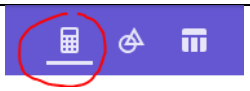
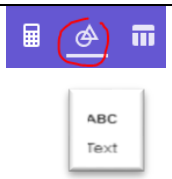
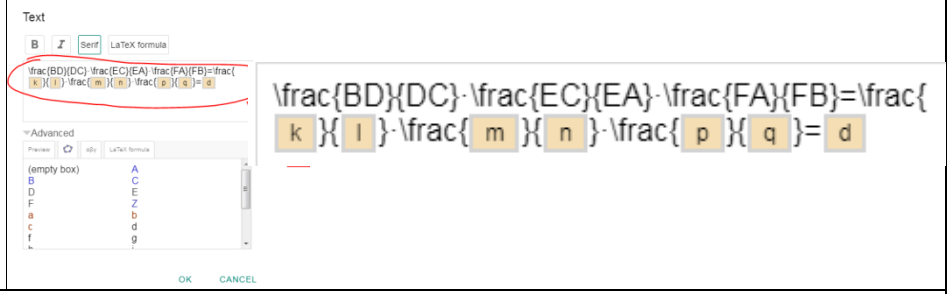
EuroGebra Worksheets

Application of Menelaus Theorem to the Bisector Theorem

 Polygon	Construct the triangle ABC
 Angle Bisector	Create the angle bisector of the angle A
 Intersect	Create the intersection point D from Bisector A and segment(BC)
 Ray	Create the CB ray and then the point Z on it, outside the segment BC
 Angle Bisector	Create the bisector of the angle ZBA.
 Ray	Create the CA ray
 Intersect	Create the intersect point E between ray CA and bisector of the ZBA angle
 Angle Bisector	Create the bisector of the angle BAC.
 Intersect	Create the intersect point F between segment AB and bisector of the BAC angle
 Segment	• Create segment BD (=k) • Create segment DC (=l) • Create segment EC (=m) • Create segment EA (=n) • Create segment FA (=p) • Create segment FB (=q)
	Go to Algebra section and type $\frac{k}{\ell} \cdot \frac{m}{n} \cdot \frac{p}{q}$ (=d)



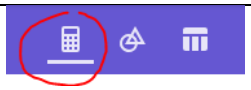
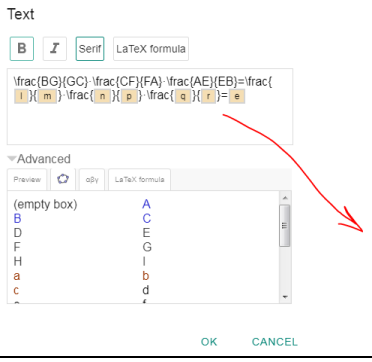
Go to Geometry section and Text button and type:



What you can say as a result about the position of the points E,F,D ?

EuroGebra Worksheets

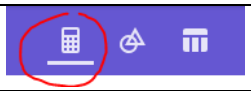
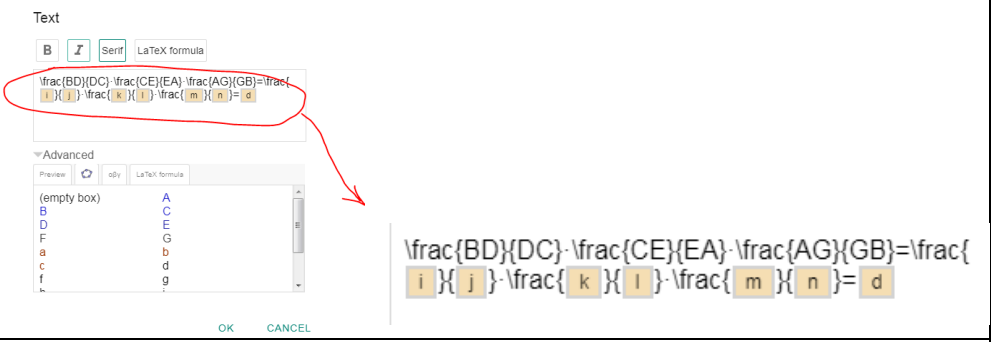
Application to Ceva Theorem

 Polygon	Construct the triangle ABC
 Angle Bisector	• Create the bisector of the BAC angle • Create the bisector of the ABC angle
 Intersect	Create the intersection point D of the two previous bisectors
 Perpendicular Line	Create the perpendicular line from point D to AB segment
 Intersect	Create the intersection point E of the perpendicular line and AB segment
 Circle with Centre	Create the inner circle d: (D,E)
 Intersect	Create the intersection points G and F of the circle and the triangle.
 Segment	Create the segments AG, BF, CE, BG, GC, CF, FA, AE, EB
	Go to Algebra section and type $:\frac{\ell}{m}\cdot\frac{n}{p}\cdot\frac{q}{r}$ (=e)
	Go to Geometry section and Text button and type:  $\frac{BG}{GC}\cdot\frac{CF}{FA}\cdot\frac{AE}{EB}=\frac{l}{m}\cdot\frac{n}{p}\cdot\frac{q}{r}=e$

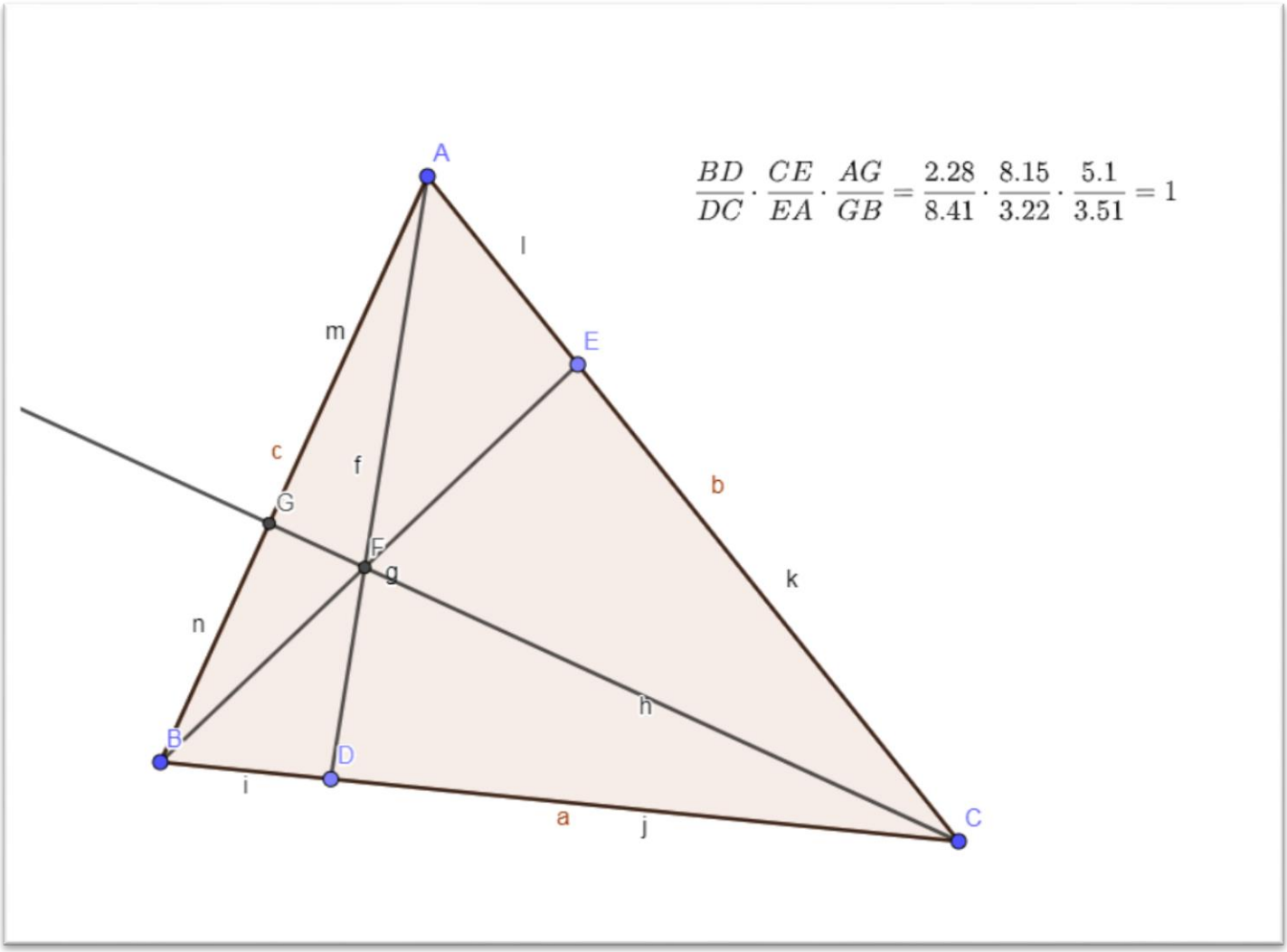
Can you find a relation to the Ceva's Theorem?

EuroGebra Worksheets

Ceva Theorem

 Polygon	Construct the triangle ABC
 Point	• Create point D on the segment BC • Create point E on the segment AC
 Segment	• Create the segment AD • Create the segment BE
 Intersect	Create the intersection point F from segments AD and BE
 Ray	Create the CF ray
 Intersect	Create the intersection point G from segments AB and ray CF
 Segment	• Create segment BD (=i) • Create segment DC (=j) • Create segment EC (=k) • Create segment EA (=l) • Create segment GA (=m) • Create segment GB (=n)
	Go to Algebra section and type $\frac{i}{j}\cdot\frac{k}{\ell}\cdot\frac{m}{n}$ (=d)
	Go to Geometry section and Text button and type: 

Can you find a relation to the Menelaos Theorem?


$\frac{BD}{DC} \cdot \frac{CE}{EA} \cdot \frac{AG}{GB} = \frac{2.28}{8.41} \cdot \frac{8.15}{3.22} \cdot \frac{5.1}{3.51} = 1$
A
E
G
F
B
D
C
l
m
c
f
b
k
g
n
h
i
a
j

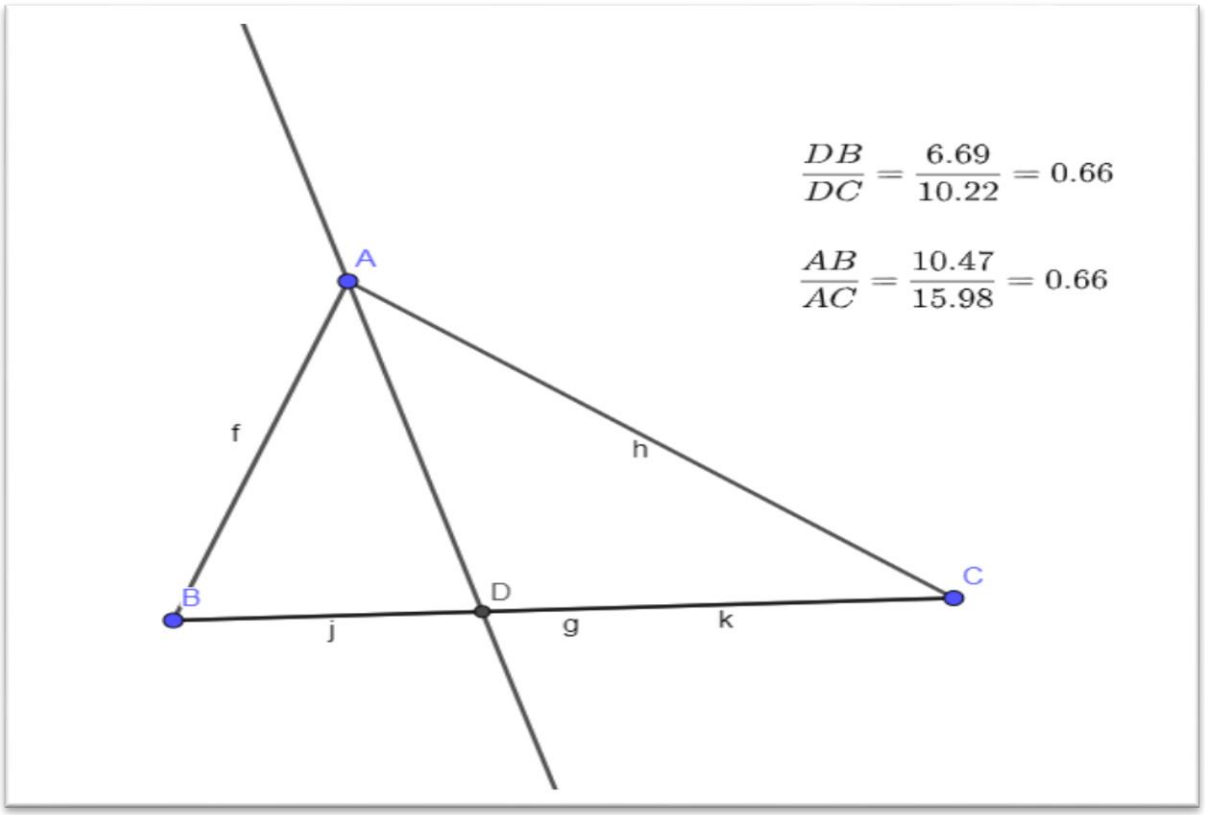
EuroGebra Worksheets

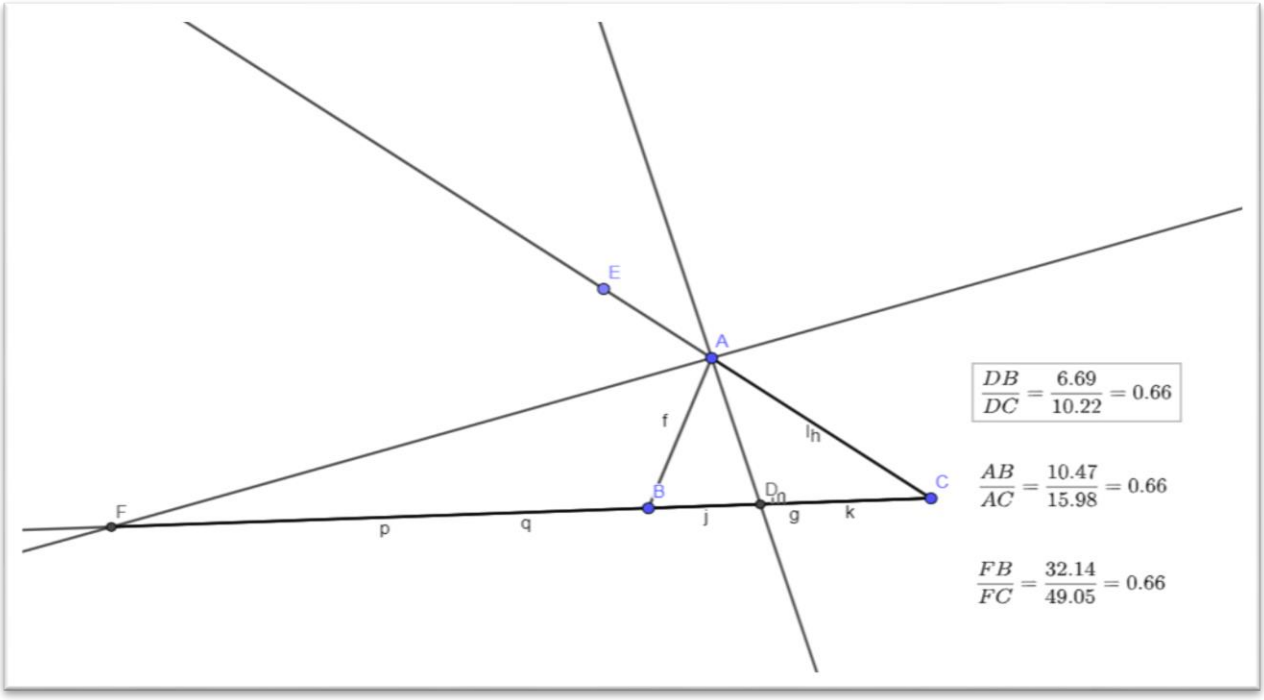
Internal Bicectors Theorem

	With this buttons create triangle ABC
	Create the angles A bisector clicking B,A,C points (with that order)
	Create the intersect point D of the segment BC and the bisector
	Create the segment BD and DC
	From Algebra section type j/k (creates a) and f/h (creates b)
	From Geometry section, create the following: 

<table>
<tr>
<td> 
</td>
<td>Similarly create

</td>
</tr>
<tr><td colspan="2">What do you notice ?</td></tr>
<tr><td colspan="2">Try to discover a similar relation with the help of external bicector of A angle</td></tr>
</table>

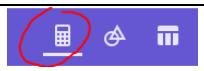
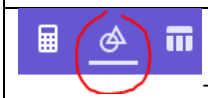


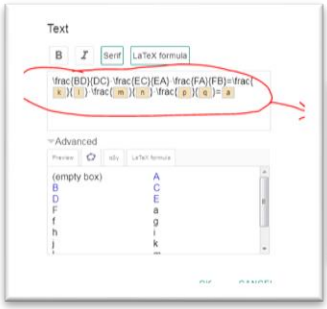

E
A
f
h
B
D
C
F
p
q
j
g
k
$\frac{DB}{DC} = \frac{6.69}{10.22} = 0.66$
$\frac{AB}{AC} = \frac{10.47}{15.98} = 0.66$
$\frac{FB}{FC} = \frac{32.14}{49.05} = 0.66$

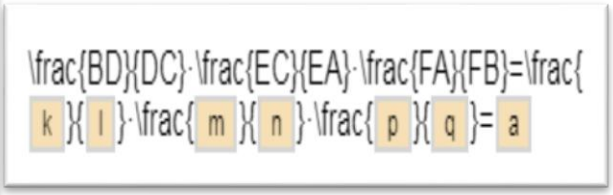
EuroGebra Worksheets

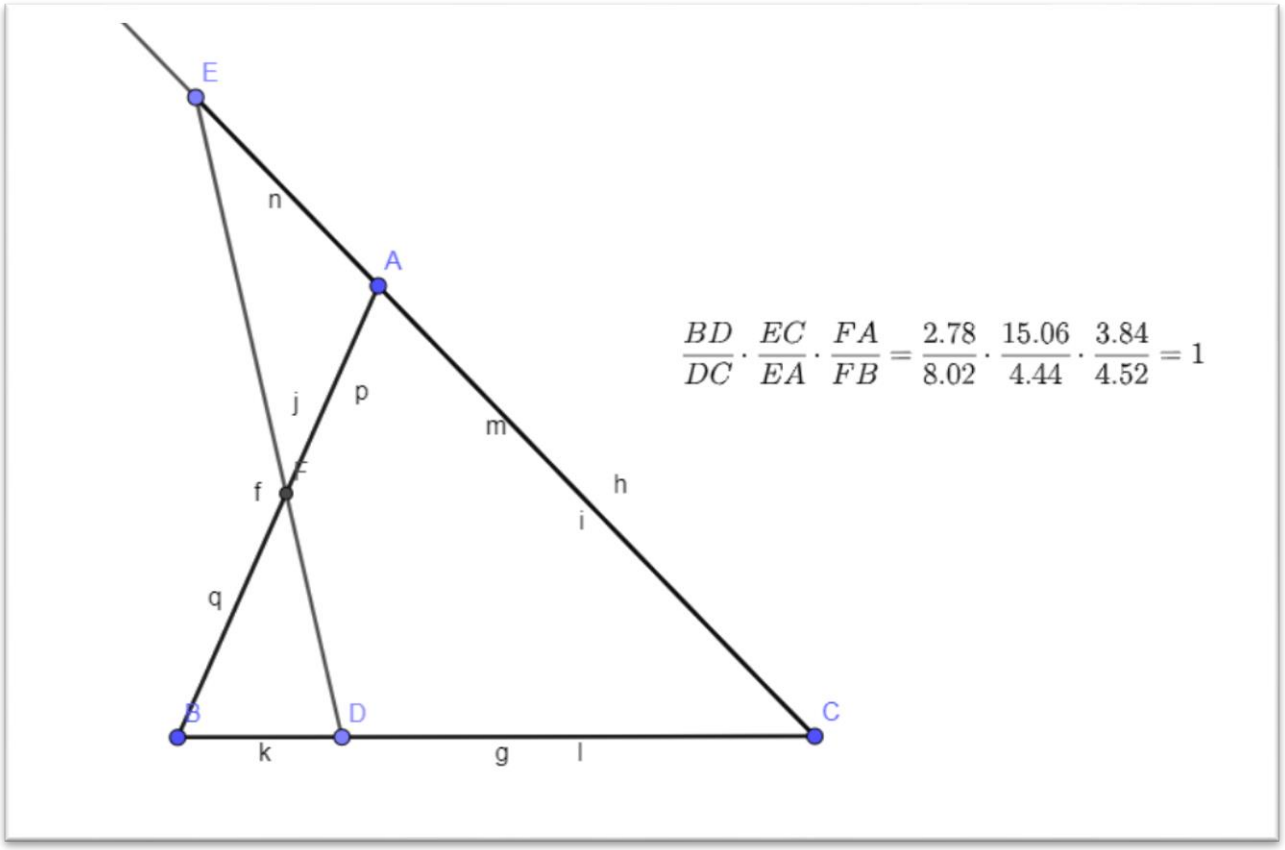
Menelaus Theorem

	Construct the triangle ABC
	Create a point D inside the segment BC
	Create the ray CA
	Create a point E on the ray CA outside of the segment AC
	Create the segment ED
	Create the intersect point F of ED and AB
	Define the segments BD,DC,EC,EA,FA,FB (with this order)

<table>
<tr>
<td>  </td>
<td>Type:  (that will give: a→1)</td>
</tr>
<tr>
<td>  ----->

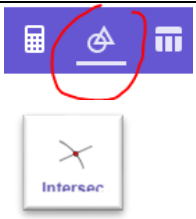
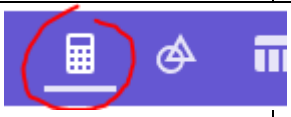
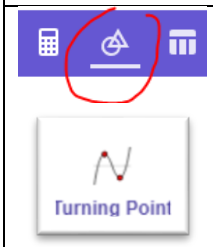
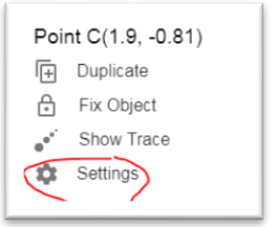
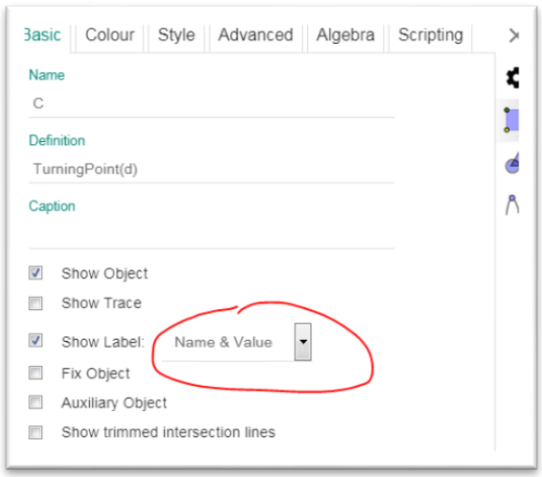
</td>
<td> 

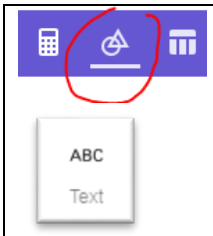

</td>
</tr>
</table>

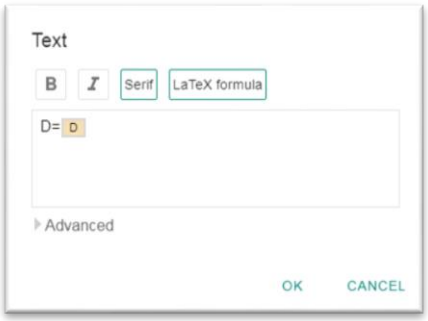


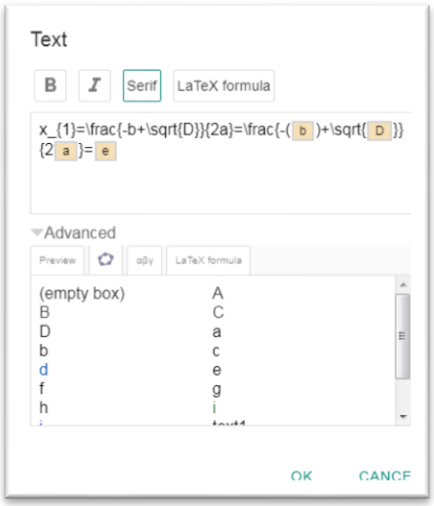
EuroGebra Worksheets

Quadratic Equation

	Create 3 sliders a,b,c
	$d(x) = a\,x^2 + b\,x + c$
	$b^2 - 4\,a\,c$ and then name it D
	Intersect(d, xAxis)
	$e = \frac{-b + \sqrt{D}}{2\,a}$ $f = \frac{-b - \sqrt{D}}{2\,a}$ $g = e + f$ $h = e\,f$
	Click on parabola d and the point C will appear. Then right click on the point C and:  
	x= (-b)/(2a) y= (-D)/(4a)

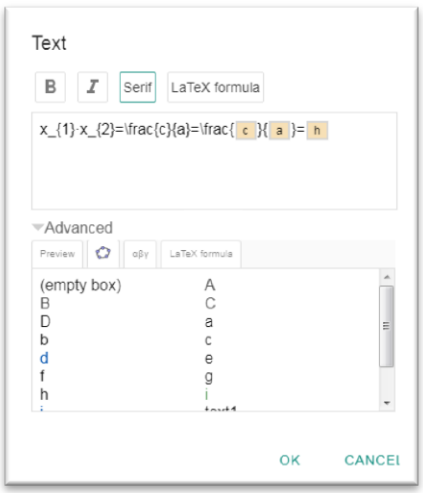

ABC
Text

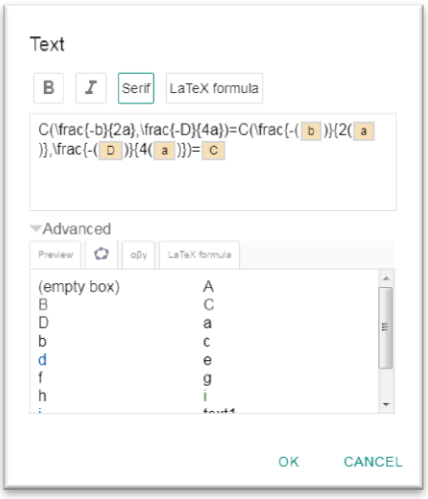

Text
B
I
Serif
LaTeX formula
D= D
Advanced
OK
CANCEL


Text
B
I
Serif
LaTeX formula
x_{1}=\frac{-b+\sqrt{D}}{2a}=\frac{-(b)+\sqrt{ D }}{2 a }= e
Advanced
Preview
αβγ
LaTeX formula
(empty box) A
B C
D a
b c
d e
f g
h i
OK
CANCE


Text
B
I
Serif
LaTeX formula
x_{2}=\frac{-b-\sqrt{D}}{2a}=\frac{-(b)-\sqrt{ D }}{2 a }= f
Advanced
Preview
αβγ
LaTeX formula
(empty box) A
B C
D a
b c
d e
f g
h i
OK
CANCEL

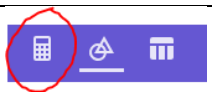
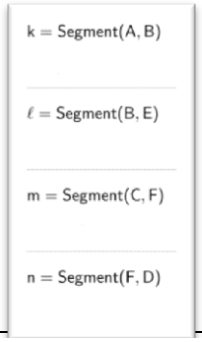

Text
B
I
Serif
LaTeX formula
x_{1}+x_{2}=\frac{-(b)}{a}=\frac{-(b)}{ a }= g
Advanced
Preview
αβγ
LaTeX formula
(empty box) A
B C
D a
b c
d e
f g
h i
OK
CANCEL

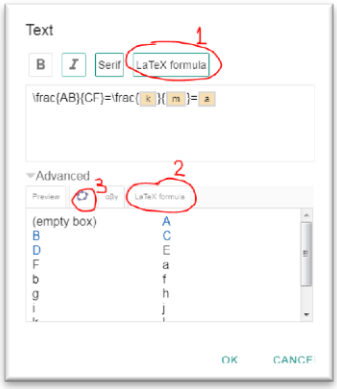
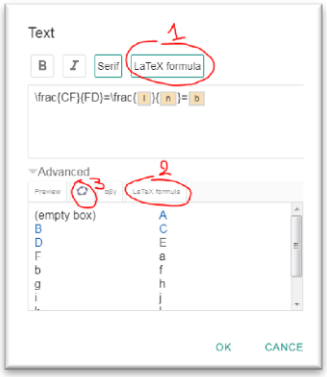

Text
B
I
Serif
LaTeX formula
x_{1}·x_{2}=\frac{c}{a}=\frac{ c }{ a }= h
Advanced
Preview
αβγ
LaTeX formula
(empty box) A
B C
D a
b c
d e
f g
h i
OK
CANCEL


Text
B
I
Serif
LaTeX formula
C(\frac{-b}{2a},\frac{-D}{4a})=C(\frac{-(b)}{2(a)},\frac{-(D)}{4(a)})= C
Advanced
Preview
αβγ
LaTeX formula
(empty box) A
B C
D a
b c
d e
f g
h i
OK
CANCEL

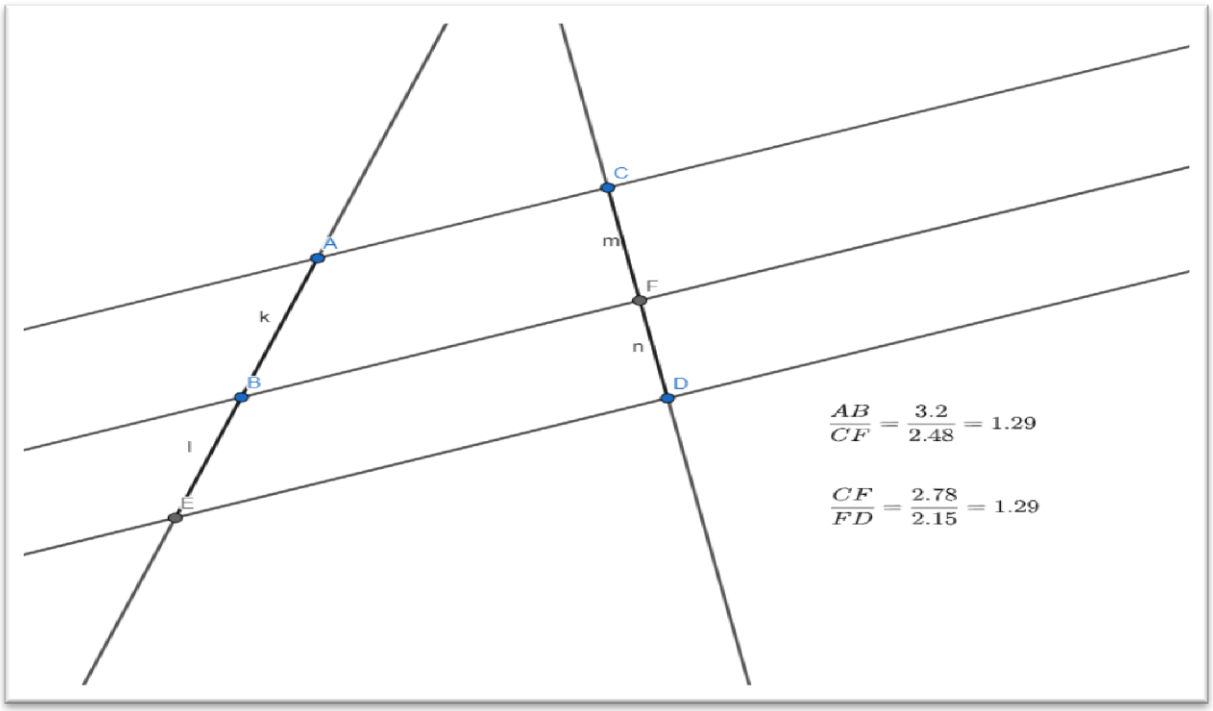
EuroGebra Worksheets

Thales Theorem

	Create a straight line of points A, B
	Similarly, a second line that is different from the first line, of points C, D
	From point A, make a straight line to point C
	From Point B make a parallel to the straight AC
	From point D, make a parallel to the straight AC
	With this button, create all the points of intersection of the lines that are not defined (from left to right) so that that the points A, B, E are in the same line and also the points C, D F.
	Define all straight parts AB, BE, CF and FD
	Go to the Algebra section and type $\frac{k}{m}$ and then type $\frac{\ell}{n}$ (Then you'll have $a = \frac{k}{m}$ and $b = \frac{\ell}{n}$) 

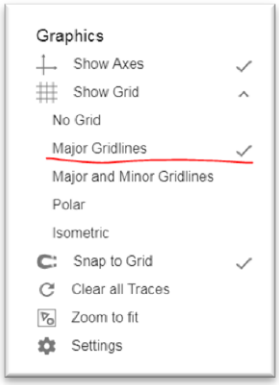
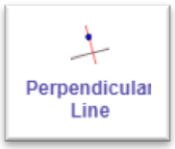
	Go back to Geometry and…
	Create the adjacent text with the button 
	Similarly, create the adjacent text with the button 

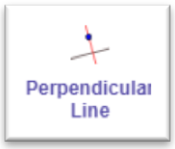
What do you notice?



EuroGebra Worksheets

Trigonometric circle and basic trigonometric identities

	Left Click and select Major gridlines
	Create point A(0,0) and B(1,0) and C(0,1)
	Create circle (A,B)
	Create:  and 
	Create point D on the circle
	Create line AD
	Create Angle(BAD)=α



PerpendicularLine(D, xAxis)

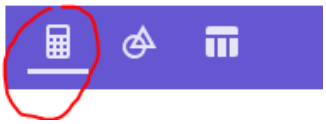
PerpendicularLine(D, yAxis)

E = Intersect(i, xAxis)

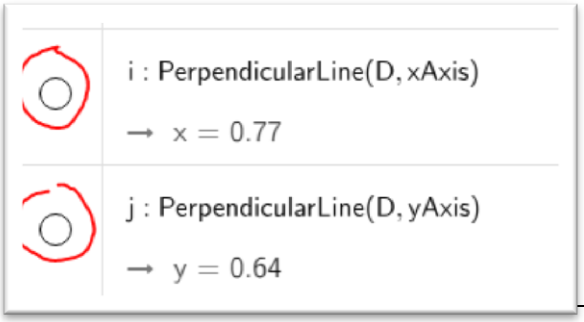
F = Intersect(j, yAxis)

G = Intersect(h, f)

H = Intersect(h, g)



Unselect the 2 left grey buttons



k = Segment(D, E)

ℓ = Segment(D, F)

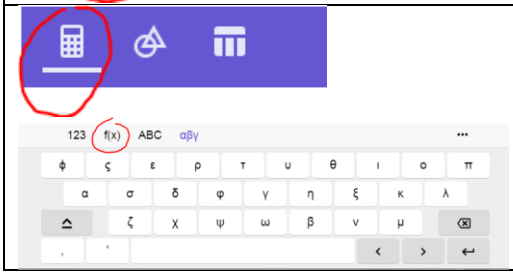
m = Segment(A, E)

n = Segment(A, F)

p = Segment(B, G)

q = Segment(C, H)

Click on the previous segments m,n,p,q and paint them with different colors



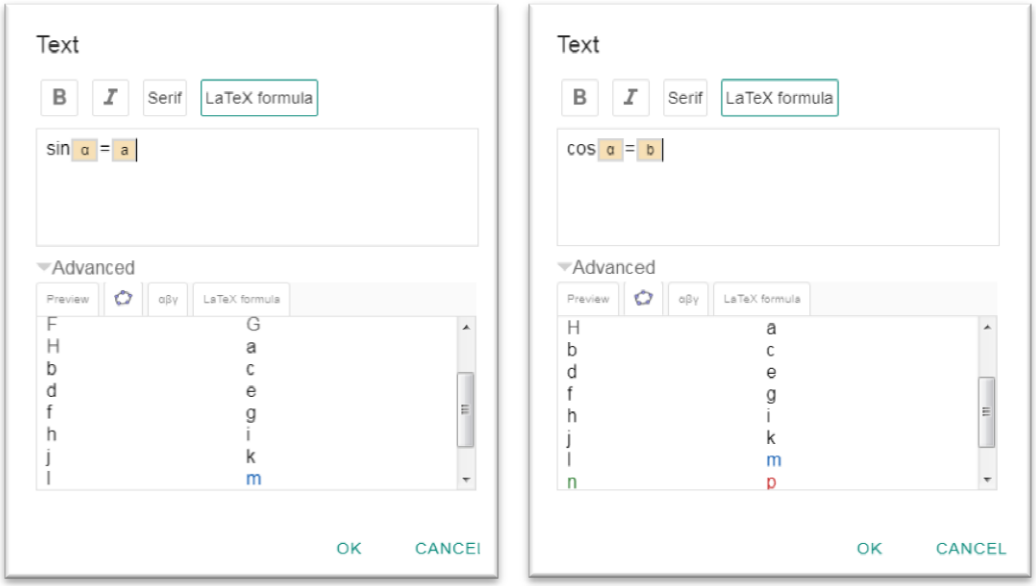
a = sin(α)

b = cos(α)

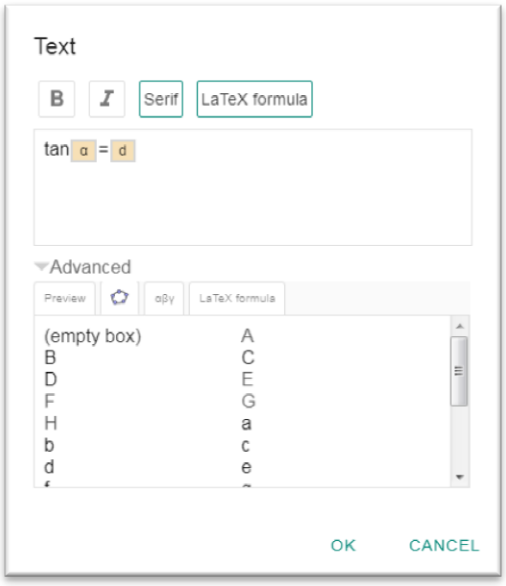
d = tan(α)

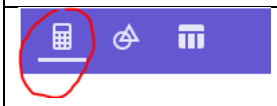
	$e = \frac{1}{\tan(\alpha)}$

Right click on point D:



.

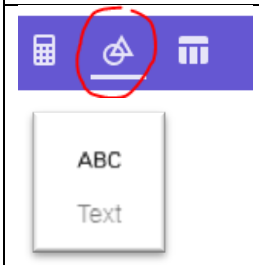




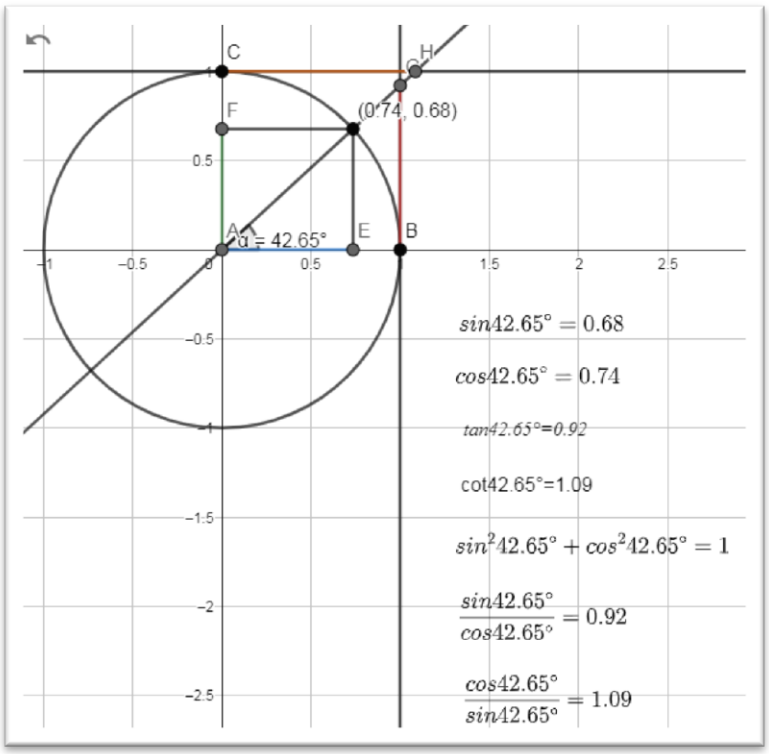
$$o = \sin^2(\alpha) + \cos^2(\alpha)$$

$$r = \frac{\sin(\alpha)}{\cos(\alpha)}$$

$$s = \frac{\cos(\alpha)}{\sin(\alpha)}$$




Text
B
I
Serif
LaTeX formula
\frac{cos α }{sin α }= s
Advanced
Preview
αβγ
LaTeX formula
(empty box)
A
B
C
D
E
F
G
H
a
b
c
d
e
OK
CANCEL


C
H
G
F
(0.74, 0.68)
0.5
A
α = 42.65°
E
B
−1
−0.5
0
0.5
1.5
2
2.5
−0.5
−1
−1.5
−2
−2.5
$sin42.65° = 0.68$
$cos42.65° = 0.74$
$tan42.65° = 0.92$
$cot42.65° = 1.09$
$sin^2 42.65° + cos^2 42.65° = 1$
$\frac{sin42.65°}{cos42.65°} = 0.92$
$\frac{cos42.65°}{sin42.65°} = 1.09$