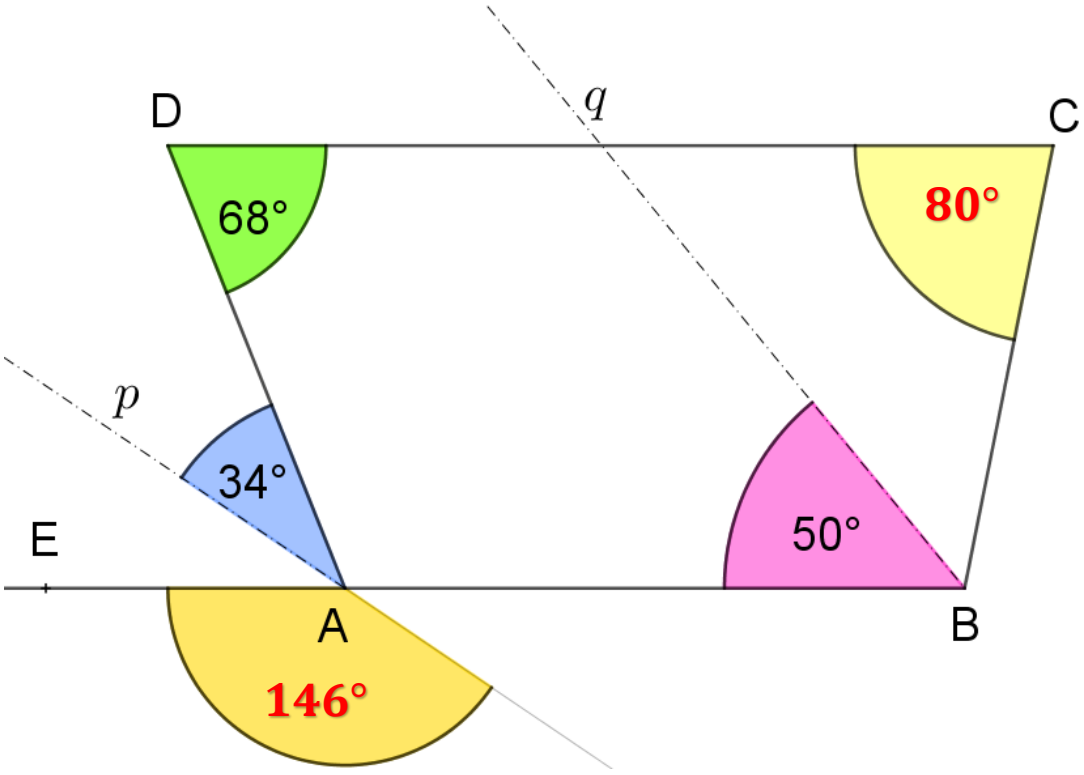


Polpriamka p je os uhla $\sphericalangle KLM$

48.



49.



V lichobežníku $ABCD$ je polpriamka q os uhla $\sphericalangle ABC$ a polpriamky p os uhla $\sphericalangle EAD$

50.

$|AD| = |DB| = |DC|$ a $AB \parallel CD$