

















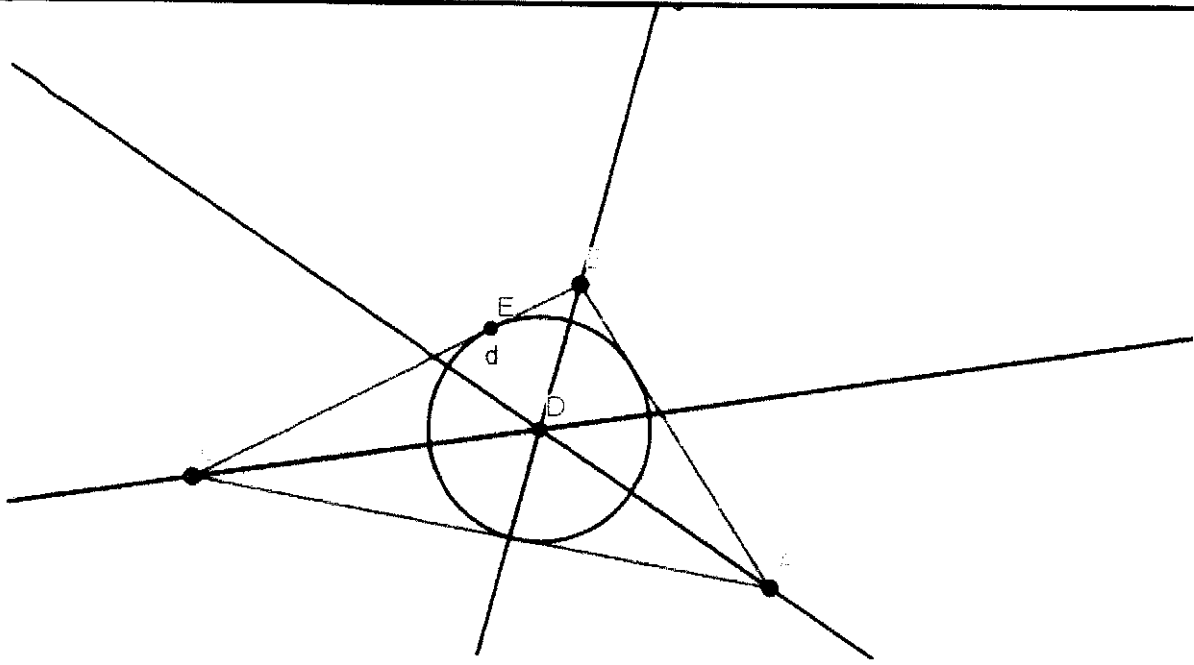


EUROGEBRA WORKSHEET

INSCRIBED CIRCLE

<i>MENU</i>	<i>TOOL</i>	<i>PROCESS STEPS</i>
	 Polygon	Draw an arbitrary triangle ABC
	 Angle Bisector	Create the angle bisector of the angle A
	 Angle Bisector	Create the angle bisector of the angle B
	 Angle Bisector	Create the angle bisector of the angle C
	 Intersect	Mark intersections of those three bisectors as a point D
	 Perpendicular Line	Draw perpendicular line from point D to BC segment
	 Point	Mark intersections of this perpendicular line and BC segment as a point E
		Create a circle whose centre is point D and passing through point E



















Did you find any relation between the centre of inscribed circle and intersection of angle bisectors?





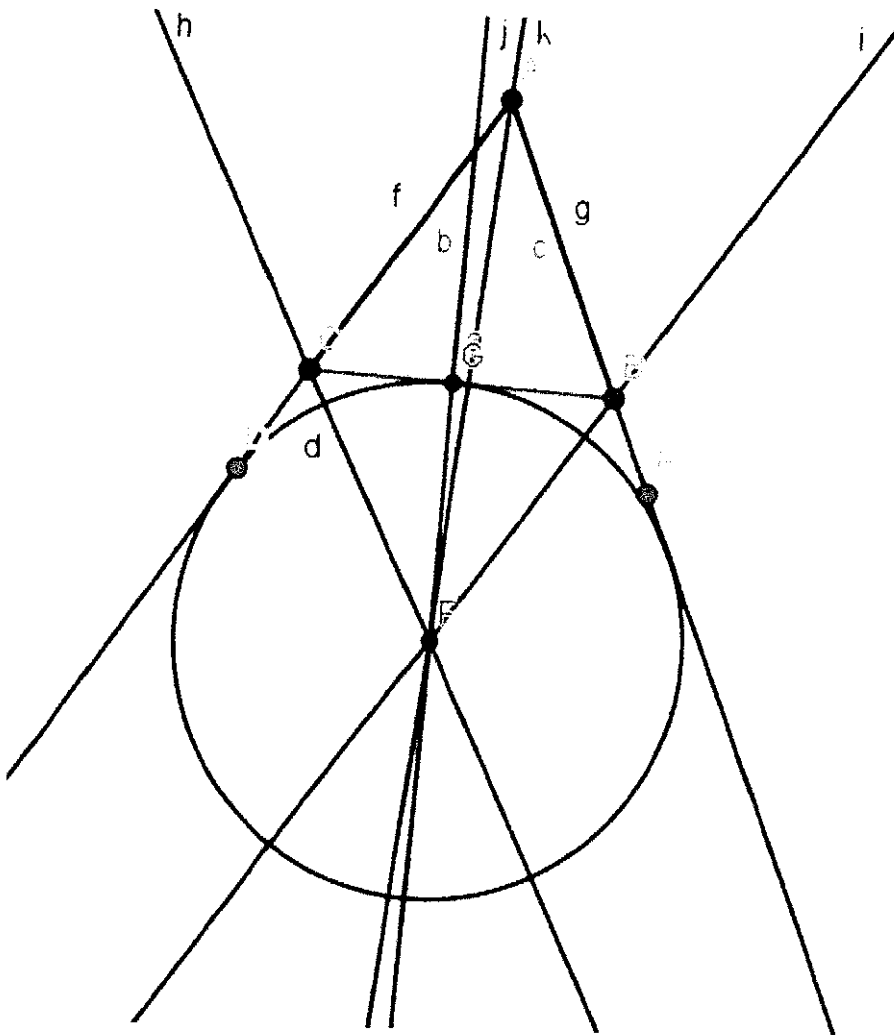
EUROGEBRA WORKSHEET No

ESCRIBED CIRCLE

<i>MENU</i>	<i>TOOL</i>	<i>PROCESS STEPS</i>
	 Polygon	Draw an arbitrary triangle ABC
	 Ray	Create the AC ray and then the point D on it, outside the segment AC
	 Ray	Create the AB ray and then the point E on it, outside the segment AB
	 Angle Bisector	Create the bisector of the angle DCB.
	 Angle Bisector	Create the bisector of the angle CBE.
	 Angle Bisector	Create the bisector of the angle CAB.
	 Intersect	Mark intersections of those three bisectors as a point F
	 Perpendicular Line	Draw perpendicular line from point F to BC segment and name it point G
	 Circle with centre through point	Create a circle whose centre is point F and passing through point G



















Repeat these processes other external angles.
Is there any relation among escribed circles of triangle and two
external angle bisectors and one internal angle bisector?





EUROGEBRA WORKSHEET

CIRCUMSCRIBED CIRCLE

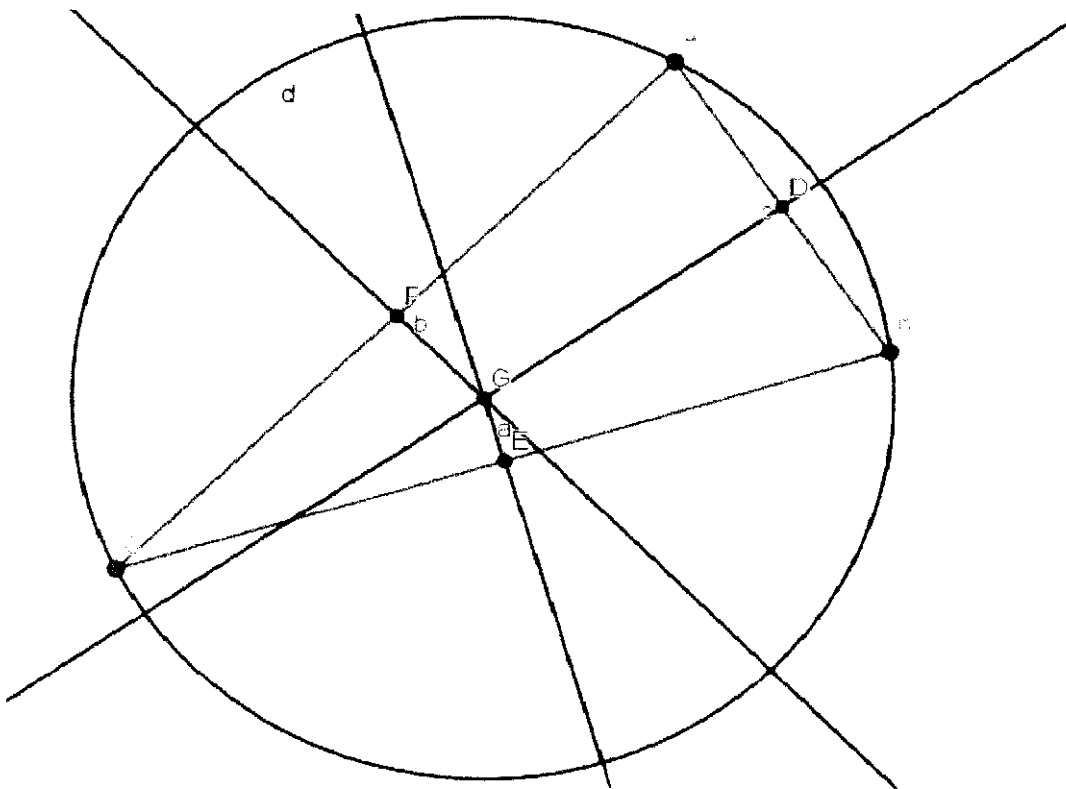
MENU	TOOL	PROCESS STEPS
	 Polygon	Draw an arbitrary triangle ABC
	 Midpoint or Centre	Find the midpoint of segment AB and name it D
	 Perpendicular Line	Draw perpendicular line from point D to AB segment
	 Midpoint or Centre	Find the midpoint of segment BC and name it E
	 Perpendicular Line	Draw perpendicular line from point E to BC segment
	 Midpoint or Centre	Find the midpoint of segment AC and name it F
	 Perpendicular Line	Draw perpendicular line from point F to AC segment
	 Intersect	Mark the intersection of perpendicular lines and name it point G



Circle with centre
through point

Create a circle whose centre is point G
and passing through point A,B or C















**Did you find any relation between the centre of
circumscribed circle and intersection of perpendicular lines?**





EUROGEBRA WORKSHEET

APPLICATION TO CARNOT THEOREM

MENU	TOOL	PROCESS STEPS
	 Polygon	Draw an arbitrary triangle ABC
	 Point	Mark an arbitrary point D inside of triangle
	 Perpendicular Line	Draw perpendicular lines from point D to segment AB
	 Perpendicular Line	Draw perpendicular lines from point D to segment AC
	 Perpendicular Line	Draw perpendicular lines from point D to segment BC
	 Intersect	Mark the intersection of perpendicular line and segment AB – point E Mark the intersection of perpendicular line and segment AC – point F Mark the intersection of perpendicular line and segment BC – point G
	 Distance or length	Find the lengths of segment AF, FC, CG, GB, BE, AE



Go to algebra section and Rename the length of segment $AF(=k)$

$CG(=l)$

$BE(=m)$

$CF(=p)$

$GB(=q)$

$AE(=r)$



















Go to algebra section and type $k^2+l^2+m^2$ and $p^2+q^2+r^2$

Compare the results you found. What do you notice?









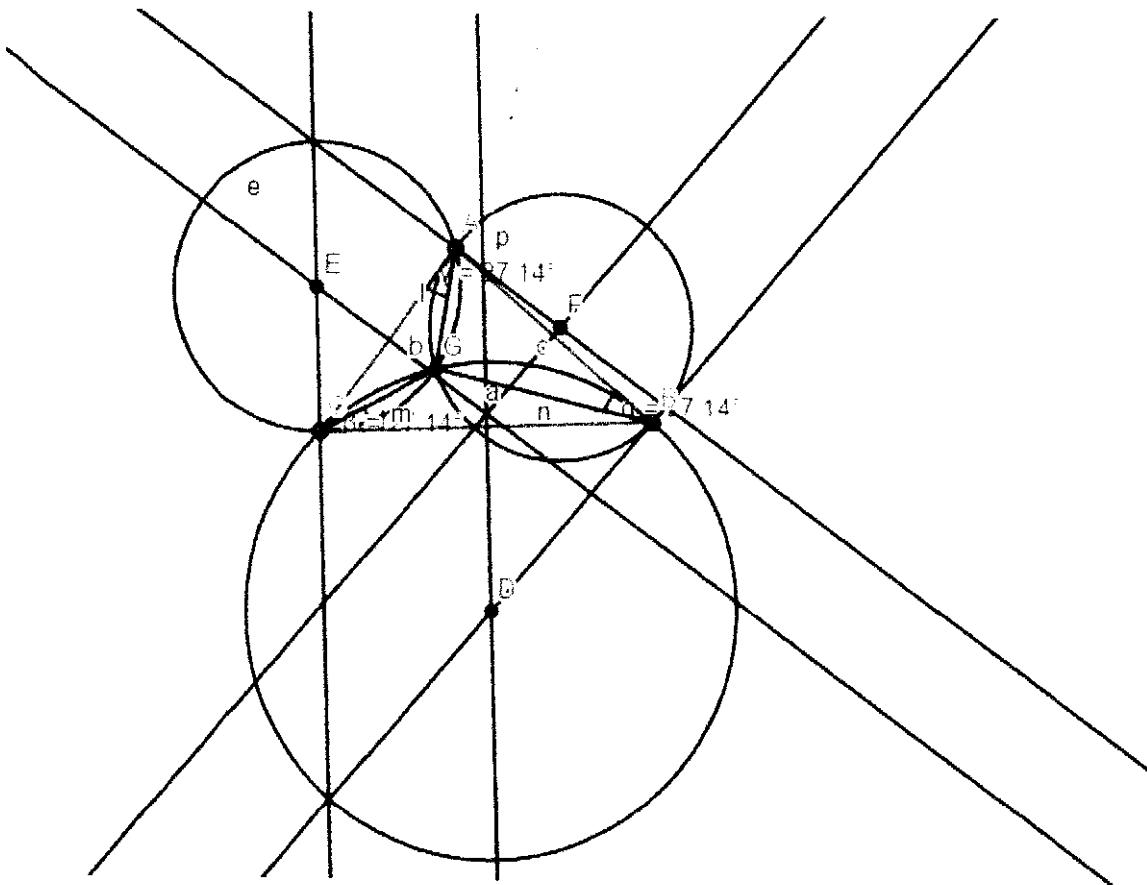
EUROGEBRA WORKSHEET

Brocard Angle

MENU	TOOL	PROCESS STEPS
	 Polygon	Draw an arbitrary triangle ABC
	 Perpendicular bisector	Create perpendicular bisectors to segment AB(name it g), BC(name it f), AC(name it h)
	 Perpendicular Line	Draw perpendicular line from point B to AB segment and name it j
	 Perpendicular Line	Draw perpendicular line from point A to AC segment and name it k
	 Perpendicular Line	Draw perpendicular line from point C to BC segment and name it i
	 Intersect	Mark the intersection of f and j (point D) Mark the intersection of h and i (point E) Mark the intersection of g and k (point F)
	 circle with centre through point	Create a circle whose centre is point D and passing through point B
	 circle with centre through point	Create a circle whose centre is point E and passing through point C
	 circle with centre through point	Create a circle whose centre is point F and passing through point A





















	 Intersect	<p>Intersect three circles and name it point G</p>
	 Segment	<p>Create segment AG, CG, BG</p>
	 Angle	<p>Find the sizes of angle ABG, angle BCG, angle CAG</p>
<p>Compare the results you found. What can you say about sizes of angles?</p>		

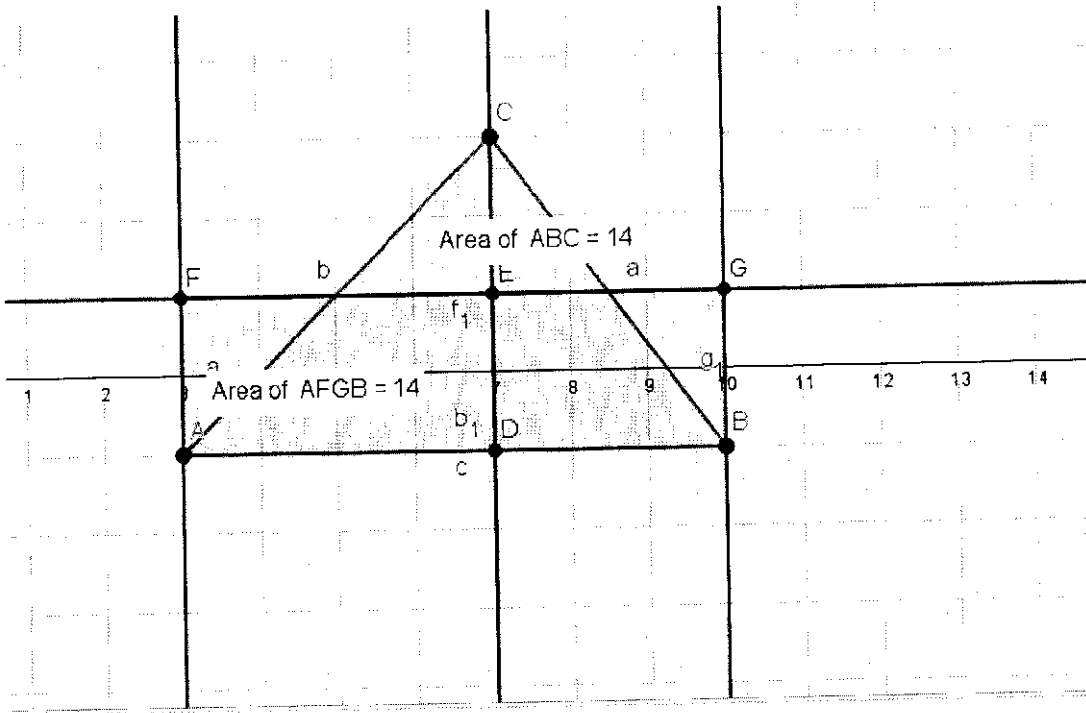




EUROGEBRA WORKSHEET No

DRAW A RECTANGLE WITH THE SAME AREA AS THE GIVEN TRIANGLE AREA

MENU	TOOL	PROCESS STEPS
	 Polygon	Draw an arbitrary triangle ABC
	 Perpendicular Line	Construct perpendicular line to segment AB from vertex C
	 Intersect	Mark the intersection of perpendicular line and segment AB – point D
	 Midpoint or Centre	Find the midpoint of segment CD – point E
	 Parallel Line	Construct the parallel line „g“ through point E to segment AB
	 Perpendicular Line	Draw perpendicular lines from points A and B to parallel line „g“
	 Point	Mark intersections of those lines – points F and G
	 Polygon	Select vertices of rectangle A, B, G, F (then first vertex again)
	 Area	Compare areas of rectangle ABGF and triangle ABC





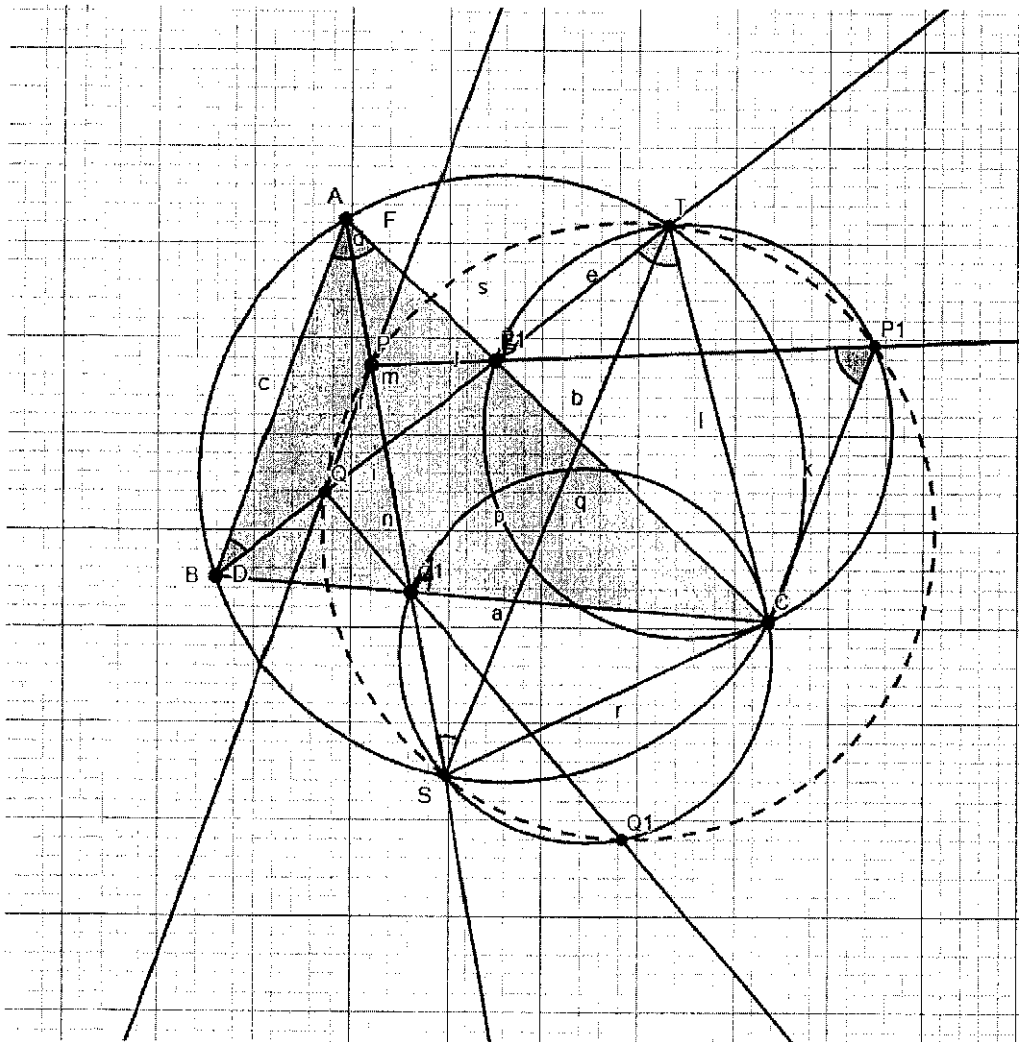
EUROGEBRA WORKSHEET ...

Math Olympiad P.2 - 2019













MENU	TOOL	PROCESS STEPS
	Polygon	Draw an arbitrary triangle ABC
	Point	<ul style="list-style-type: none"> • Draw point A₁ on the side BC • Draw point B₁ on the side AC
	Segment	<ul style="list-style-type: none"> • Draw the segment AA₁ • Draw the segment BB₁
	Point	Draw point P on the side AA ₁
	Parallel Line	Draw a parallel line from point P to the side AB
	Intersect	Find the intersection of the previous parallel with BB ₁ and name it Q
	Circle through 3 Points	Draw the circle of the triangle ABC
	Ray	Draw the ray BB ₁
	Intersect	Name T the intersection point between BB ₁ and the circle of the ABC.
	Circle through 3 Points	Draw the circle of the triangle TB ₁ C
	Ray	Draw the ray PB ₁
	Intersect	Name P ₁ the intersection point of the previous ray and the circle of the triangle TB ₁ C
	Segment	Draw the segments CP ₁ and TC
Now the $\angle PP_1C = \angle BAC$ (Why?)		
	Ray	Draw the ray AA ₁
	Intersect	Name S the intersection point between AA ₁ and the circle of the ABC.



	Circle through 3 Points	Draw the circle of the triangle SA_1C
	Ray	Draw the ray QA_1
	Intersect	Name Q_1 the intersection point of the previous ray and the circle of the triangle SA_1C
	Segment	Draw the segments ST and SC
<p><i>Draw the segment Q_1C</i> / Now the $\angle CQ_1Q = \angle CBA$ (Why?)</p>		
<p>Prove that P, Q, P_1, Q_1 are concyclic</p>		



EUROGEBRA WORKSHEET 1
Zostrojte úsečku, ktorá má dĺžku $\sqrt{12}$

MENU	TOOL	PROCESS STEPS
		We find two numbers whose product is 12 and whose length we can construct. For example, 4 and 3.
	 Úsečka s danou dĺžkou	Create a line A, B with a length of 7cm (4 + 3)
	 Úsečka s danou dĺžkou	Mark the point C on the line AB at a distance of 4 cm from the point A
	 Kolmica	Make a perpendicular line to line AB in point C
	 Stred	Locate the midpoint of the line AB - point D
	 Kružnica daná stredom a bodom	Make a circle with the center D and the radius DB, respectively DA
	 Priesečník	Determine the intersection of the circle and the perpendicular to the line AB - point F



cm ↗ Vzďialenosť alebo dĺžka

Check the length of the FC line

Riešenie vychádza z Euklidovej vety o výške : $v^2 = c_a \cdot c_b$

V tomto prípade $(FC)^2 = AC \cdot CB$

$v = \sqrt{12}$ cm, $c_a = 4$ cm, $c_b = 3$ cm

Riešenie vychádza z Euklidovej vety o výške : $v^2 = c_a \cdot c_b$

V tomto prípade $(FC)^2 = AC \cdot CB$

$v = \sqrt{12}$ cm, $c_a = 4$ cm, $c_b = 3$ cm

