












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	<ul style="list-style-type: none"> • 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 $\frac{k}{l} \cdot \frac{m}{n} \cdot \frac{p}{q} (=d)$












Go to Geometry section and Text button and type:

The screenshot shows a software interface with a top toolbar containing icons for a calculator, a geometry tool (circled in red), and a list icon. Below the toolbar is a 'Text' button. The main area displays a text input field with the LaTeX formula $\frac{BD}{DC} \cdot \frac{EC}{EA} \cdot \frac{FA}{FB} = \frac{k}{l} \cdot \frac{m}{n} \cdot \frac{p}{q} = d$. The input field is circled in red. To the right, the rendered formula is shown with the variables k, l, m, n, p, q highlighted in yellow. Below the input field is an 'Advanced' section with a 'Preview' button and a list of variables: (empty box), A, B, C, D, E, F, Z, a, b, c, d, f, g. At the bottom are 'OK' and 'CANCEL' buttons.

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











EuroGebra Worksheets

Application to Ceva Theorem

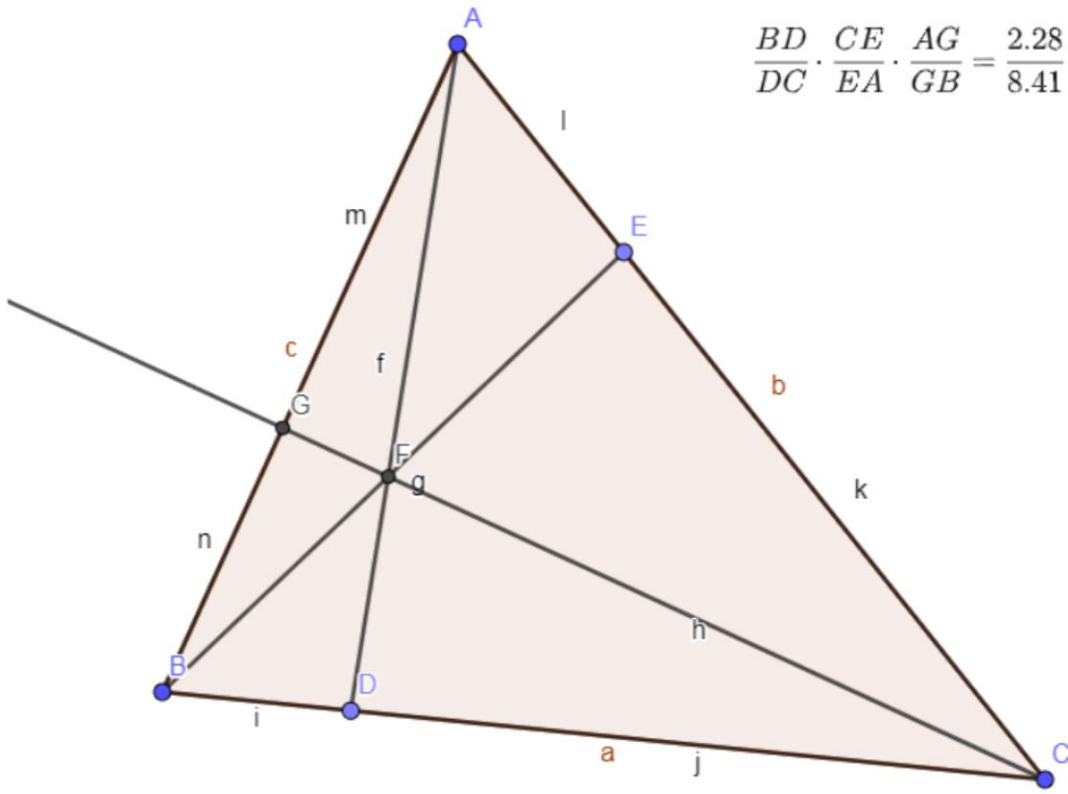
 Polygon	Construct the triangle ABC														
 Angle Bisector	<ul style="list-style-type: none"> • Create the bisector of the BAC angle • Create the bisector of the ABC angle 														
 Intersect	Create the intersection point D of the two previous bisectors														
 Perpendicular Line	Create 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 $\frac{l}{m} \cdot \frac{n}{p} \cdot \frac{q}{r} (=e)$														
 → 	Go to Geometry section and Text button and type: <div style="border: 1px solid gray; padding: 5px; margin: 10px 0;"> Text <div style="border: 1px solid gray; padding: 2px; margin: 2px 0;"> B I Serr LaTeX formula </div> $\frac{\text{BG}}{\text{GC}} \cdot \frac{\text{CF}}{\text{FA}} \cdot \frac{\text{AE}}{\text{EB}} = \frac{\text{CF}}{\text{FA}} \cdot \frac{\text{AE}}{\text{EB}} = \frac{\text{CF}}{\text{FA}} \cdot \frac{\text{AE}}{\text{EB}} = e$ </div> <div style="border: 1px solid gray; padding: 5px; margin: 10px 0;"> Advanced <div style="border: 1px solid gray; padding: 2px; margin: 2px 0;"> Preview <input type="checkbox"/> obj LaTeX formula </div> (empty box) <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; border-right: 1px solid gray; padding: 2px;">A</td> <td style="width: 50%; padding: 2px;">E</td> </tr> <tr> <td style="border-right: 1px solid gray; padding: 2px;">B</td> <td style="padding: 2px;">C</td> </tr> <tr> <td style="border-right: 1px solid gray; padding: 2px;">D</td> <td style="padding: 2px;">G</td> </tr> <tr> <td style="border-right: 1px solid gray; padding: 2px;">F</td> <td style="padding: 2px;">I</td> </tr> <tr> <td style="border-right: 1px solid gray; padding: 2px;">H</td> <td style="padding: 2px;">l</td> </tr> <tr> <td style="border-right: 1px solid gray; padding: 2px;">a</td> <td style="padding: 2px;">b</td> </tr> <tr> <td style="border-right: 1px solid gray; padding: 2px;">c</td> <td style="padding: 2px;">d</td> </tr> </table> </div> <div style="text-align: right; margin-top: 10px;"> $\frac{\text{BG}}{\text{GC}} \cdot \frac{\text{CF}}{\text{FA}} \cdot \frac{\text{AE}}{\text{EB}} = \frac{\text{CF}}{\text{FA}} \cdot \frac{\text{AE}}{\text{EB}} = e$ </div>	A	E	B	C	D	G	F	I	H	l	a	b	c	d
A	E														
B	C														
D	G														
F	I														
H	l														
a	b														
c	d														
<h3>Can you find a relation to the Ceva's Theorem?</h3>															

EuroGebra Worksheets

Ceva Theorem







 Polygon	Construct the triangle ABC		
 Point	<ul style="list-style-type: none"> • Create point D on the segment BC • Create point E on the segment AC 		
 Segment	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 $\frac{i}{j} \cdot \frac{k}{l} \cdot \frac{m}{n} (=d)$		
 	Go to Geometry section and Text button and type: <div style="border: 1px solid gray; padding: 5px; margin-top: 10px;"> Text <div style="border: 1px solid gray; padding: 2px; margin-top: 5px;"> B I Serif LaTeX formula </div> <div style="border: 1px solid gray; padding: 2px; margin-top: 5px;"> $\frac{\text{BD}}{\text{DC}} \cdot \frac{\text{CE}}{\text{EA}} \cdot \frac{\text{AG}}{\text{GB}} = \frac{\text{m}}{\text{n}}$ </div> <div style="border: 1px solid gray; padding: 2px; margin-top: 5px;"> Advanced <div style="border: 1px solid gray; padding: 2px; margin-top: 5px;"> Preview copy LaTeX formula </div> <div style="border: 1px solid gray; padding: 2px; margin-top: 5px;"> (empty box) <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; border-right: 1px solid gray; padding: 2px;"> B D F a c f </td> <td style="width: 50%; padding: 2px;"> A C E b d g </td> </tr> </table> </div> </div> </div> <div style="margin-top: 10px;"> $\frac{\text{BD}}{\text{DC}} \cdot \frac{\text{CE}}{\text{EA}} \cdot \frac{\text{AG}}{\text{GB}} = \frac{\text{m}}{\text{n}}$ </div>	B D F a c f	A C E b d g
B D F a c f	A C E b d g		
Can you find a relation to the Menelaos Theorem?			

$$\frac{BD}{DC} \cdot \frac{CE}{EA} \cdot \frac{AG}{GB} = \frac{2.28}{8.41} \cdot \frac{8.15}{3.22} \cdot \frac{5.1}{3.51} = 1$$



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: 

ABC

Text

Similarly create

Text

B *I* Serif LaTeX formula

$\frac{AB}{AC} = \frac{f}{h} = b$

Advanced

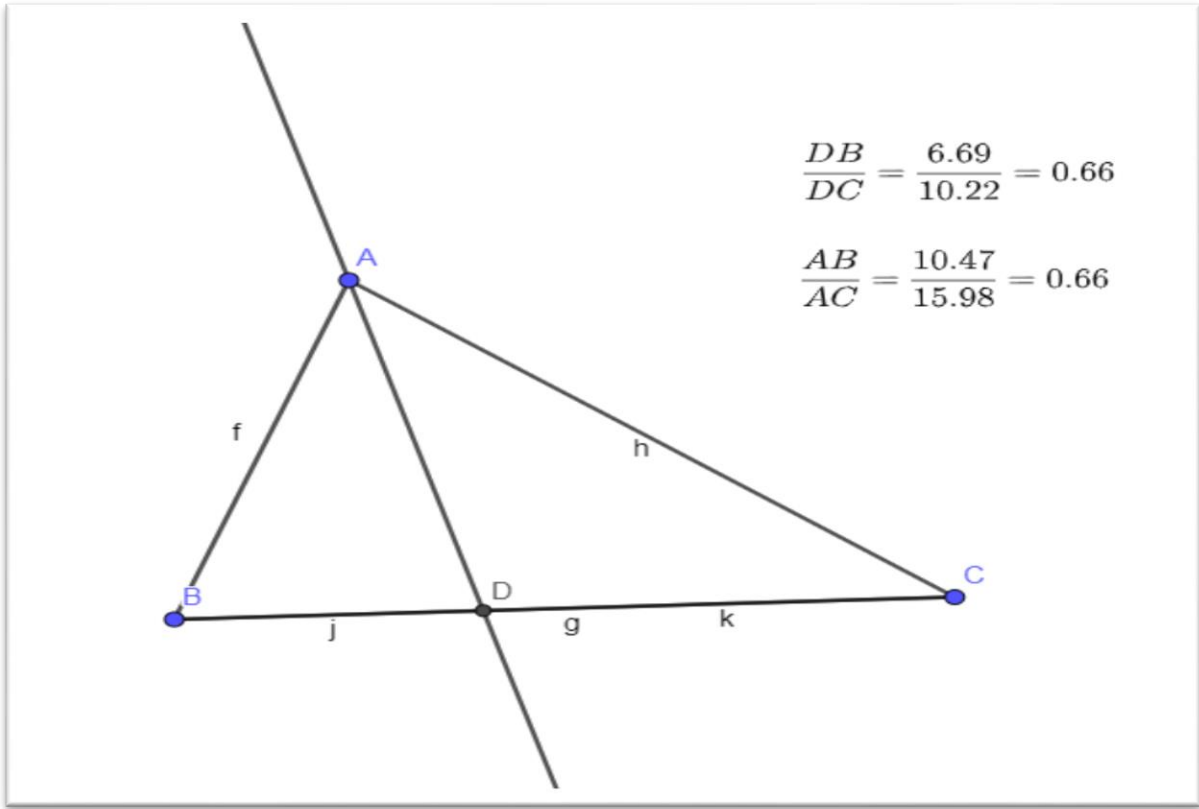
Preview copy LaTeX formula

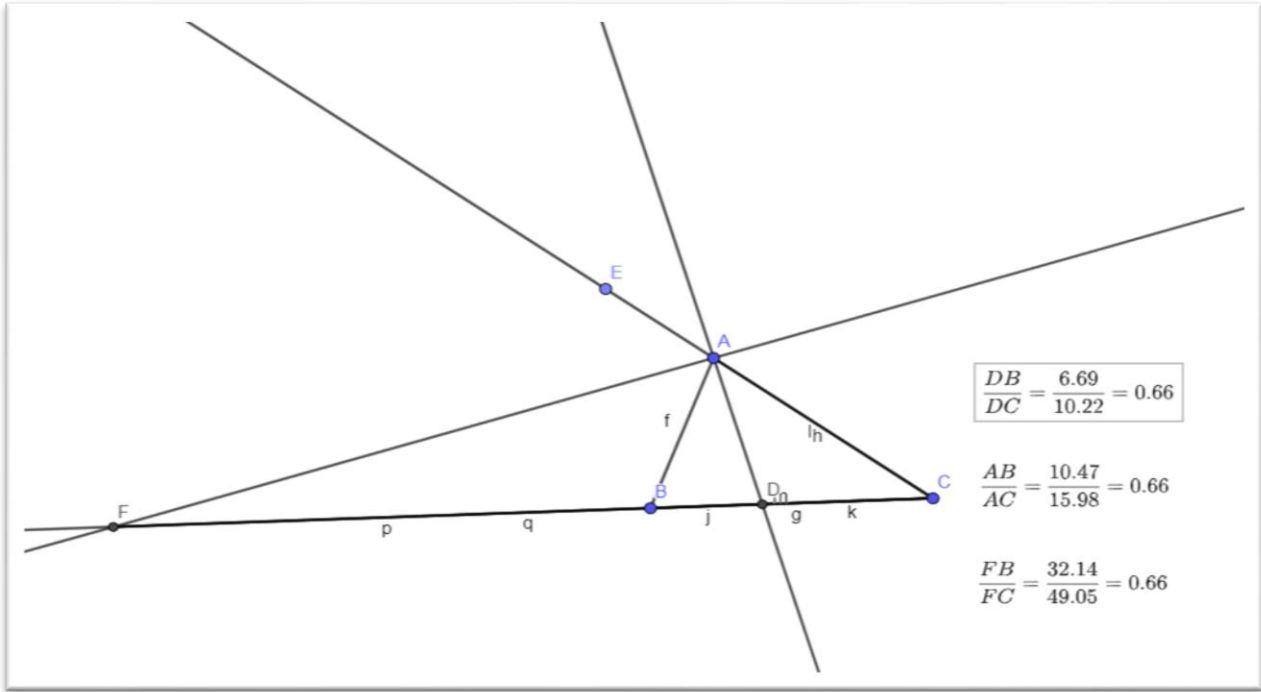
(empty box)	A
B	C
D	E
F	a
b	c
f	g
h	i
:	.

OK CANCEL

What do you notice ?

Try to discover a similar relation with the help of external bisector of A angle

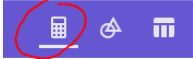




EuroGebra Worksheets

Menelaus Theorem

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



$$\frac{k}{l} \cdot \frac{m}{n} \cdot \frac{p}{q}$$

Type: (that will give: a→1)



ABC
Text

Text

B I Serif LaTeX formula

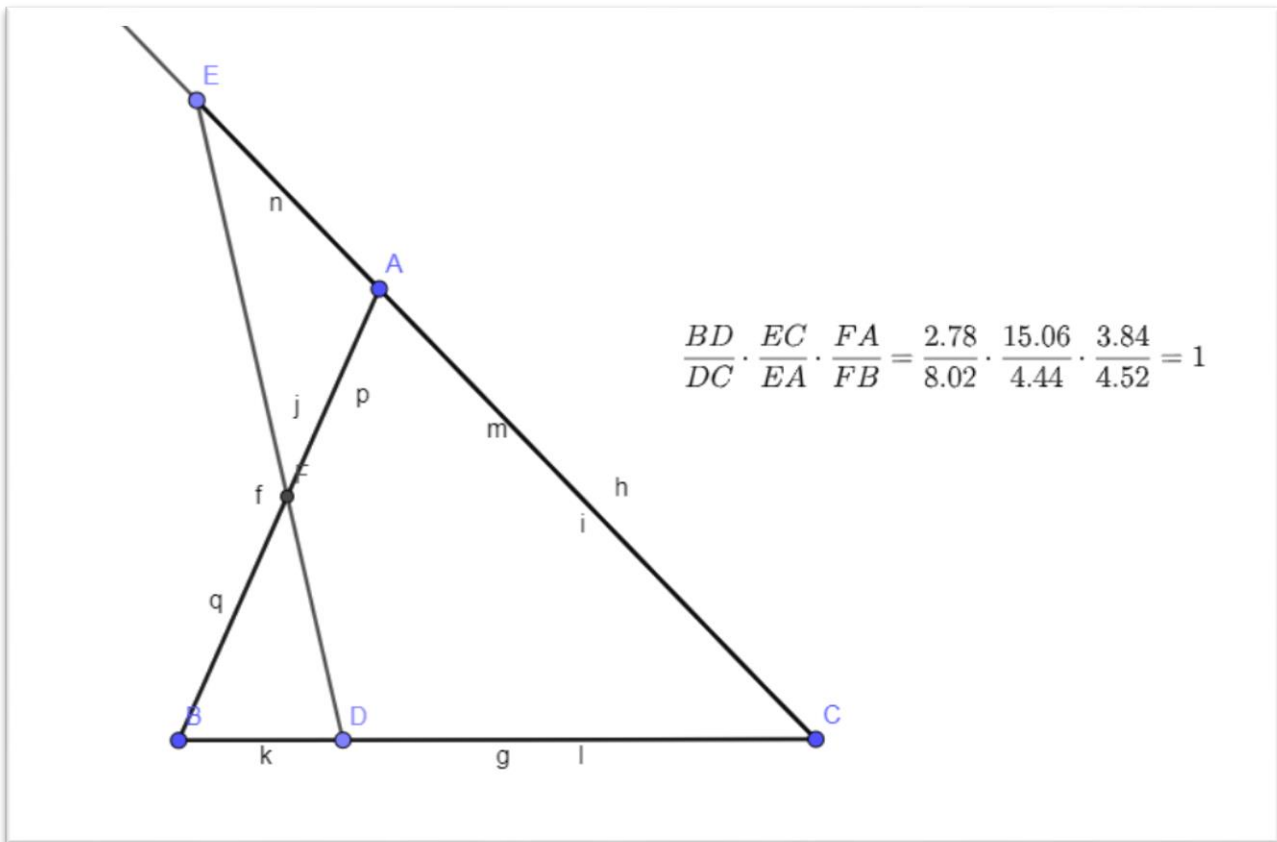
$\frac{BD}{DC} \cdot \frac{EC}{EA} \cdot \frac{FA}{FB} = \frac{k}{l} \cdot \frac{m}{n} \cdot \frac{p}{q} = a$

Advanced

Preview Help LaTeX formula









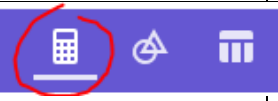
(empty box)	A
B	C
D	E
F	A
h	g
i	i
j	k

$$\frac{BD}{DC} \cdot \frac{EC}{EA} \cdot \frac{FA}{FB} = \frac{k}{l} \cdot \frac{m}{n} \cdot \frac{p}{q} = a$$



EuroGebra Worksheets

Quadratic Equation

 	<p>Create 3 sliders a,b,c</p>
	$d(x) = a x^2 + b x + c$
	$b^2 - 4 a c$ <p>and then name it D</p>
 	<div style="border: 1px solid gray; padding: 5px; width: fit-content; margin: 0 auto;">Intersect(d, xAxis)</div>
	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid gray; padding: 5px; text-align: center;">$e = \frac{-b + \sqrt{D}}{2 a}$</div> <div style="border: 1px solid gray; padding: 5px; text-align: center;">$f = \frac{-b - \sqrt{D}}{2 a}$</div> <div style="border: 1px solid gray; padding: 5px; text-align: center;">$g = e + f$</div> <div style="border: 1px solid gray; padding: 5px; text-align: center;">$h = e f$</div> </div>
 	<p>Click on parabola d and the point C will appear. Then right click on the point C and:</p> <div style="display: flex; align-items: center; justify-content: center; margin: 10px 0;"> <div style="border: 1px solid gray; padding: 5px; width: 150px;"> <p>Point C(1.9, -0.81)</p> <ul style="list-style-type: none"> Duplicate Fix Object Show Trace Settings </div> <div style="font-size: 2em; margin: 0 10px;">→</div> <div style="border: 1px solid gray; padding: 5px; width: 300px;"> <p>Basic Colour Style Advanced Algebra Scripting ></p> <p>Name C</p> <p>Definition TurningPoint(d)</p> <p>Caption</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Show Object <input type="checkbox"/> Show Trace <input checked="" type="checkbox"/> Show Label: Name & Value <input type="checkbox"/> Fix Object <input type="checkbox"/> Auxiliary Object <input type="checkbox"/> Show trimmed intersection lines </div> </div>
	$x = \frac{-b}{2a}$ $y = \frac{-D}{4a}$



ABC
Text

Text

B I Serif LaTeX formula

D =

Advanced

OK CANCEL

Text

B I Serif LaTeX formula

$x_1 = \frac{-b + \sqrt{D}}{2a} = \frac{-(-b) + \sqrt{D}}{2a} = e$

Advanced

Preview copy 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

$x_2 = \frac{-b - \sqrt{D}}{2a} = \frac{-(-b) - \sqrt{D}}{2a} = f$

Advanced

Preview copy 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 copy 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

$x_1 - x_2 = \frac{D}{a} = \frac{D}{a} = h$

Advanced

Preview copy 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

$C \left(\frac{-b}{2a}, \frac{-D}{4a} \right) = C \left(\frac{-(-b)}{2a}, \frac{-D}{4a} \right) = c$

Advanced









Preview copy LaTeX formula

(empty box)	A
B	C
D	a
b	c
d	e
f	g
h	i

OK CANCEL

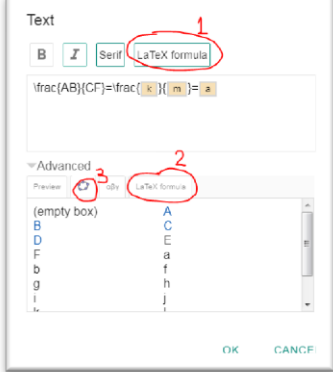
EuroGebra Worksheets

Thales Theorem

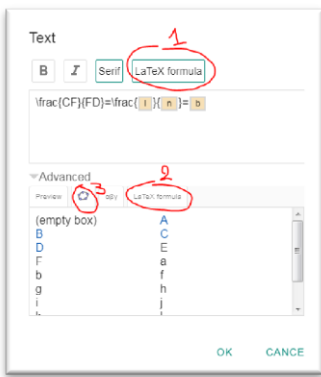
	<p>Create a straight line of points A, B</p>
	<p>Similarly, a second line that is different from the first line, of points C, D</p>
	<p>From point A, make a straight line to point C</p>
	<p>From Point B make a parallel to the straight AC</p>
	<p>From point D, make a parallel to the straight AC</p>
	<p>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.</p>
	<p>Define all straight parts AB, BE, CF and FD</p>
	<p>Go to the Algebra section and type</p> $\frac{k}{m} \quad \frac{\ell}{n}$ <p>and then type</p> $a = \frac{k}{m} \quad \text{and} \quad b = \frac{\ell}{n}$ <p>(Then you'll have</p> <div style="border: 1px solid gray; padding: 5px; width: fit-content; margin-left: auto; margin-right: auto;"> <p>k = Segment(A, B)</p> <hr/> <p>ℓ = Segment(B, E)</p> <hr/> <p>m = Segment(C, F)</p> <hr/> <p>n = Segment(F, D)</p> </div> <p>)</p>



Go back to Geometry and...



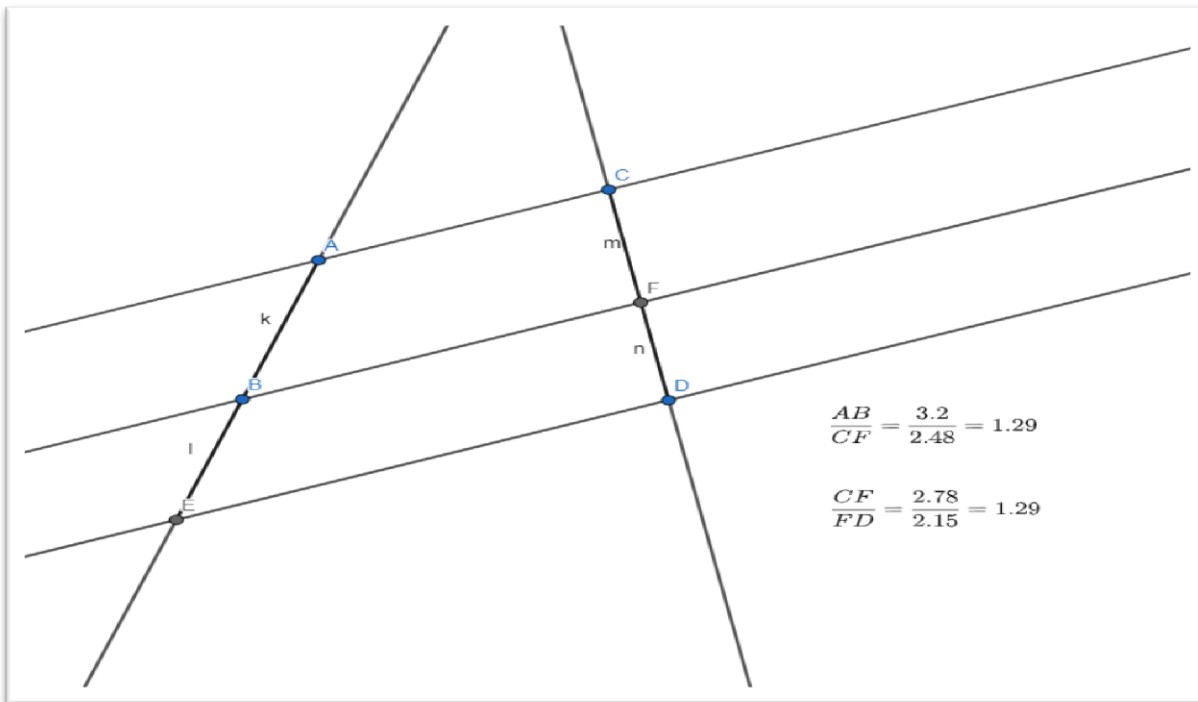
Create the adjacent text with the button



Similarly, create the adjacent text with the button

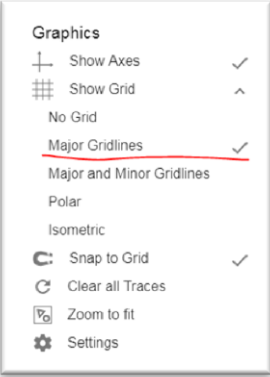


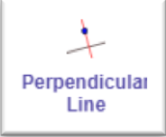





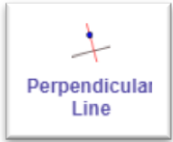
What do you notice?



EuroGebra Worksheets

Trigonometric circle and basic trigonometric identities

 <p>Graphics</p> <ul style="list-style-type: none">Show Axes ✓Show Grid ^No Grid<u>Major Gridlines</u> ✓Major and Minor GridlinesPolarIsometricⓈ Snap to Grid ✓Ⓢ Clear all Traces🔍 Zoom to fit⚙ Settings	Left Click and select Major gridlines
	Create point A(0,0) and B(1,0) and C(0,1)
	Create circle (A,B)
	Create: <code>PerpendicularLine(B, xAxis)</code> and <code>PerpendicularLine(C, yAxis)</code>
	Create point D on the circle
	Create line AD
	Create Angle(BAD)= α



PerpendicularLine(D, xAxis)

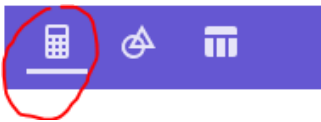
PerpendicularLine(D, yAxis)



```

E = Intersect(i, xAxis)
...
F = Intersect(j, yAxis)
...
G = Intersect(h, f)
...
H = Intersect(h, g)

```



Unselect the 2 left grey buttons

	i : PerpendicularLine(D, xAxis) → x = 0.77
	j : PerpendicularLine(D, yAxis) → y = 0.64



k = Segment(D, E)

ℓ = Segment(D, F)

m = Segment(A, E)

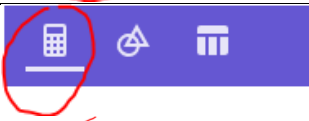
n = Segment(A, F)

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:

Point D(0.73, 0.68)

- Duplicate
- Fix Object
- Show Trace
- Animation Off
- Settings**



Basic Colour Style Advanced Algebr

Name
D

Definition
Point(c)

Caption

Show Object
 Show Trace
 Show Label: Value
 Fix Object
 Auxiliary Object
 Animation On

ABC
Text

Text

B I Serif LaTeX formula

sin α = a

Advanced

Preview	oBy	LaTeX formula
F		G
H		a
b		c
d		e
f		g
h		i
j		k
l		m

OK CANCEL

Text

B I Serif LaTeX formula

cos α = b

Advanced

Preview	oBy	LaTeX formula
H		a
b		c
d		e
f		g
h		i
j		k
l		m
n		p

OK CANCEL

Text

B *I* Serif LaTeX formula

tan $\alpha = d$

Advanced

Preview Copy LaTeX formula

(empty box)	A
B	C
D	E
F	G
H	a
b	c
d	e
f	

OK CANCEL

Text

B *I* Serif LaTeX formula

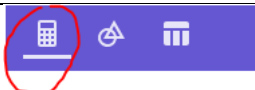
cot $\alpha = e$

Advanced

Preview Copy LaTeX formula

(empty box)	A
B	C
D	E
F	G
H	a
b	c
d	e
f	

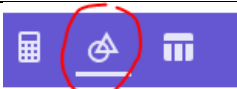
OK CANCEL



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

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

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



ABC
Text

Text

B *I* Serif LaTeX formula

sin² α + cos² $\alpha = o$

Advanced

Preview Copy LaTeX formula

(empty box)	A
B	C
D	E
F	G
H	a
b	c
d	e
f	

OK CANCEL

Text

B *I* Serif LaTeX formula

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

Advanced

Preview Copy LaTeX formula

(empty box)	A
B	C
D	E
F	G
H	a
b	c
d	e
f	

OK CANCEL

Text

B

I

Serif

LaTeX formula

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

Advanced

Preview

🔄

copy

LaTeX formula

(empty box)

B

D

F

H

b

d

f

A

C

E

G

a

c

e

OK

CANCEL

