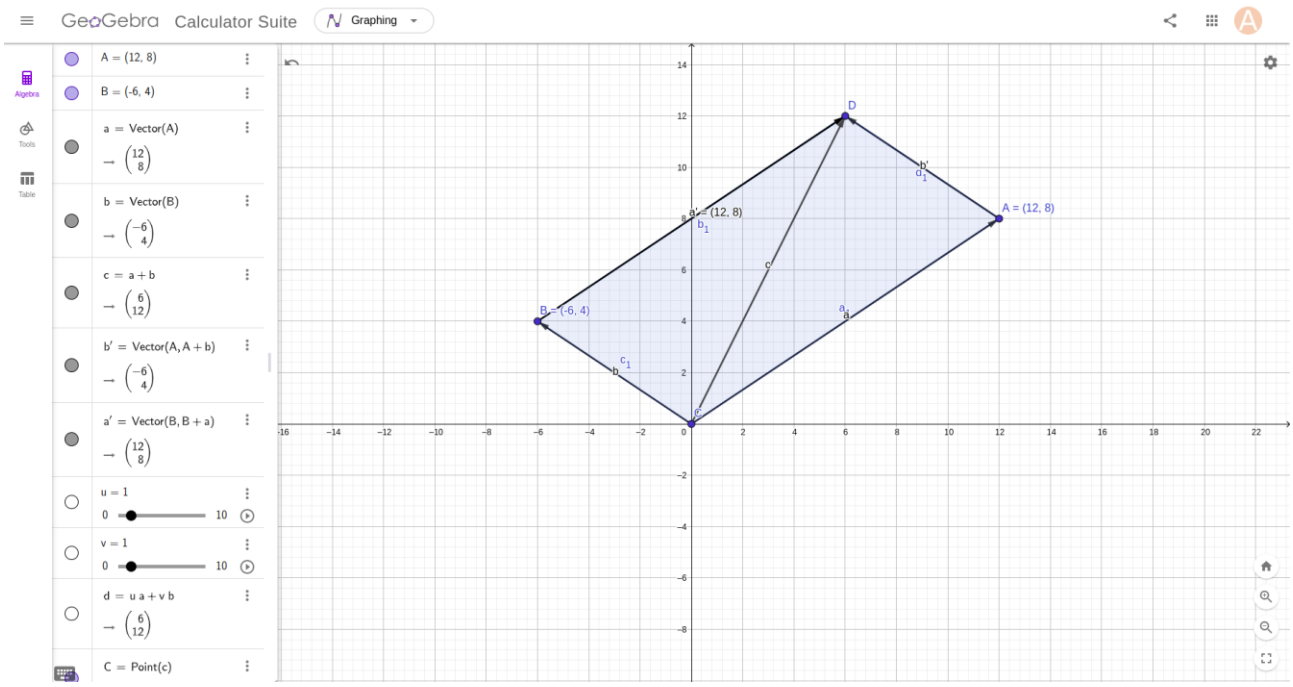
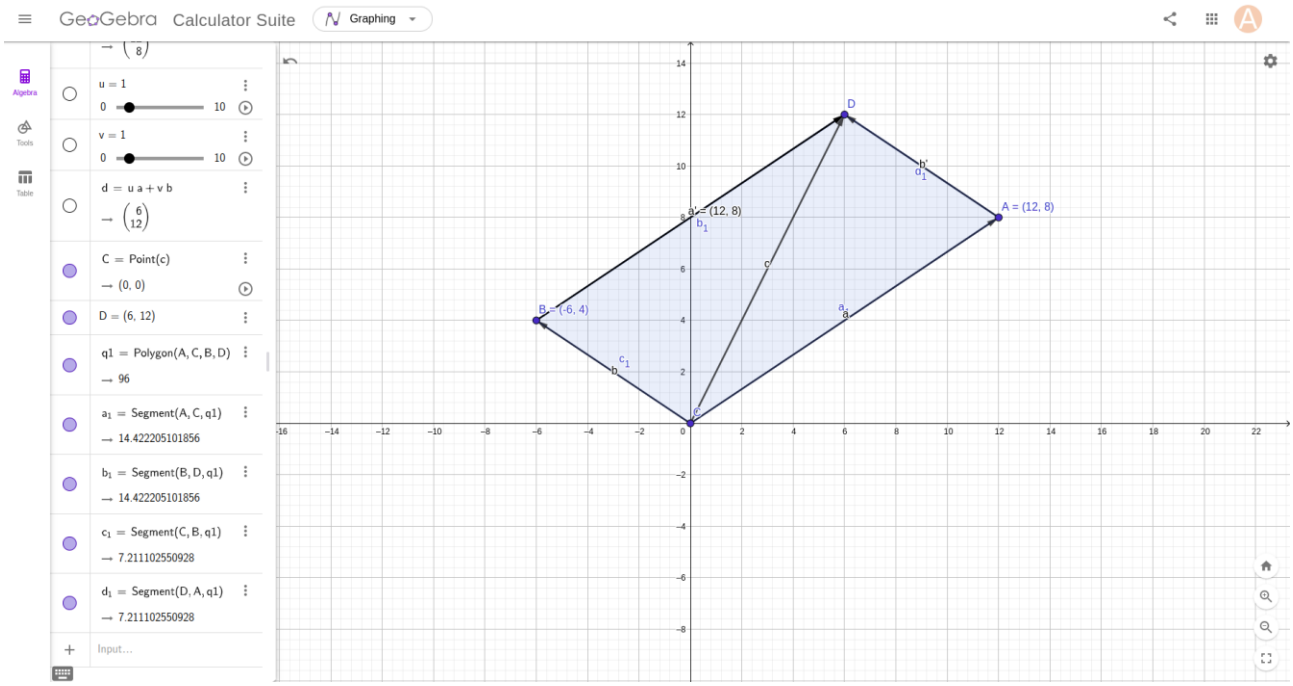
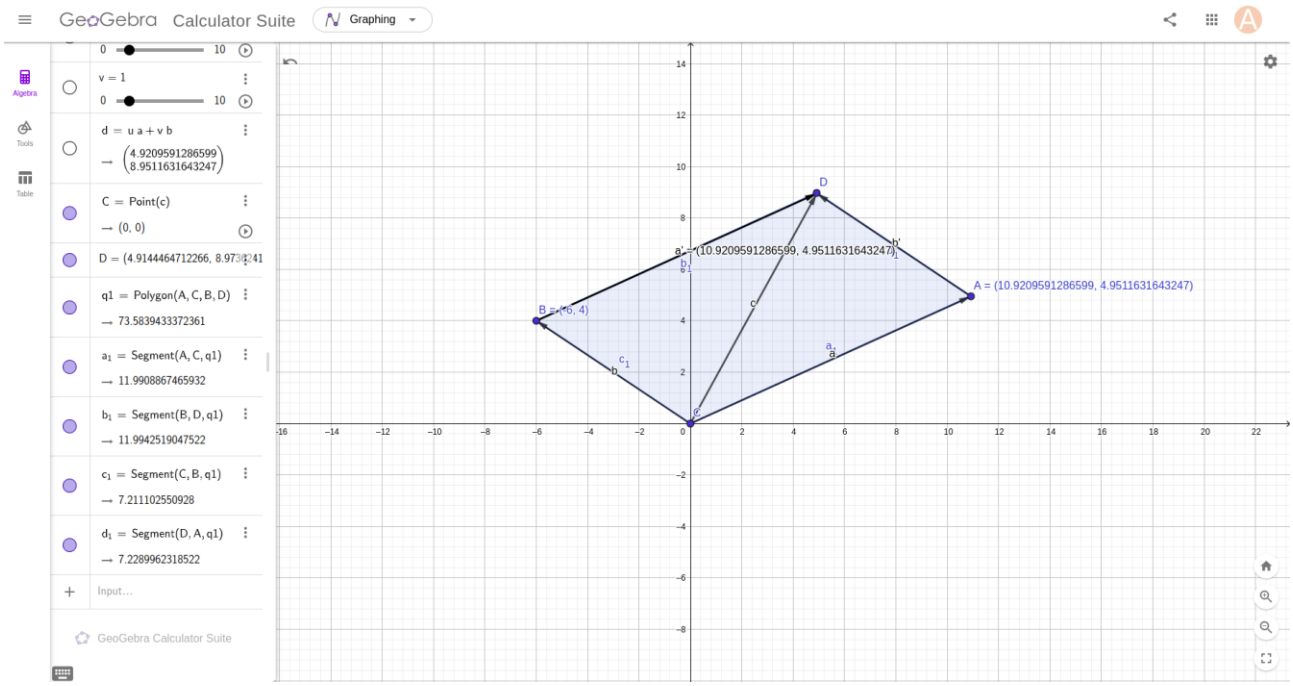
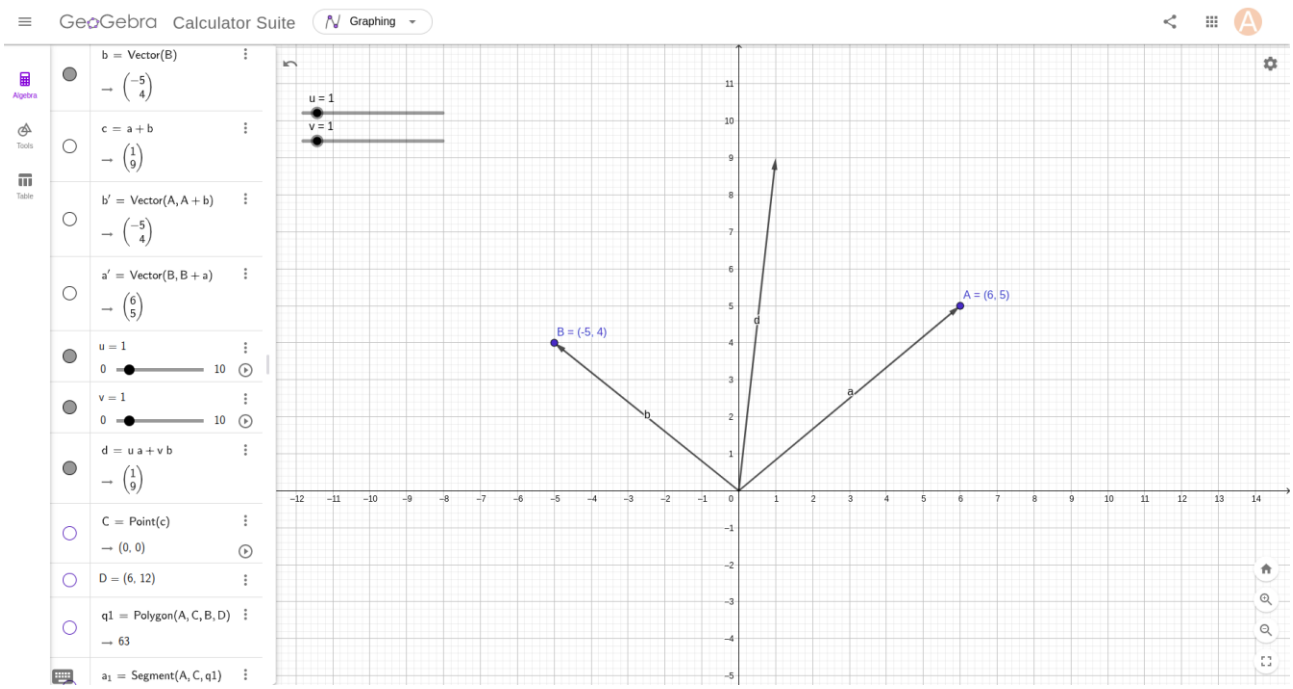
Assignment #1
Saad Ahmad
(20P-0051)
BS (CS) – 5A

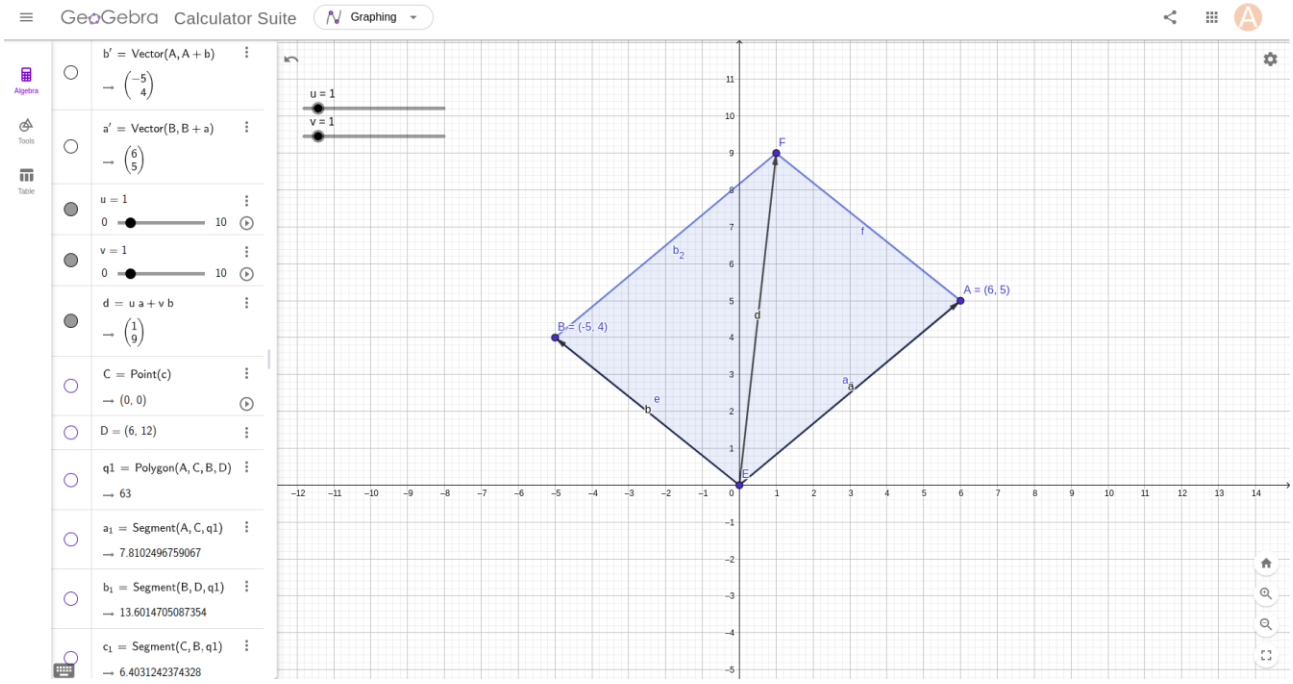
Geogebra of Vectors:

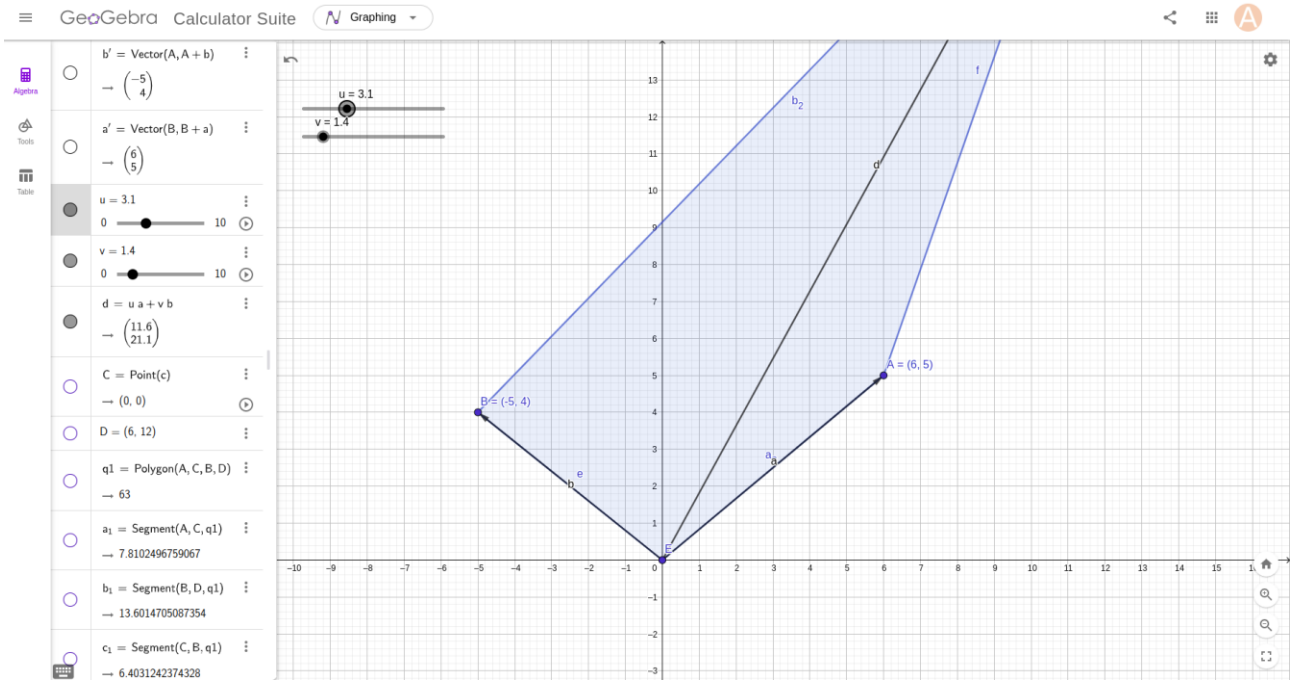





GeoGebra Calculator Suite
Graphing
v = 1
d = u a + v b
C = Point(c)
D = (4.9144464712266, 8.973
q1 = Polygon(A, C, B, D)
73.5839433372361
a1 = Segment(A, C, q1)
11.9908867465932
b1 = Segment(B, D, q1)
11.9942519047522
c1 = Segment(C, B, q1)
7.211102550928
d1 = Segment(D, A, q1)
7.2289962318522
Input...
GeoGebra Calculator Suite
D
A = (10.9209591286599, 4.9511631643247)
B = (-6, 4)


GeoGebra Calculator Suite
Graphing
b = Vector(B)
c = a + b
b' = Vector(A, A + b)
a' = Vector(B, B + a)
u = 1
v = 1
d = u a + v b
C = Point(c)
D = (6, 12)
q1 = Polygon(A, C, B, D)
63
a1 = Segment(A, C, q1)
A = (6, 5)
B = (-5, 4)


GeoGebra Calculator Suite
Graphing
b′ = Vector(A, A + b)
(−5, 4)
a′ = Vector(B, B + a)
(6, 5)
u = 1
0 10
v = 1
0 10
d = u a + v b
(1, 9)
C = Point(c)
(0, 0)
D = (6, 12)
q1 = Polygon(A, C, B, D)
63
a1 = Segment(A, C, q1)
7.8102496759067
b1 = Segment(B, D, q1)
13.6014705087354
c1 = Segment(C, B, q1)
6.4031242374328
u = 1
v = 1
F
A = (6, 5)
B = (-5, 4)
E
b2
f
d
a
e
b


GeoGebra Calculator Suite
Graphing
b′ = Vector(A, A + b)
(−5, 4)
a′ = Vector(B, B + a)
(6, 5)
u = 3.1
0 10
v = 1.4
0 10
d = u a + v b
(11.6, 21.1)
C = Point(c)
(0, 0)
D = (6, 12)
q1 = Polygon(A, C, B, D)
63
a1 = Segment(A, C, q1)
7.8102496759067
b1 = Segment(B, D, q1)
13.6014705087354
c1 = Segment(C, B, q1)
6.4031242374328
u = 3.1
v = 1.4
A = (6, 5)
B = (-5, 4)
E
b2
f
d
a
e
b

GeoGebra Calculator Suite — Graphing

Algebra | Tools | Table

c_1 = Segment(C, B, q1) → 6.4031242374328

d_1 = Segment(D, A, q1) → 19.7989898732233

E = Point(d) → (0, 0)

F = Point(d) → (-13, 2)

q2 = Polygon(A, E, B, F) → 42

a_2 = Segment(A, E, q2) → 8.2462112512353

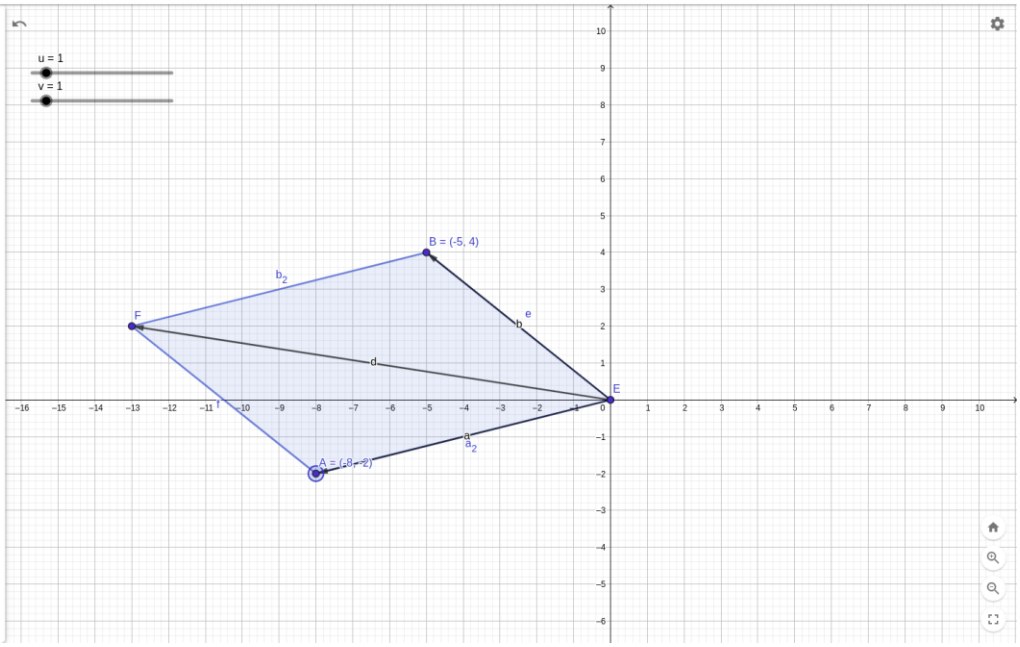
b_2 = Segment(B, F, q2) → 8.2462112512353

e = Segment(E, B, q2) → 6.4031242374328

f = Segment(F, A, q2) → 6.4031242374328

Input…

GeoGebra Calculator Suite



GeoGebra Calculator Suite — Graphing

Algebra | Tools | Table

c_1 = Segment(C, B, q1) → 6.4031242374328

d_1 = Segment(D, A, q1) → 19.7989898732233

E = Point(d) → (0, 0)

F = Point(d) → (-32.5, 5)

q2 = Polygon(A, E, B, F) → 105

a_2 = Segment(A, E, q2) → 8.2462112512353

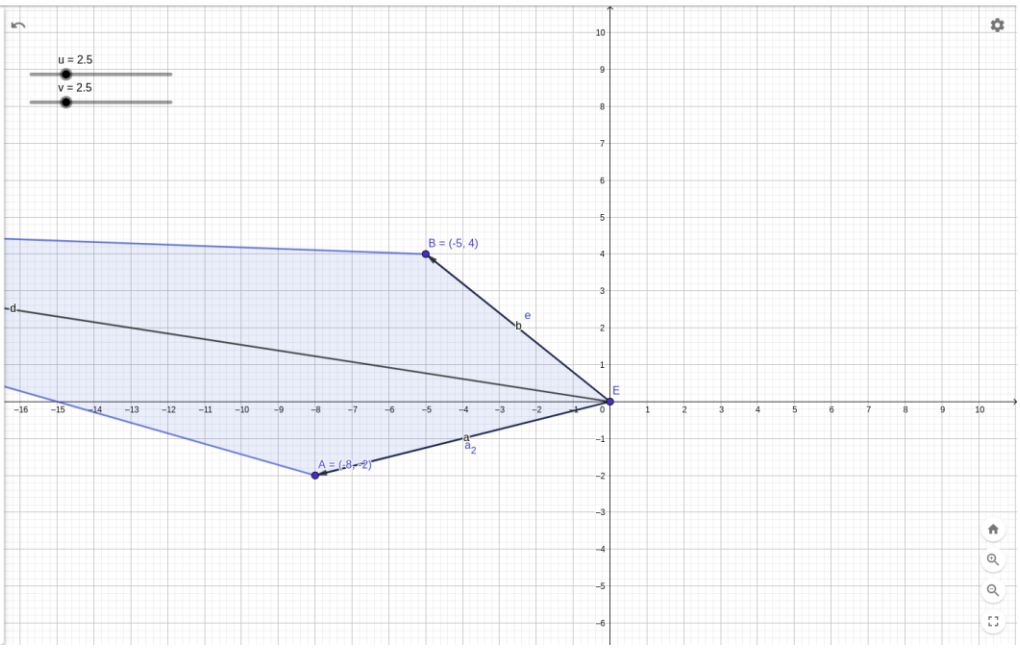
b_2 = Segment(B, F, q2) → 27.518175811634

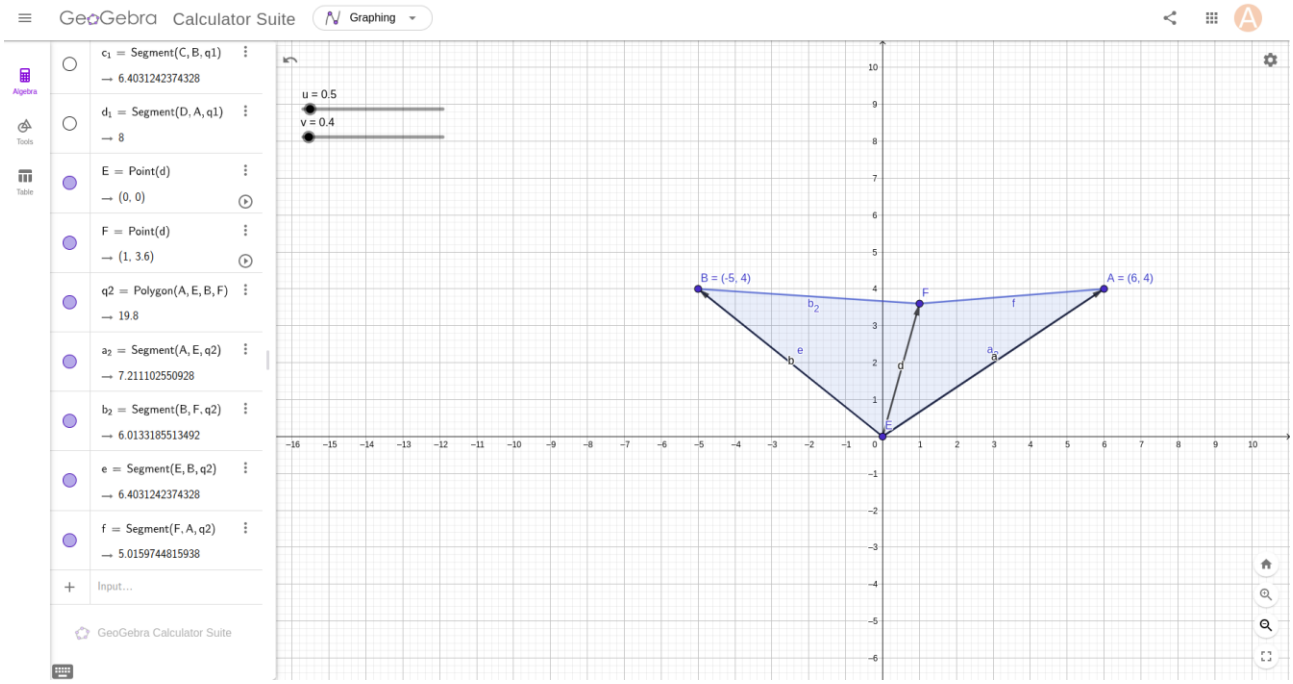
e = Segment(E, B, q2) → 6.4031242374328

f = Segment(F, A, q2) → 25.4803846124818

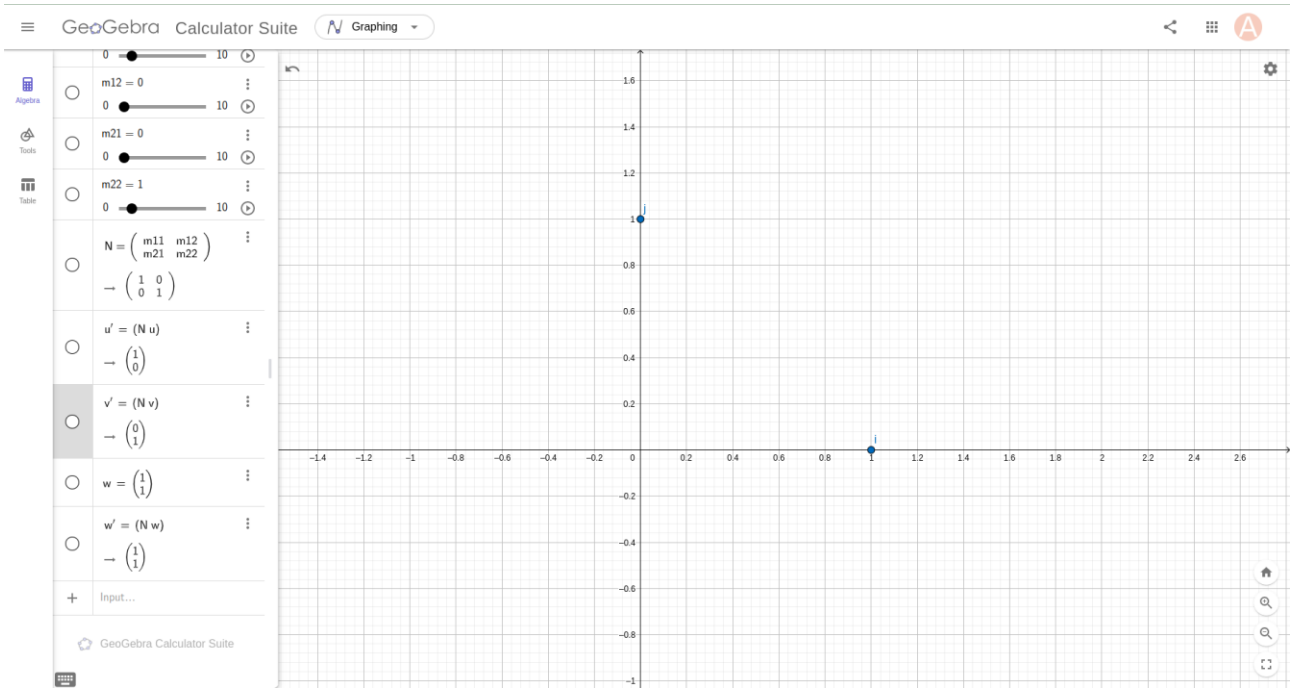
Input…

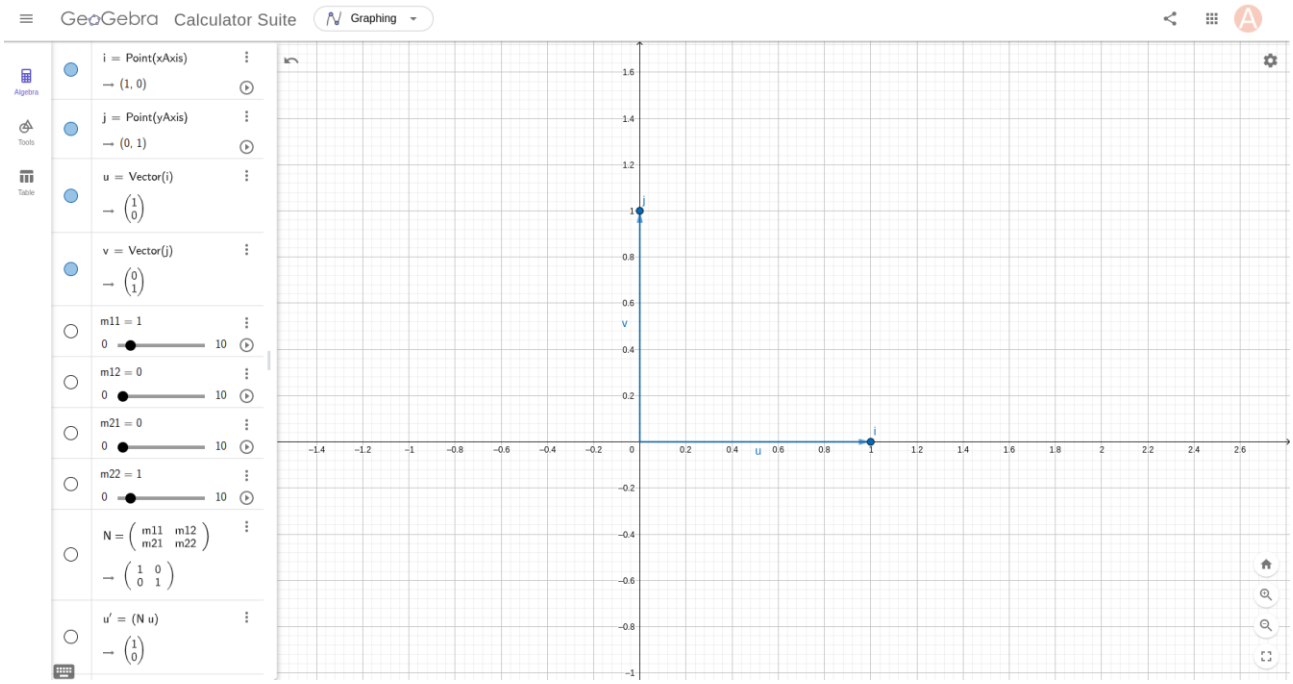
GeoGebra Calculator Suite

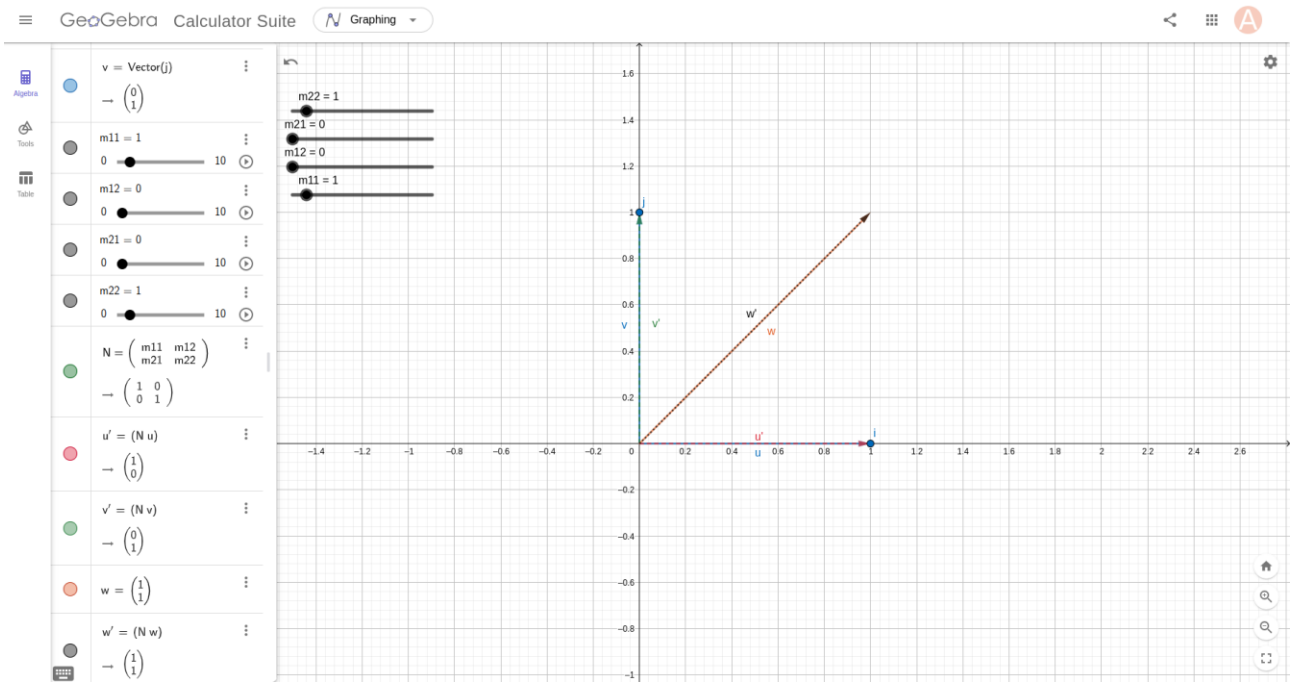




Geogebra of Metrix:




GeoGebra Calculator Suite
Graphing
i = Point(xAxis)
(1, 0)
j = Point(yAxis)
(0, 1)
u = Vector(i)
v = Vector(j)
m11 = 1
m12 = 0
m21 = 0
m22 = 1
N = (m11 m12 / m21 m22)
(1 0 / 0 1)
u′ = (N u)


GeoGebra Calculator Suite
Graphing
v = Vector(j)
m11 = 1
m12 = 0
m21 = 0
m22 = 1
N = (m11 m12 / m21 m22)
(1 0 / 0 1)
u′ = (N u)
v′ = (N v)
w = (1 / 1)
w′ = (N w)

GeoGebra Calculator Suite — Graphing

$\rightarrow \begin{pmatrix} 0 \\ 1 \end{pmatrix}$

m11 = 2 (0 — 10)

m12 = 0 (0 — 10)

m21 = 0 (0 — 10)

m22 = 1 (0 — 10)

$N = \begin{pmatrix} m11 & m12 \\ m21 & m22 \end{pmatrix}$

$\rightarrow \begin{pmatrix} 2 & 0 \\ 0 & 1 \end{pmatrix}$

u′ = (N u)

$\rightarrow \begin{pmatrix} 2 \\ 0 \end{pmatrix}$

v′ = (N v)

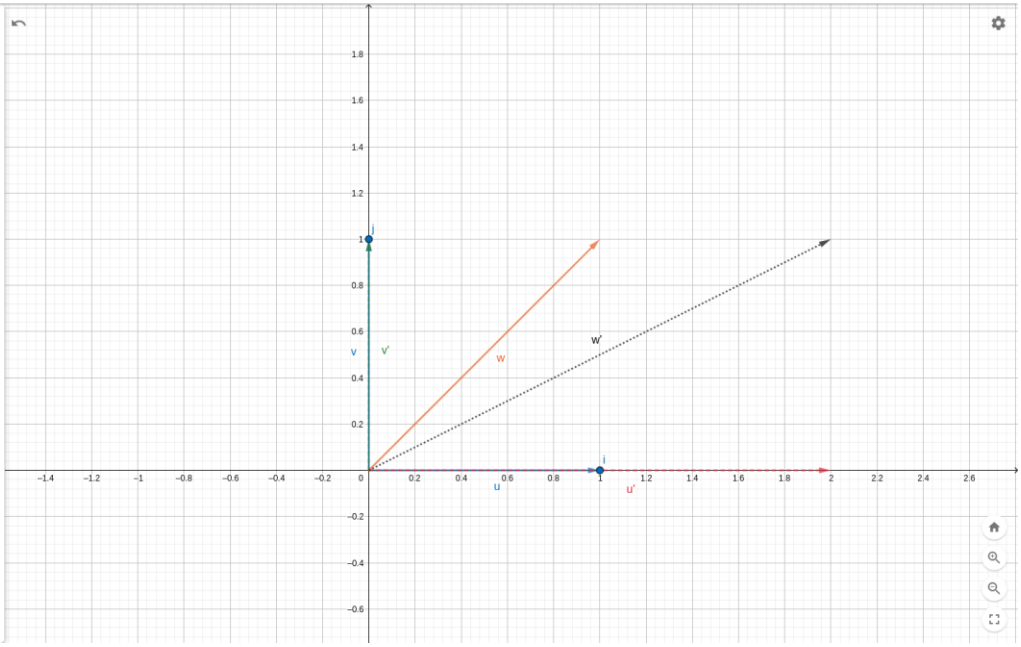
$\rightarrow \begin{pmatrix} 0 \\ 1 \end{pmatrix}$

$w = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$

w′ = (N w)

$\rightarrow \begin{pmatrix} 2 \\ 1 \end{pmatrix}$

Input…



GeoGebra Calculator Suite — Graphing

$\rightarrow \begin{pmatrix} 2 \\ 1 \end{pmatrix}$

A = Point(w′)

→ (0, 0)

B = Point(u′)

→ (2, 0)

C = Point(w′)

→ (2, 1)

q1 = Polygon(A, B, C, j)

→ 2

a = Segment(A, B, q1)

→ 2

b = Segment(B, C, q1)

→ 1

c = Segment(C, j, q1)

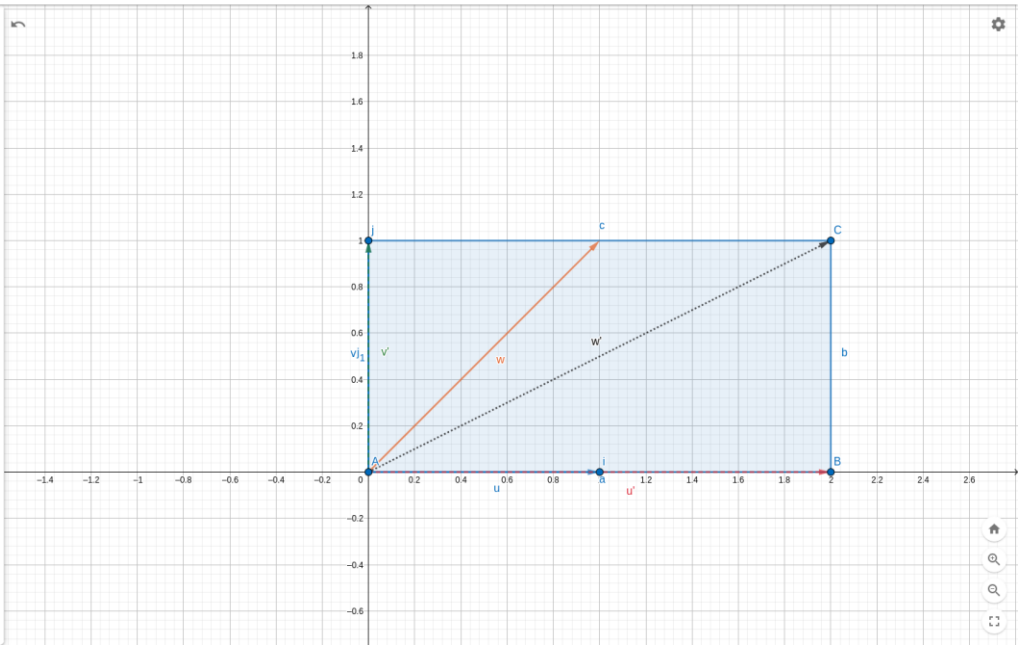
→ 2

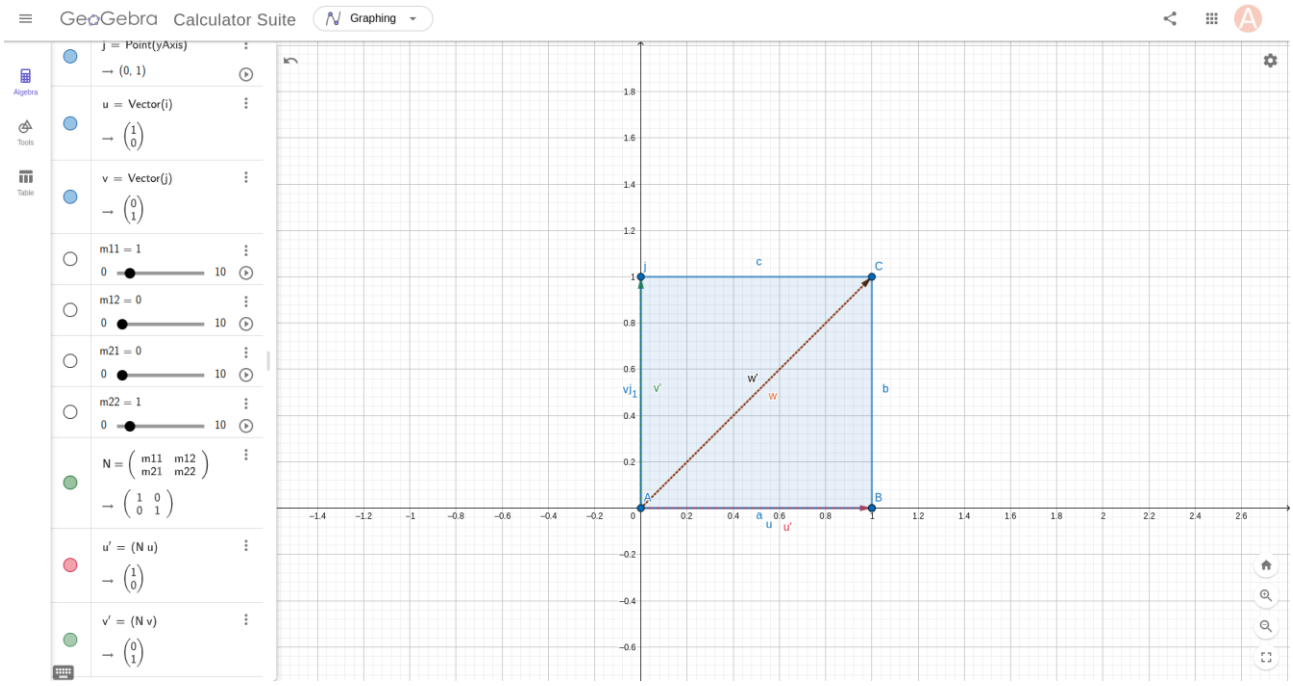
j_1 = Segment(j, A, q1)

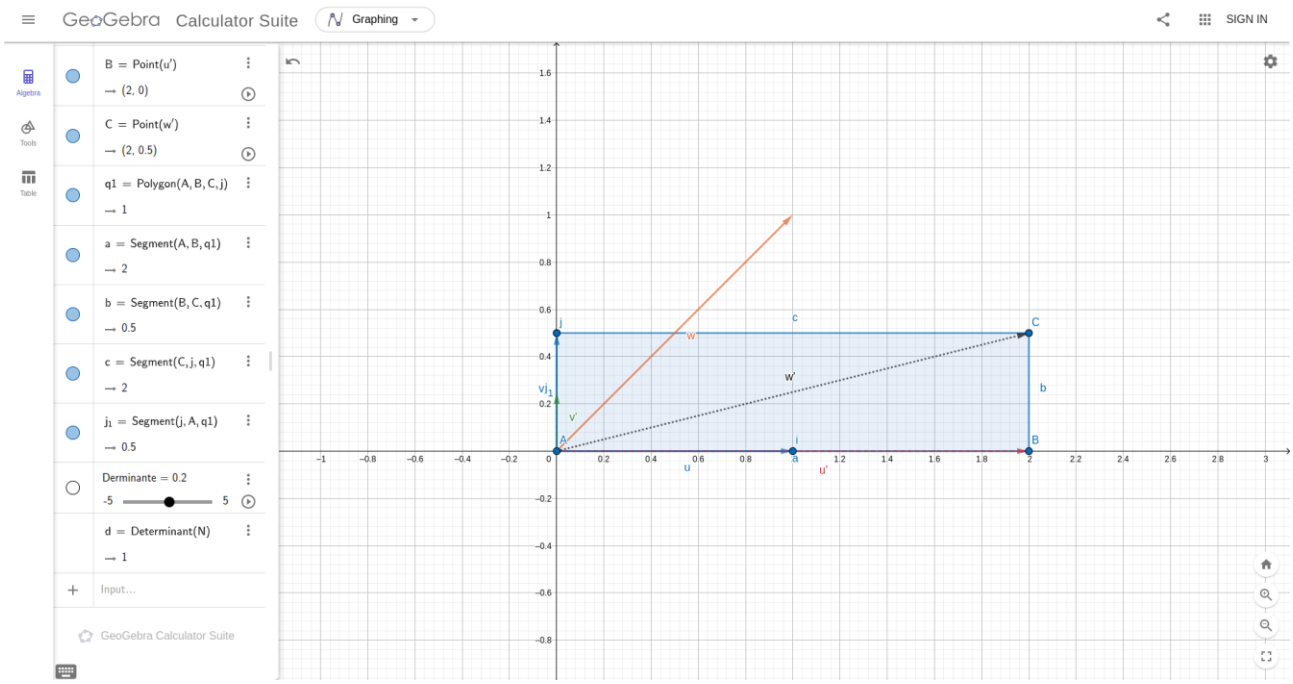
→ 1

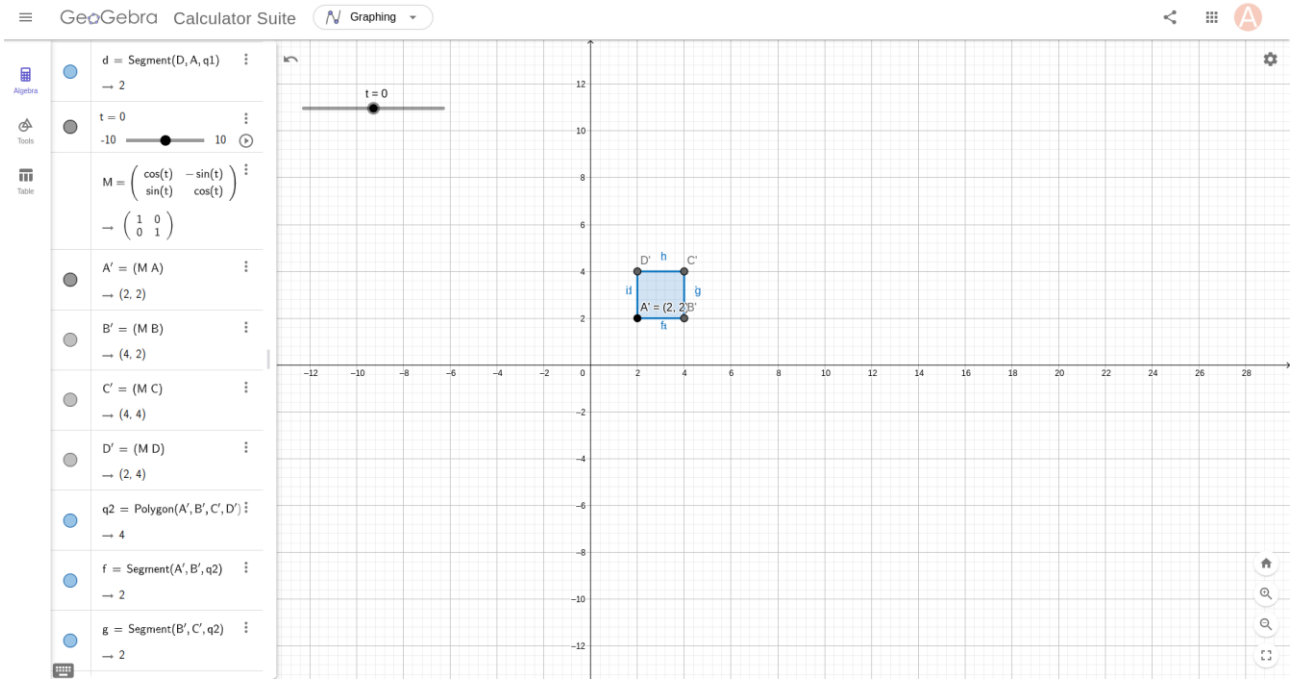
Input…

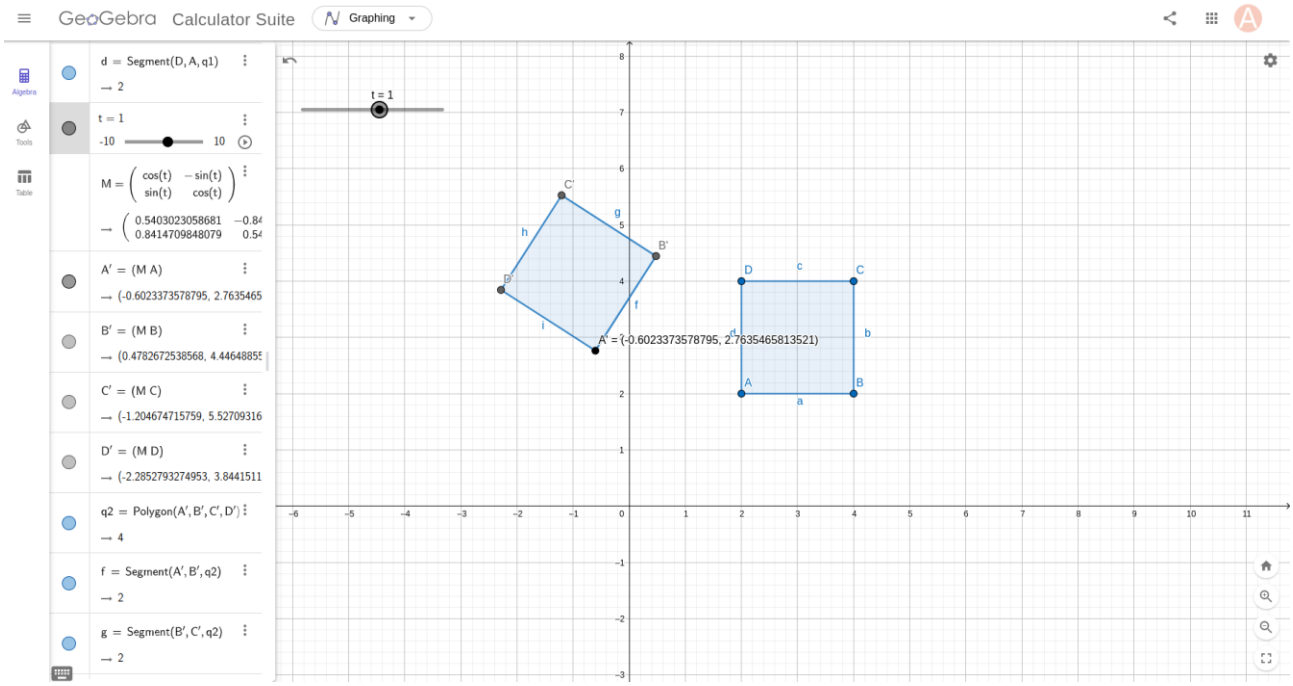
GeoGebra Calculator Suite

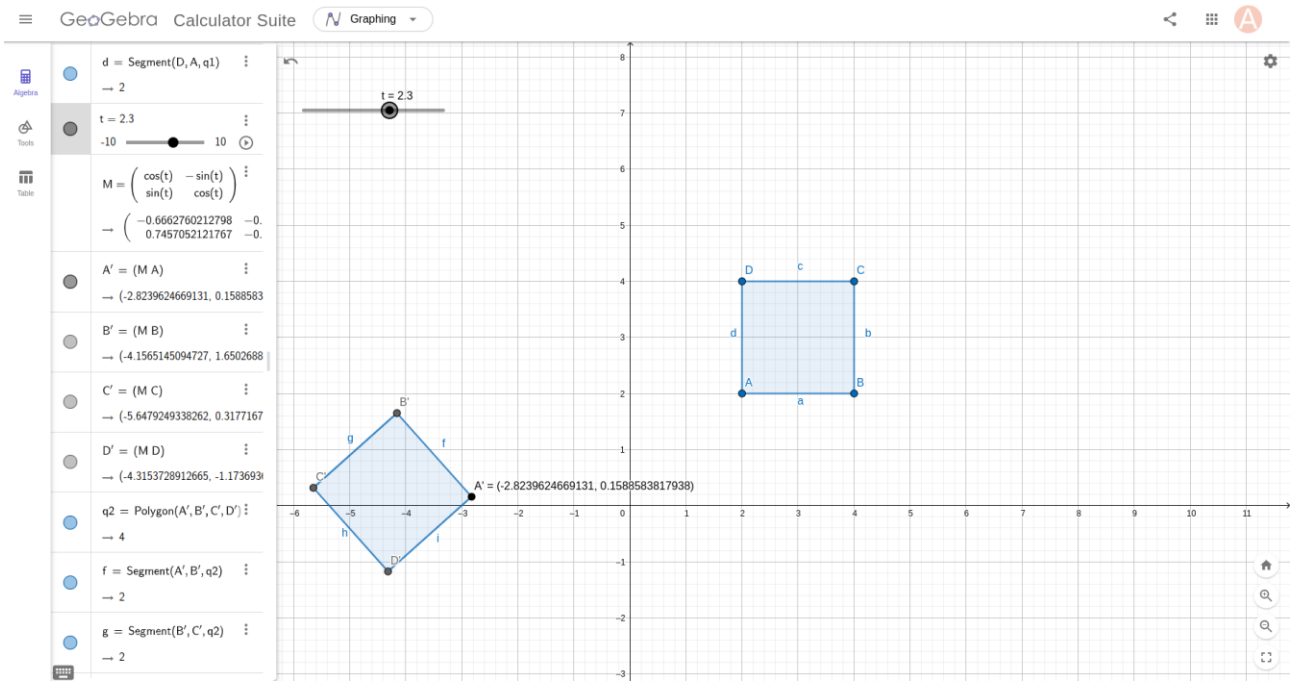


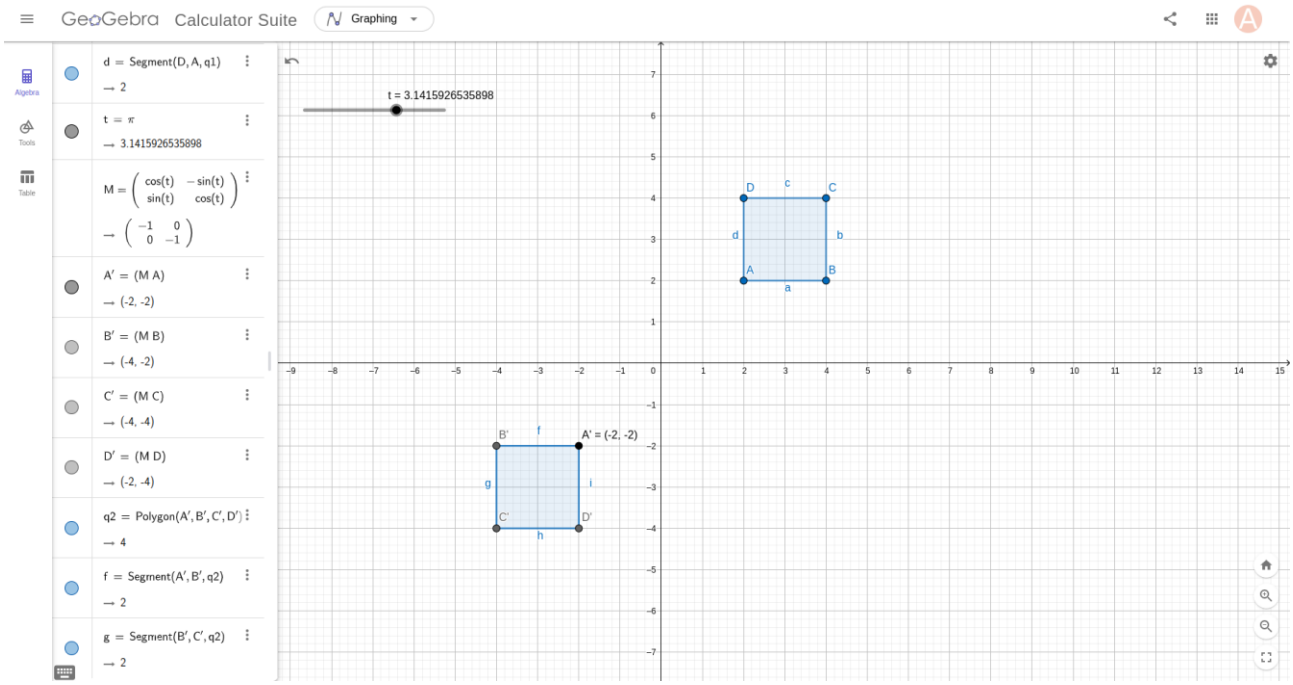

GeoGebra Calculator Suite
Graphing
j = Point(yAxis)
(0, 1)
u = Vector(i)
v = Vector(j)
m11 = 1
m12 = 0
m21 = 0
m22 = 1
N = (m11 m12 / m21 m22)
(1 0 / 0 1)
u' = (N u)
v' = (N v)
Algebra
Tools
Table
A
B
C
a
b
c
w
w'
v'
u
u'


GeoGebra Calculator Suite
Graphing
SIGN IN
B = Point(u')
(2, 0)
C = Point(w')
(2, 0.5)
q1 = Polygon(A, B, C, j)
1
a = Segment(A, B, q1)
2
b = Segment(B, C, q1)
0.5
c = Segment(C, j, q1)
2
j1 = Segment(j, A, q1)
0.5
Derminante = 0.2
-5
5
d = Determinant(N)
1
Input...
GeoGebra Calculator Suite
Algebra
Tools
Table
A
B
C
a
b
c
w
w'
v'
u
u'


GeoGebra Calculator Suite
Graphing
d = Segment(D, A, q1)
→ 2
t = 0
-10
10
M = (cos(t) −sin(t) / sin(t) cos(t))
→ (1 0 / 0 1)
A′ = (M A)
→ (2, 2)
B′ = (M B)
→ (4, 2)
C′ = (M C)
→ (4, 4)
D′ = (M D)
→ (2, 4)
q2 = Polygon(A′, B′, C′, D′)
→ 4
f = Segment(A′, B′, q2)
→ 2
g = Segment(B′, C′, q2)
→ 2
t = 0
D'
h
C'
i
g
A' = (2, 2)
B'
f


GeoGebra Calculator Suite
Graphing
d = Segment(D, A, q1)
→ 2
t = 1
-10
10
M = (cos(t) −sin(t) / sin(t) cos(t))
→ (0.5403023058681 −0.84 / 0.8414709848079 0.54)
A′ = (M A)
→ (-0.6023373578795, 2.7635465
B′ = (M B)
→ (0.4782672538568, 4.4464885
C′ = (M C)
→ (-1.204674715759, 5.52709316
D′ = (M D)
→ (-2.2852793274953, 3.8441511
q2 = Polygon(A′, B′, C′, D′)
→ 4
f = Segment(A′, B′, q2)
→ 2
g = Segment(B′, C′, q2)
→ 2
t = 1
C'
g
h
B'
D'
f
i
A' = (-0.6023373578795, 2.7635465813521)
D
c
C
d
b
A
B
a


GeoGebra Calculator Suite
Graphing
d = Segment(D, A, q1)
→ 2
t = 2.3
-10
10
M = (cos(t) −sin(t) / sin(t) cos(t))
→ (−0.6662760212798 −0. / 0.7457052121767 −0.)
A′ = (M A)
→ (-2.8239624669131, 0.1588583
B′ = (M B)
→ (-4.1565145094727, 1.6502688
C′ = (M C)
→ (-5.6479249338262, 0.3177167
D′ = (M D)
→ (-4.3153728912665, -1.173693
q2 = Polygon(A′, B′, C′, D′)
→ 4
f = Segment(A′, B′, q2)
→ 2
g = Segment(B′, C′, q2)
→ 2
t = 2.3
A′ = (-2.8239624669131, 0.1588583817938)
D
c
C
d
b
A
B
a
B′
g
f
C′
h
i
D′


GeoGebra Calculator Suite
Graphing
d = Segment(D, A, q1)
→ 2
t = π
→ 3.1415926535898
M = (cos(t) −sin(t) / sin(t) cos(t))
→ (−1 0 / 0 −1)
A′ = (M A)
→ (-2, -2)
B′ = (M B)
→ (-4, -2)
C′ = (M C)
→ (-4, -4)
D′ = (M D)
→ (-2, -4)
q2 = Polygon(A′, B′, C′, D′)
→ 4
f = Segment(A′, B′, q2)
→ 2
g = Segment(B′, C′, q2)
→ 2
t = 3.1415926535898
D
c
C
d
b
A
B
a
B′
f
A′ = (-2, -2)
g
i
C′
D′
h

GeoGebra Calculator Suite — Graphing

d = Segment(D, A, q1)
→ 2

t = -1.6
-10 — 10

M = (cos(t) −sin(t) ; sin(t) cos(t))
→ (−0.0291995223013 0. ; −0.9995736030415 −0.)

A′ = (M A)
→ (1.9407481614804, -2.0575462

B′ = (M B)
→ (1.8823491168779, -4.0566934

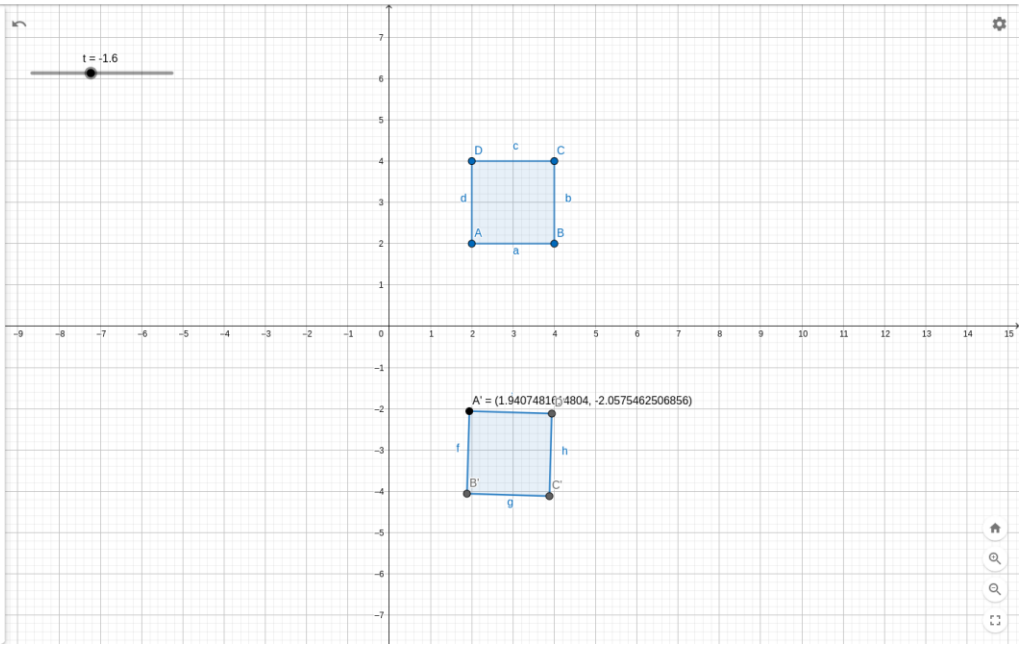
C′ = (M C)
→ (3.8814963229609, -4.1150925

D′ = (M D)
→ (3.9398953675634, -2.1159452

q2 = Polygon(A′, B′, C′, D′)
→ 4

f = Segment(A′, B′, q2)
→ 2

g = Segment(B′, C′, q2)
→ 2



GeoGebra Calculator Suite — Graphing

i = Point(xAxis)
→ (1, 0)

j = Point(yAxis)
→ (0, 1)

u = Vector(i)
→ (1 ; 0)

v = Vector(j)
→ (0 ; 1)

m11 = 1
0 — 10

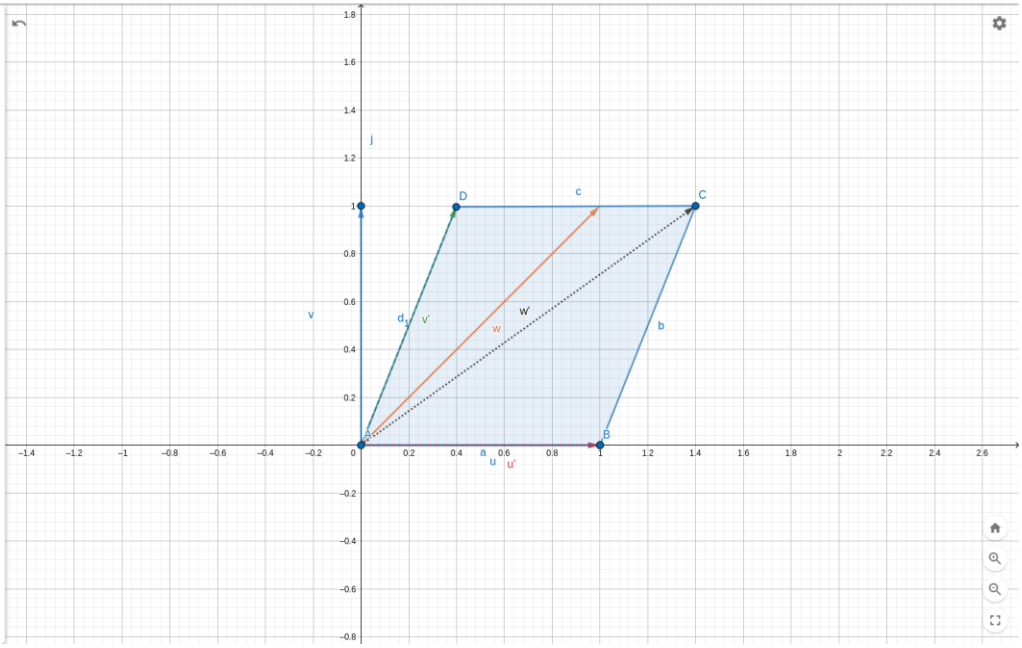
m12 = 0.4
0 — 10

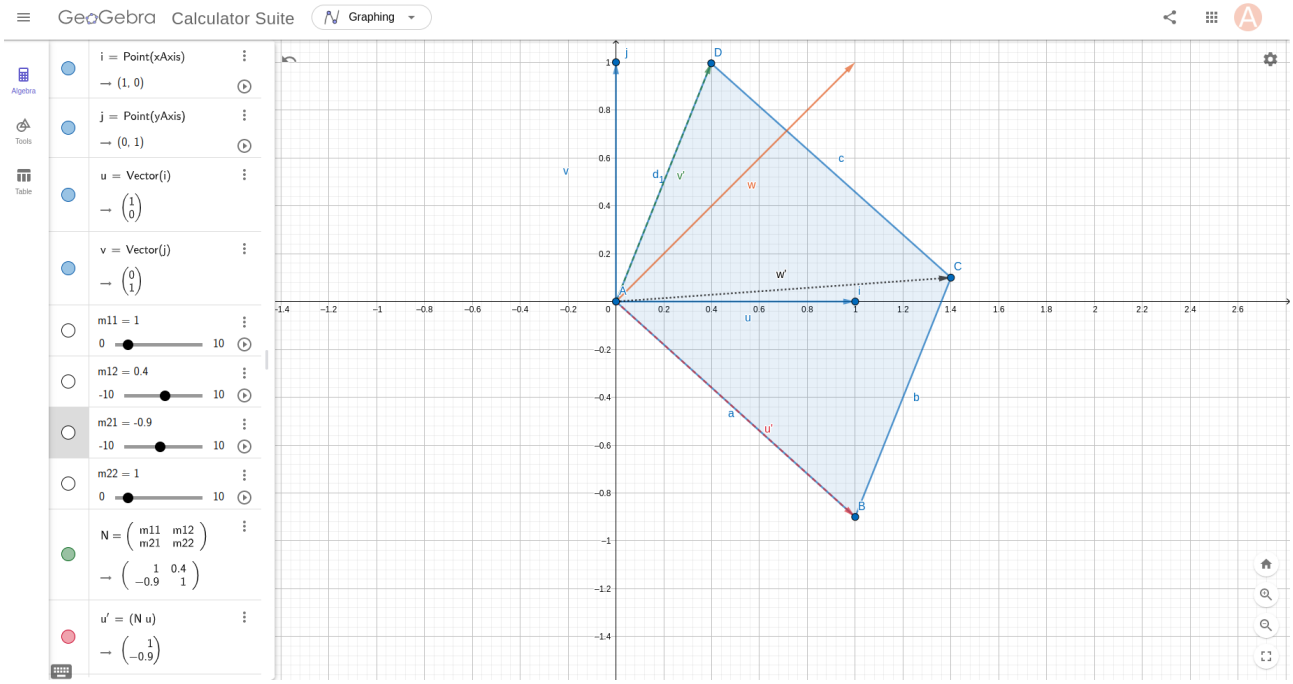
m21 = 0
-10 — 10

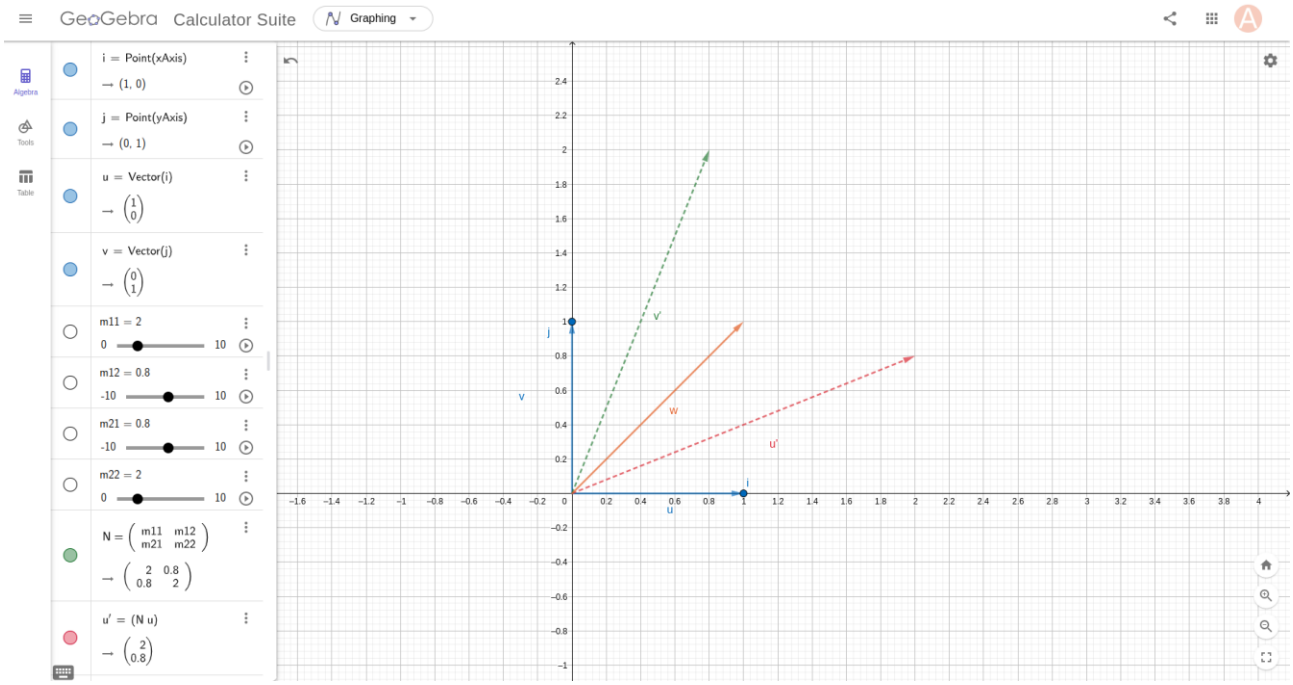
m22 = 1
0 — 10

N = (m11 m12 ; m21 m22)
→ (1 0.4 ; 0 1)

u′ = (N u)
→ (1 ; 0)




GeoGebra Calculator Suite
Graphing
i = Point(xAxis)
(1, 0)
j = Point(yAxis)
(0, 1)
u = Vector(i)
v = Vector(j)
m11 = 1
m12 = 0.4
m21 = -0.9
m22 = 1
N = (m11 m12 / m21 m22)
(1 0.4 / −0.9 1)
u′ = (N u)
(1 / −0.9)
A
B
C
D
a
b
c
d
u
v
w
u′
v′
w′


GeoGebra Calculator Suite
Graphing
i = Point(xAxis)
(1, 0)
j = Point(yAxis)
(0, 1)
u = Vector(i)
v = Vector(j)
m11 = 2
m12 = 0.8
m21 = 0.8
m22 = 2
N = (m11 m12 / m21 m22)
(2 0.8 / 0.8 2)
u′ = (N u)
(2 / 0.8)
u
v
w
u′
v′