

786

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Subject: Numerical Computing

Assignment No: 1

Section: 5A

Submitted To Respected Sir: Muhammad Nauman

What is GeoGebra?

Answer:

GeoGebra is an interactive geometry, algebra, statistics and calculus application, intended for learning and teaching mathematics and science from primary school to university level.

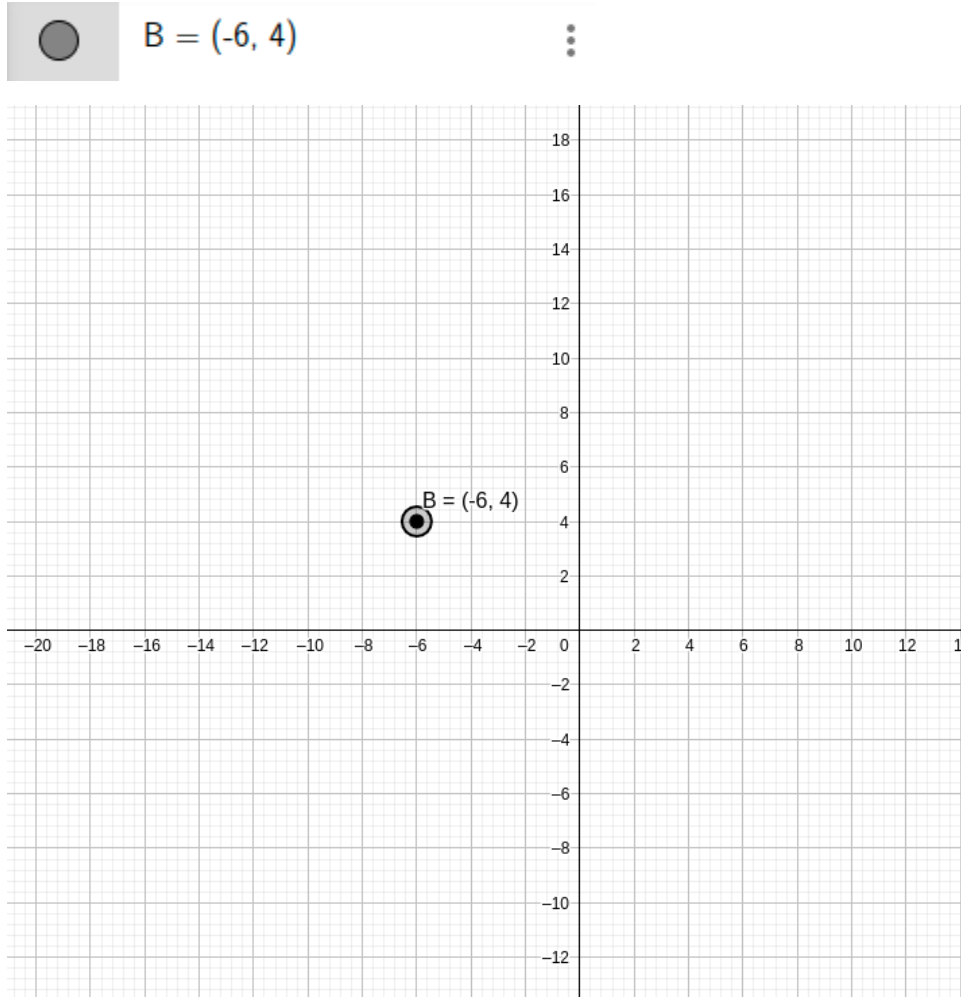
GeoGebra is an application that helps in working with Geometry, Algebra and Statistics. It is available online. You can check this by clicking the link below:

<https://www.geogebra.org/?lang=en>

Working with the GeoGebra:

Operation 1:

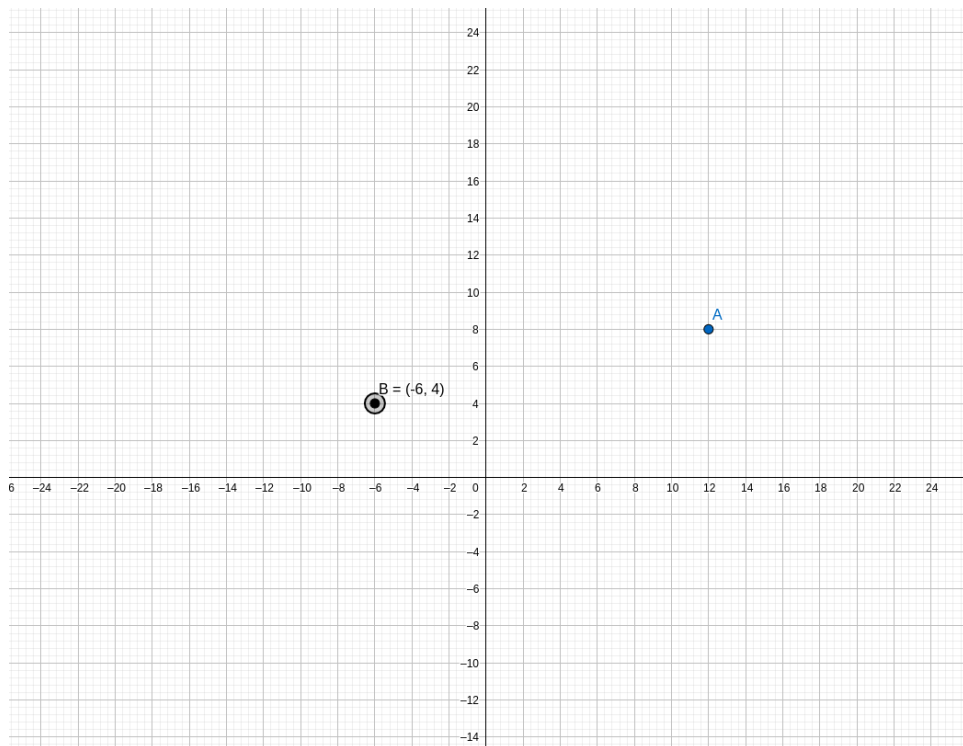
Simply add a single point on the canvas with the x and y values as -6 and 4 .



Operation 2:



Add another Point A with the values of X and Y.

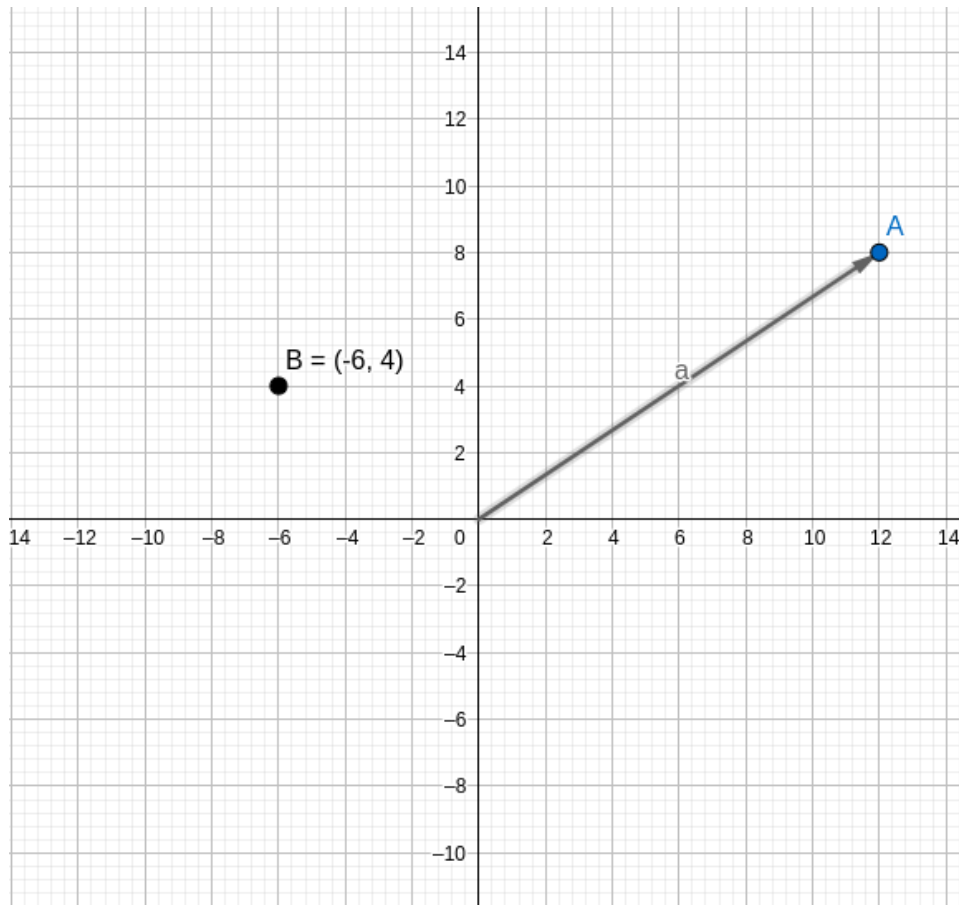
	$B = (-6, 4)$	
	$A = (12, 8)$	



Operation 3:


Now add a vector 'a' starting from the origin 0 of the graph to the point A.

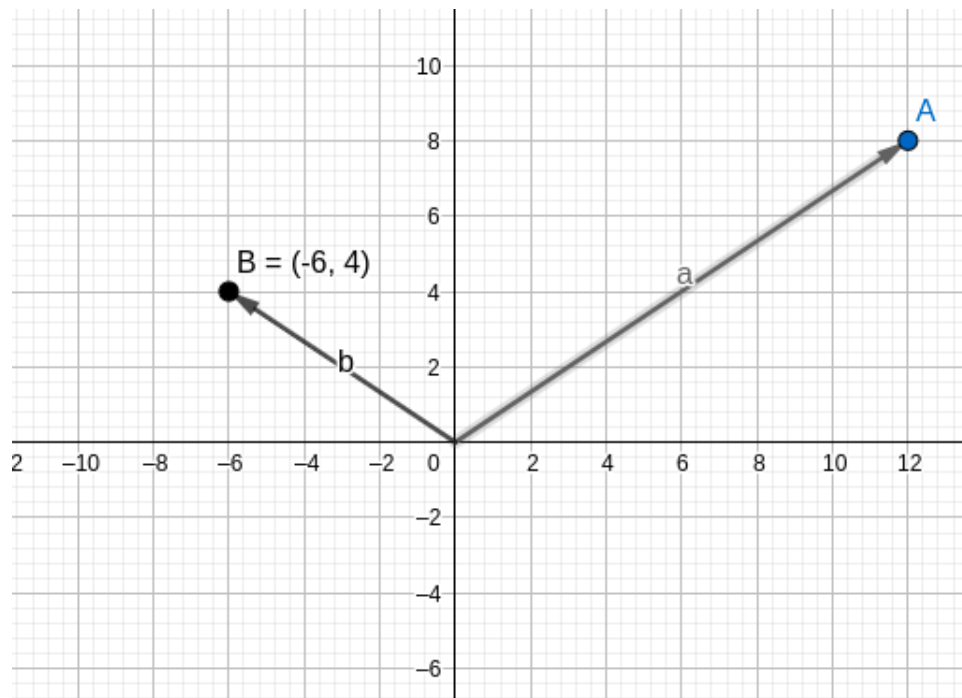
	$a = \text{Vector}(A)$	
	$\rightarrow \begin{pmatrix} 12 \\ 8 \end{pmatrix}$	



Operation 4:

Now place another vector ' b ' starting from the origin ' O ' and ending to the point ' B '.


$$b = \text{Vector}(B)$$
$$\rightarrow \begin{pmatrix} -6 \\ 4 \end{pmatrix}$$

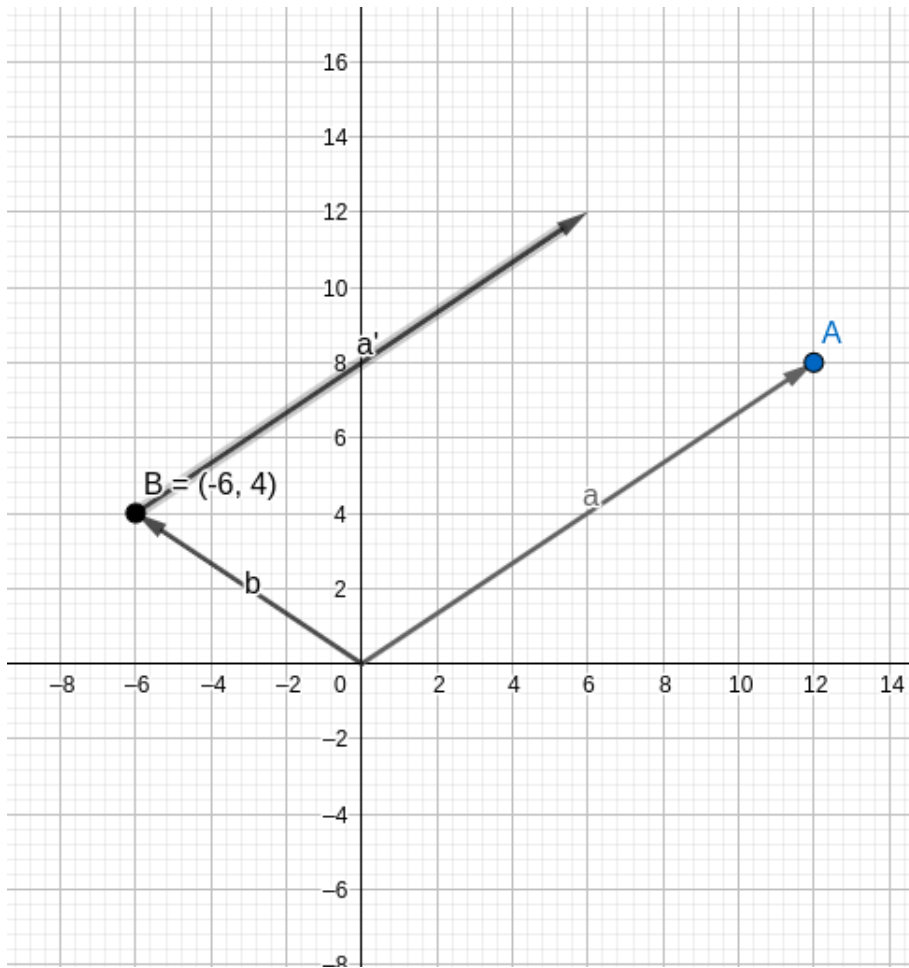


Operation 5:

Place another vector " a ' " starting from the point 'B' and ending at the point (B+a)

$$a = \text{Vector}(B, B + a)$$

$$\rightarrow \begin{pmatrix} 12 \\ 8 \end{pmatrix}$$



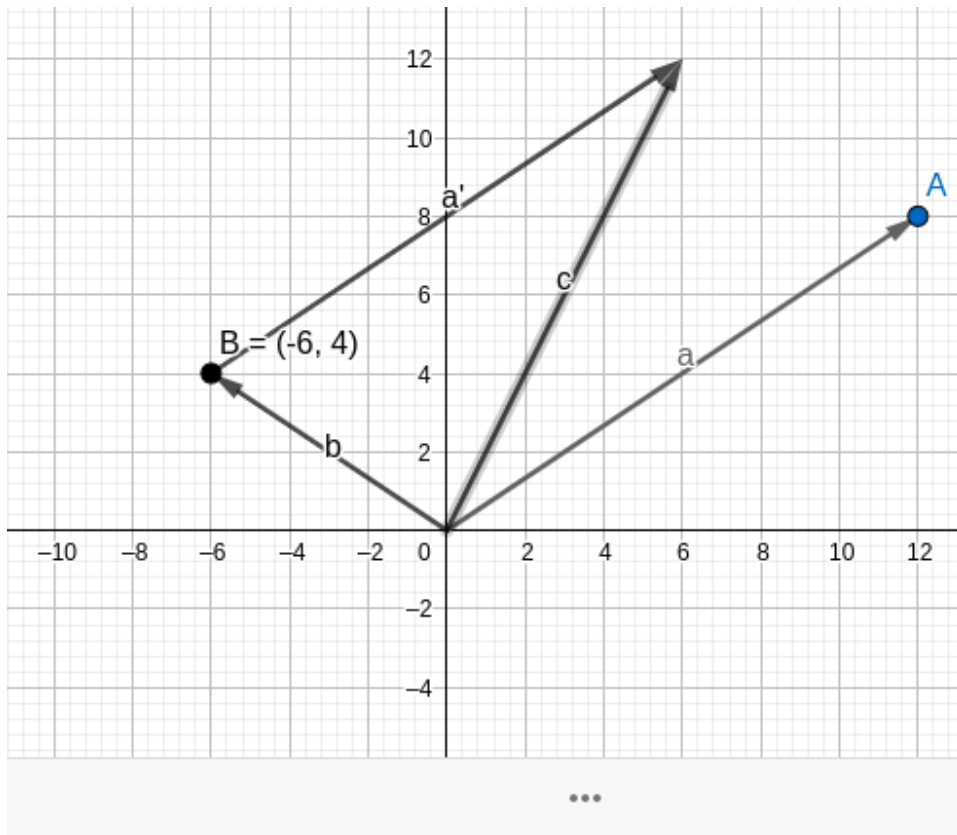
Operation 6:

Place another vector ' c ' starting from origin ' 0 ' and ending at ' $a+b$ '.

$$c = a + b$$

$$\rightarrow \begin{pmatrix} 6 \\ 12 \end{pmatrix}$$

$$\vdots$$

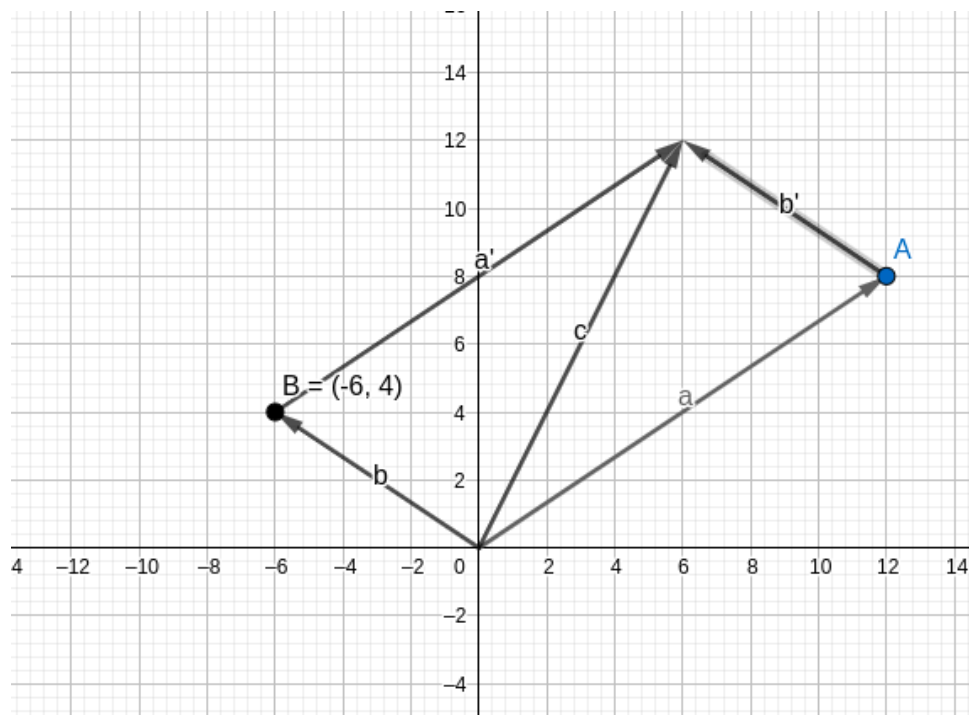


Operation 7:

Place another vector “ b ’ ” with the x-axis coordinate as ‘ A ’ and y-axis coordinate ‘ A+b ’.

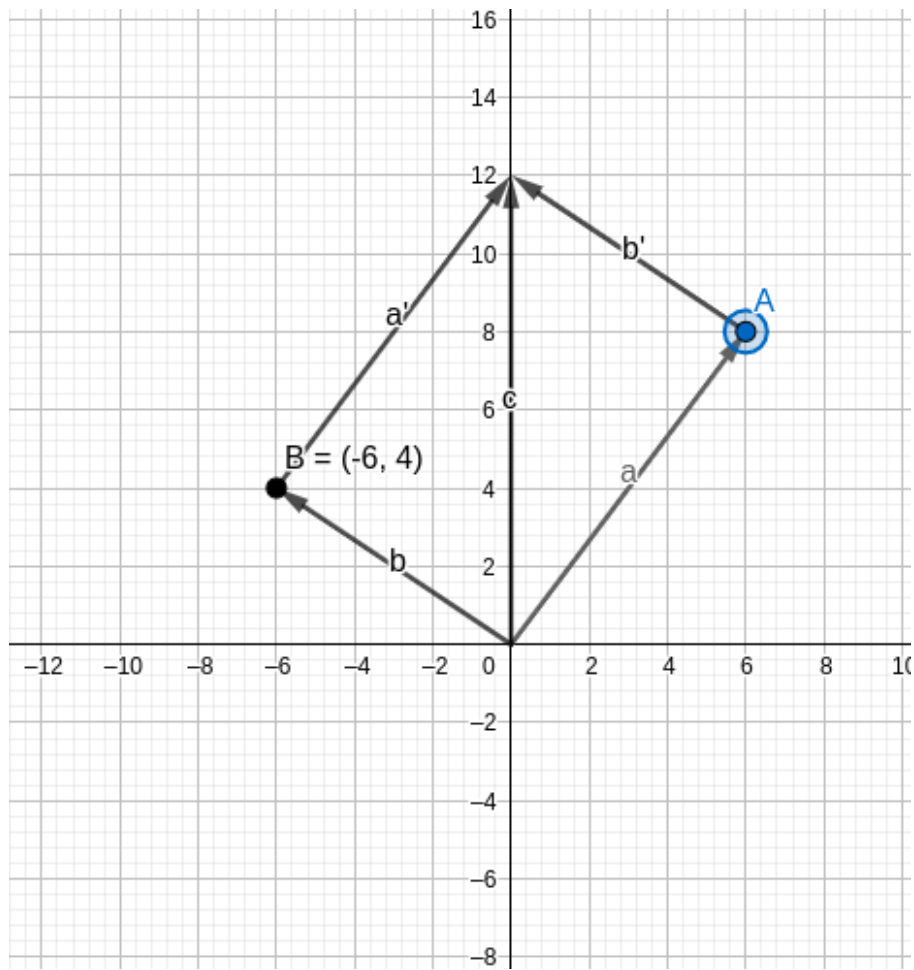
$$b' = \text{Vector}(A, A + b) \quad \vdots$$

$$\rightarrow \begin{pmatrix} -6 \\ 4 \end{pmatrix}$$



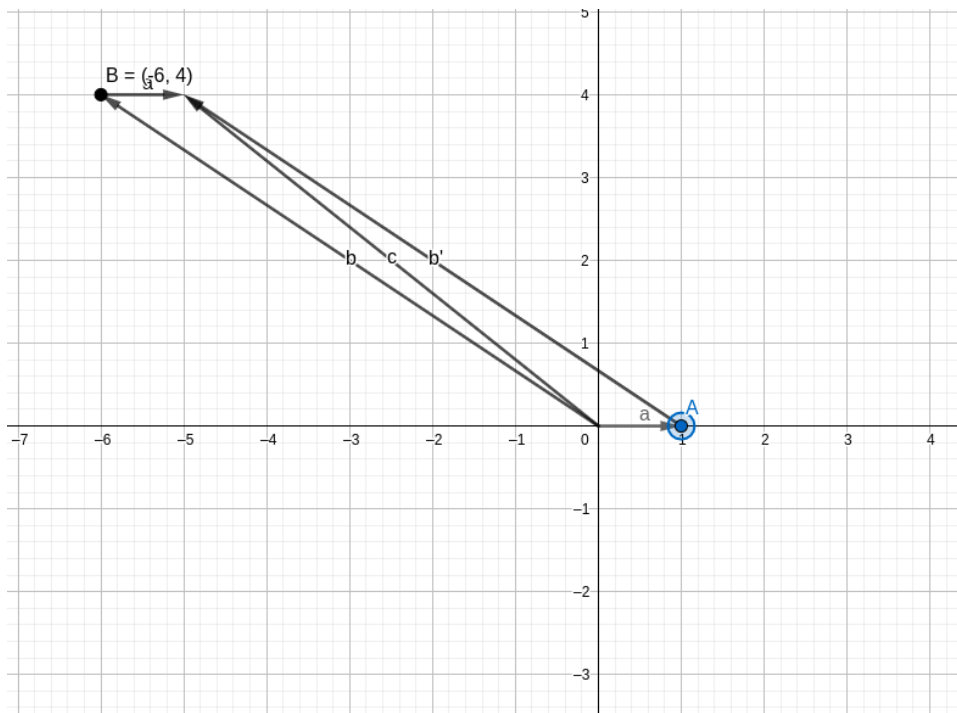
Operation 8:

Moving the point A.



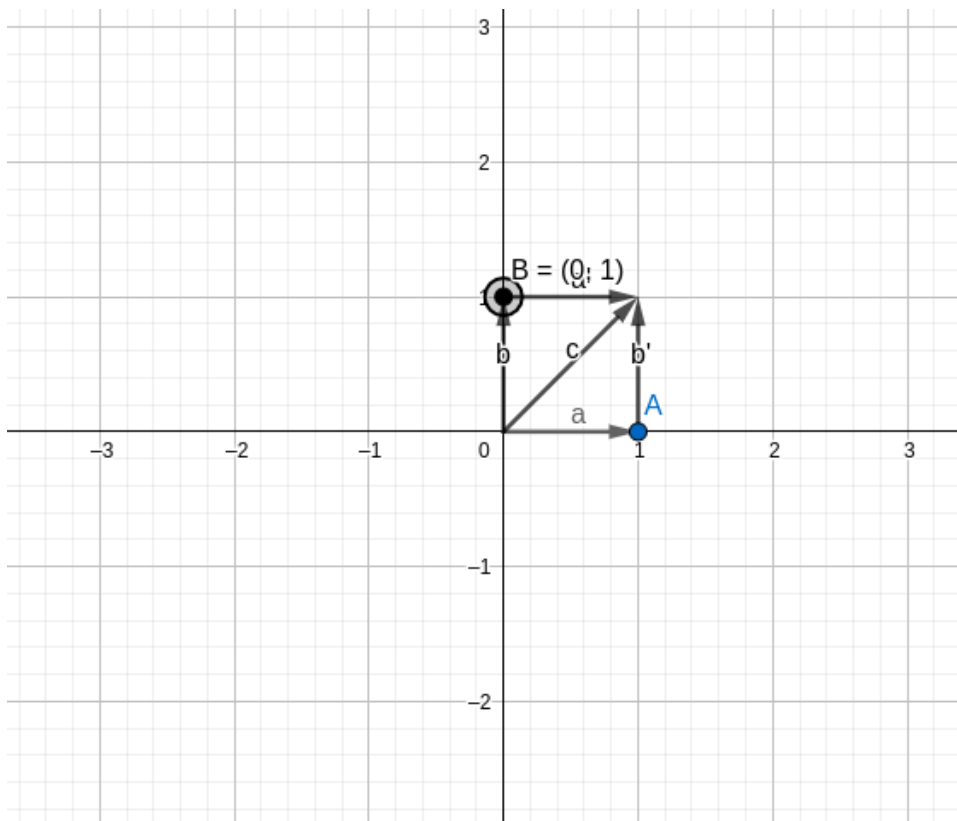
Operation 9:

Moving Point 'A' to 1 on x-axis.



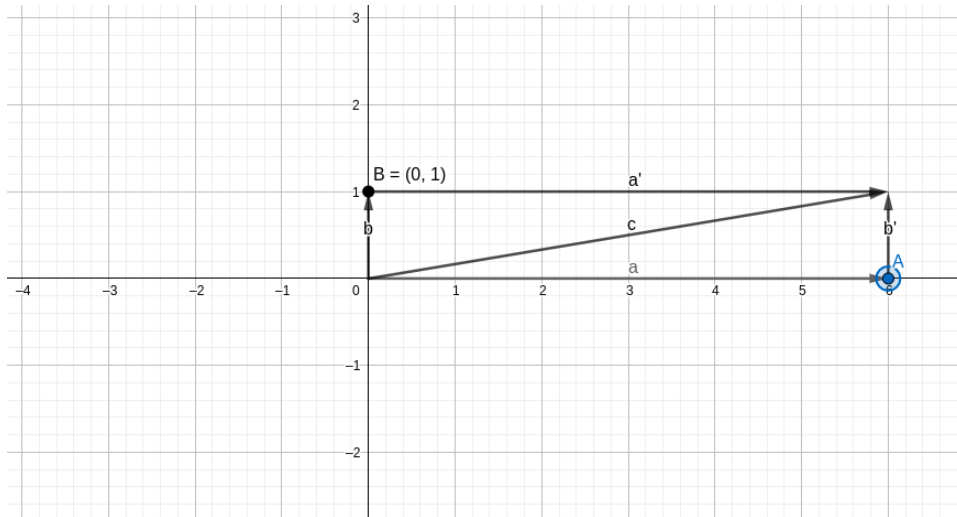
Operation 10:

Moving 'B' to 1 on y-axis.



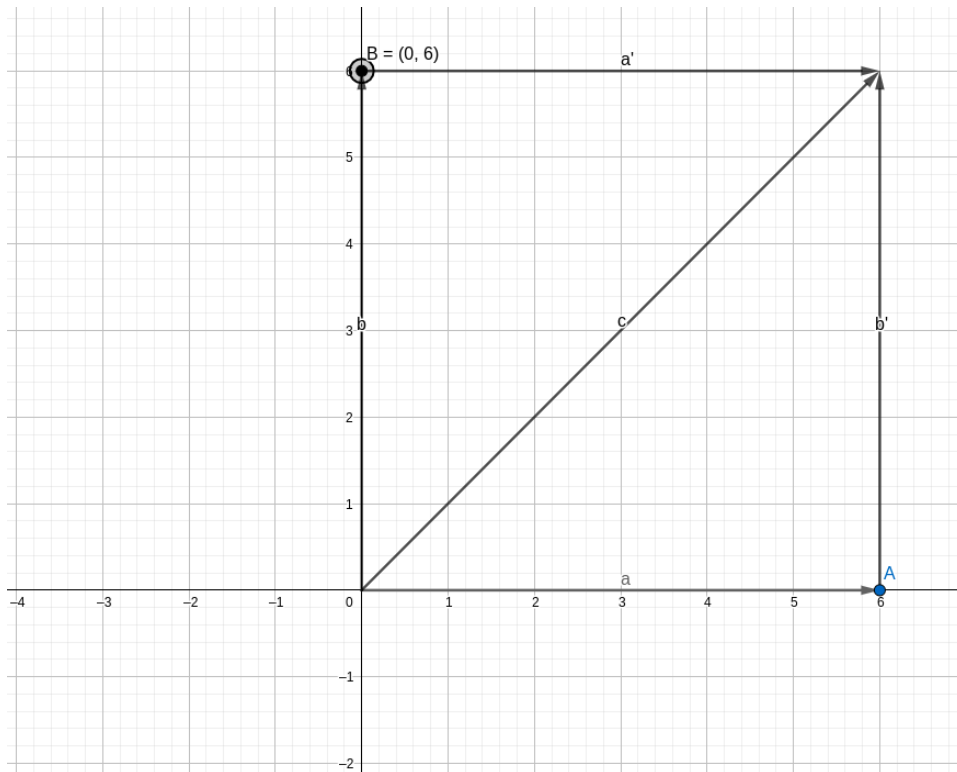
Operation 11:

Moving 'A' to 6 on the x-axis.









Operation 12:

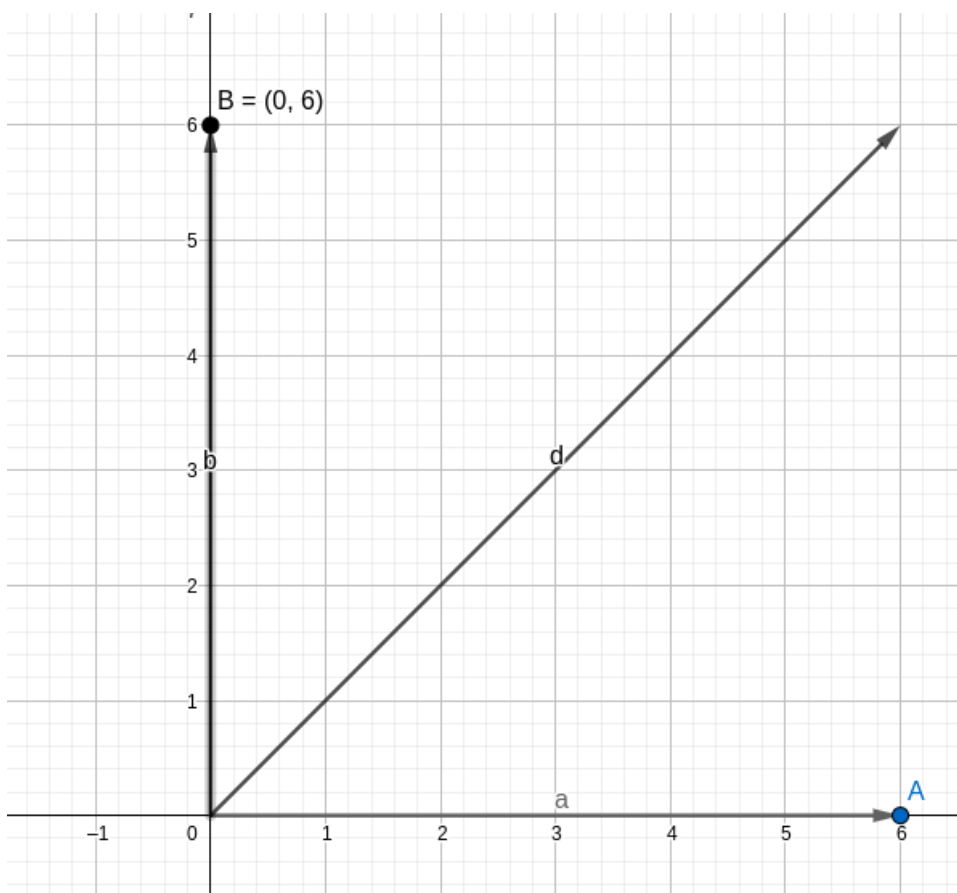
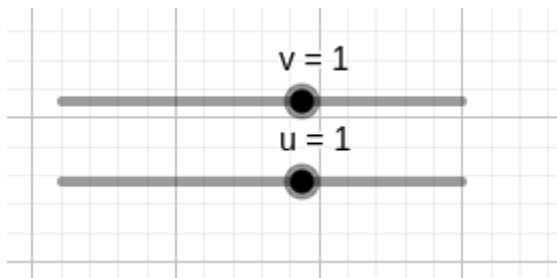
Moving 'B' to 6 on the y-axis.



Operation 13:

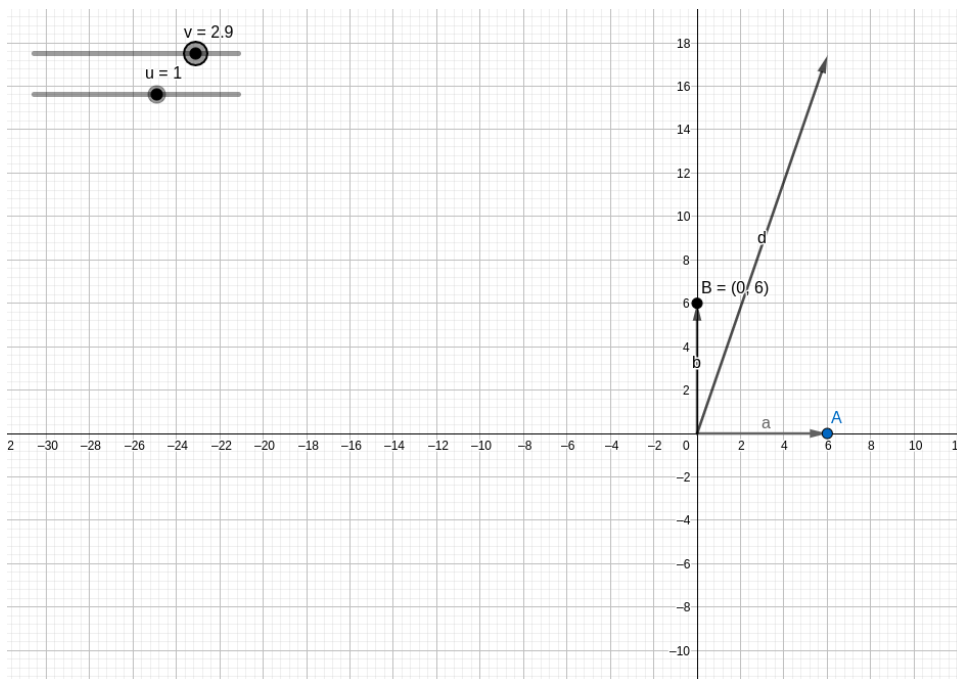
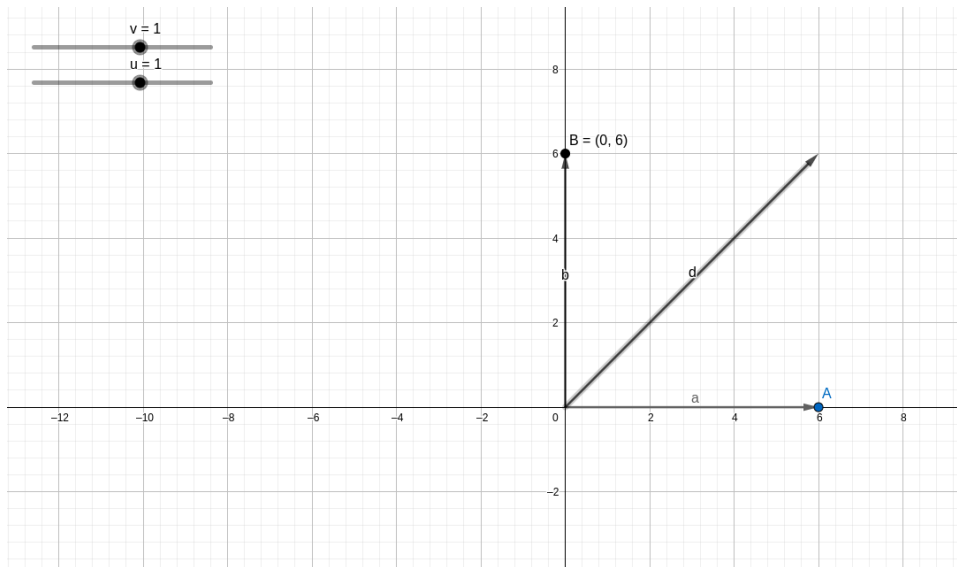
Place 3 new points 'u', 'v' and 'd'.

	$u = 1$	
	-5  5	
	$v = 1$	
	-5  5	



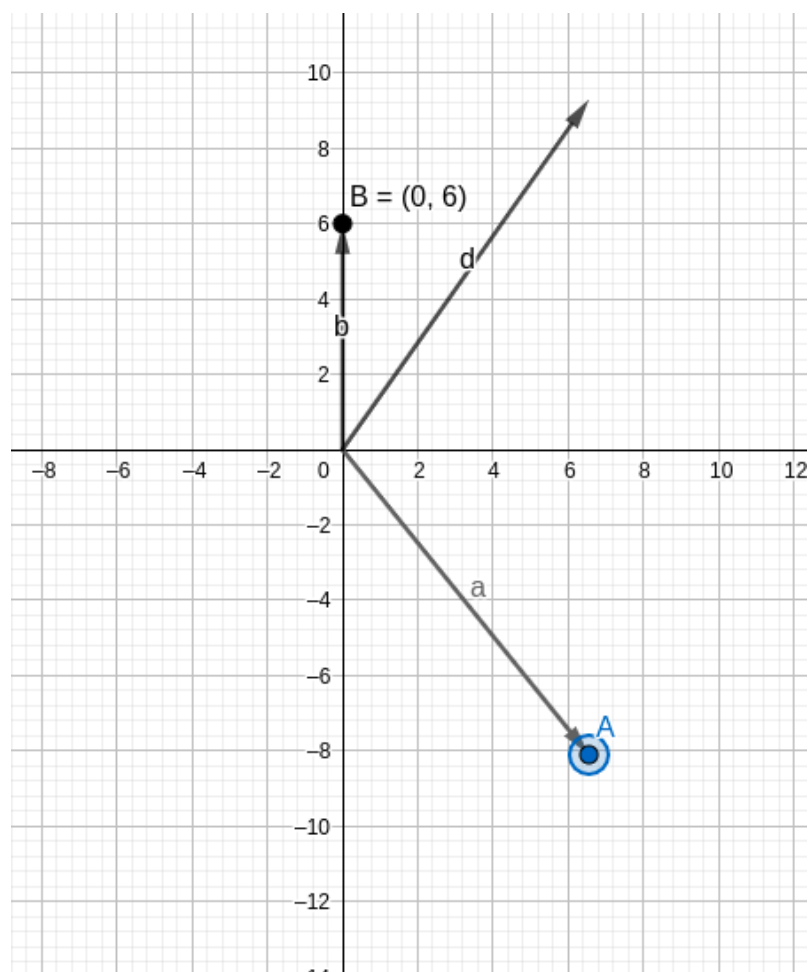
Operation 14:

Changing the values of 'u' and 'v' will affect the vector 'd'. You can see the change on the canvas.





Operation 15:

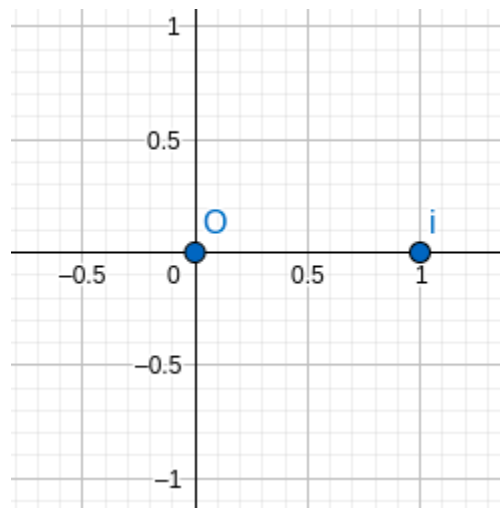
Change in 'd' by changing 'A'.



Operation 1:





Place a point with the 'x' and 'y' coordinates as (1,0)

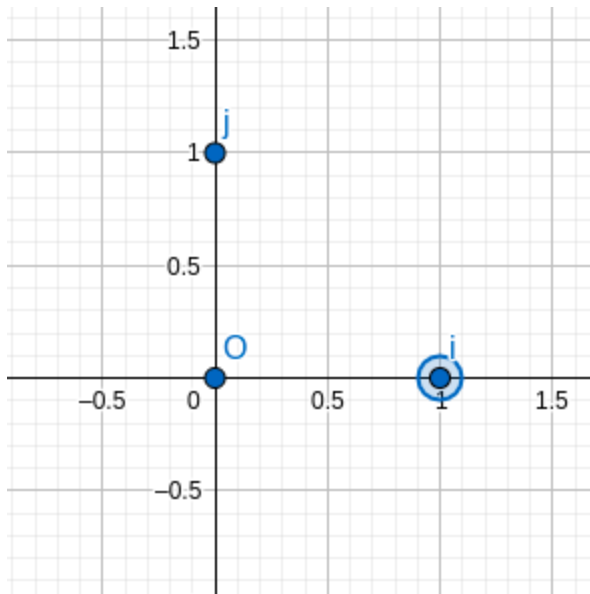
	$i = \text{Point}(\text{xAxis})$	\vdots
	$\rightarrow (1, 0)$	



Operation 2:




Place a point with the 'x' and 'y' coordinates as (0,1)

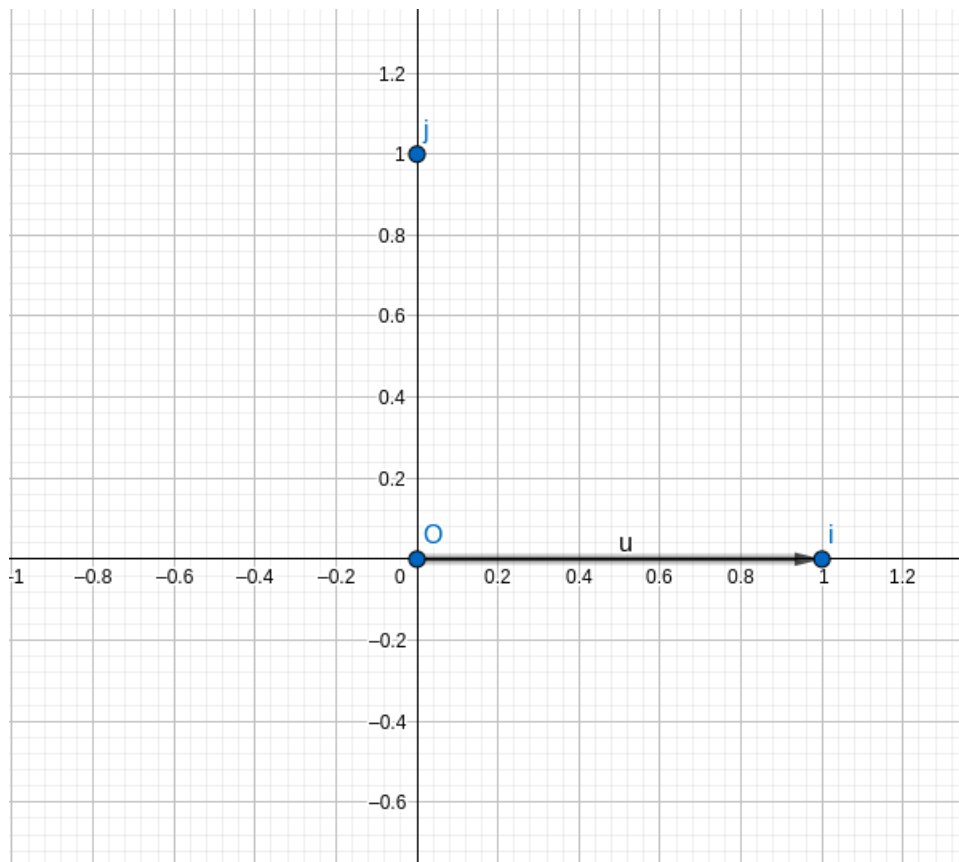
	$i = \text{Point}(\text{xAxis})$	\vdots
	$\rightarrow (1, 0)$	
	$j = \text{Point}(\text{yAxis})$	\vdots
	$\rightarrow (0, 1)$	



Operation 3:







Place a vector 'u' with the coordinates of 'x' and 'y' as (1,0)

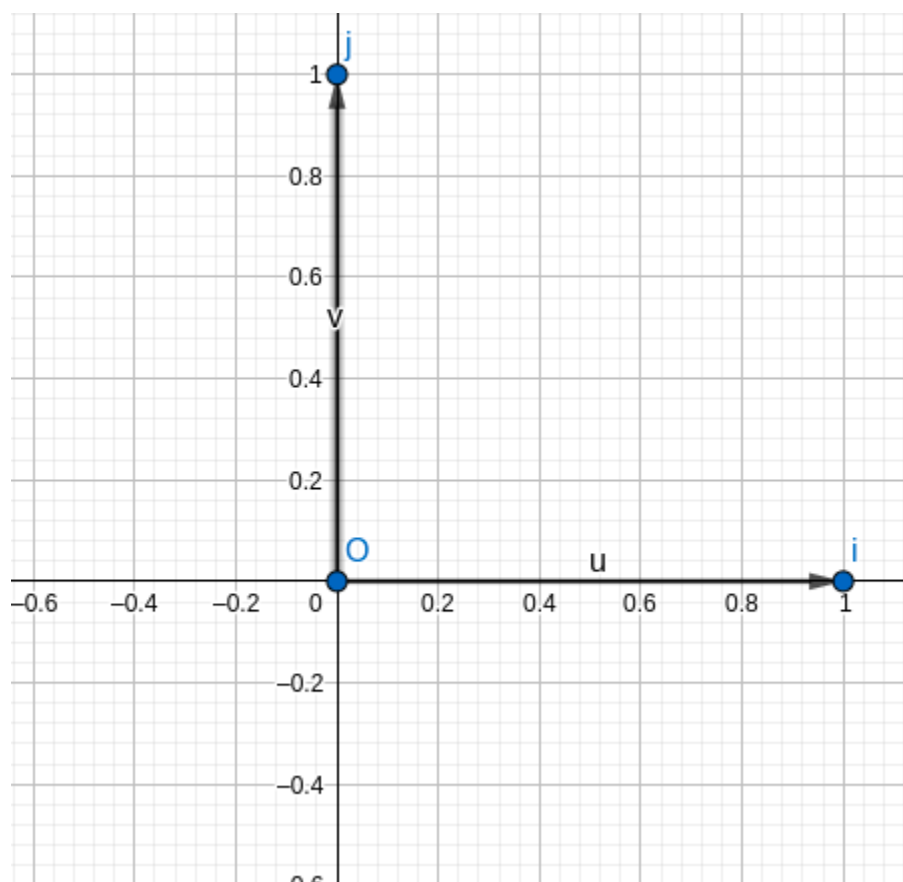
	$i = \text{Point}(\text{xAxis})$ $\rightarrow (1, 0)$	⋮ ▶
	$j = \text{Point}(\text{yAxis})$ $\rightarrow (0, 1)$	⋮ ▶
	$u = \text{Vector}(i)$ $\rightarrow \begin{pmatrix} 1 \\ 0 \end{pmatrix}$	⋮



Operation 4:

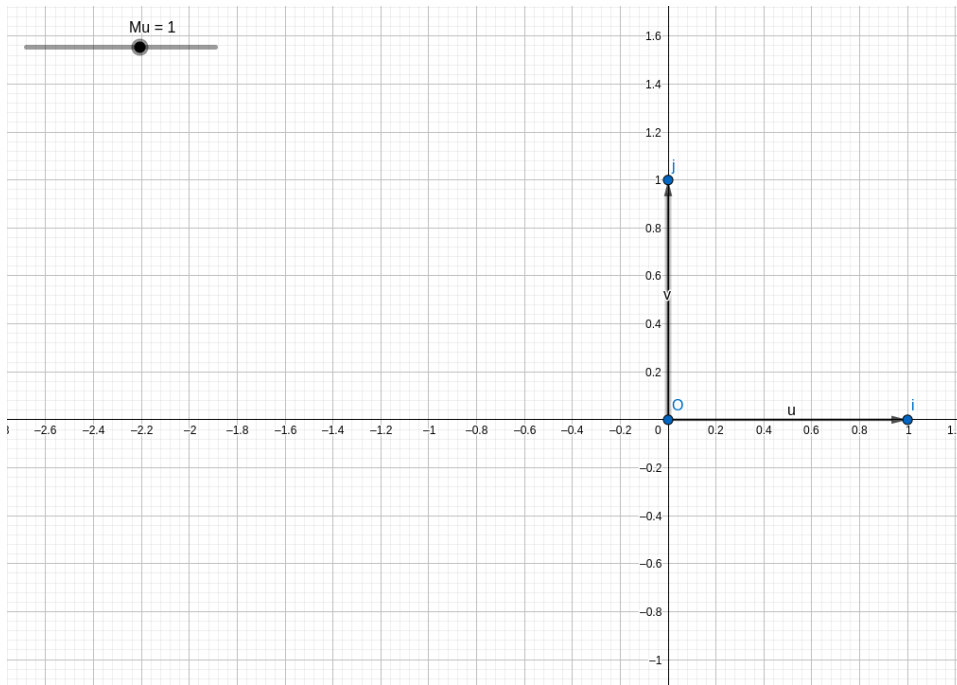
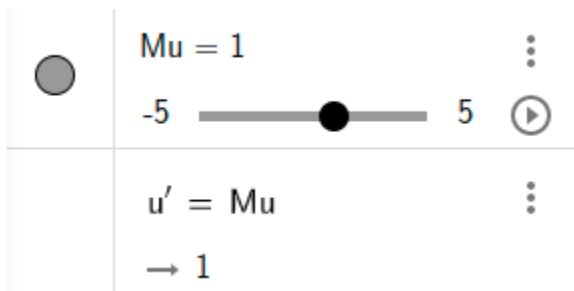
Place a vector v with the 'x' and 'y' coordinates as $(0,1)$.

	$i = \text{Point}(\text{xAxis})$ $\rightarrow (1, 0)$	\vdots 
	$j = \text{Point}(\text{yAxis})$ $\rightarrow (0, 1)$	\vdots 
	$u = \text{Vector}(i)$ $\rightarrow \begin{pmatrix} 1 \\ 0 \end{pmatrix}$	\vdots
	$v = \text{Vector}(j)$ $\rightarrow \begin{pmatrix} 0 \\ 1 \end{pmatrix}$	\vdots



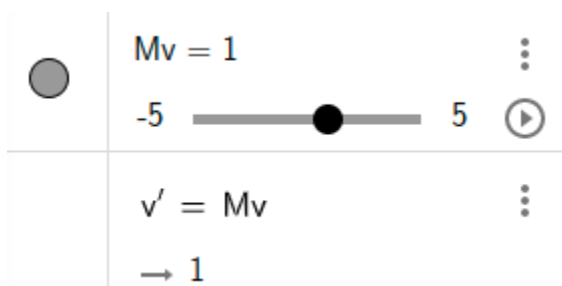
Operation 5:

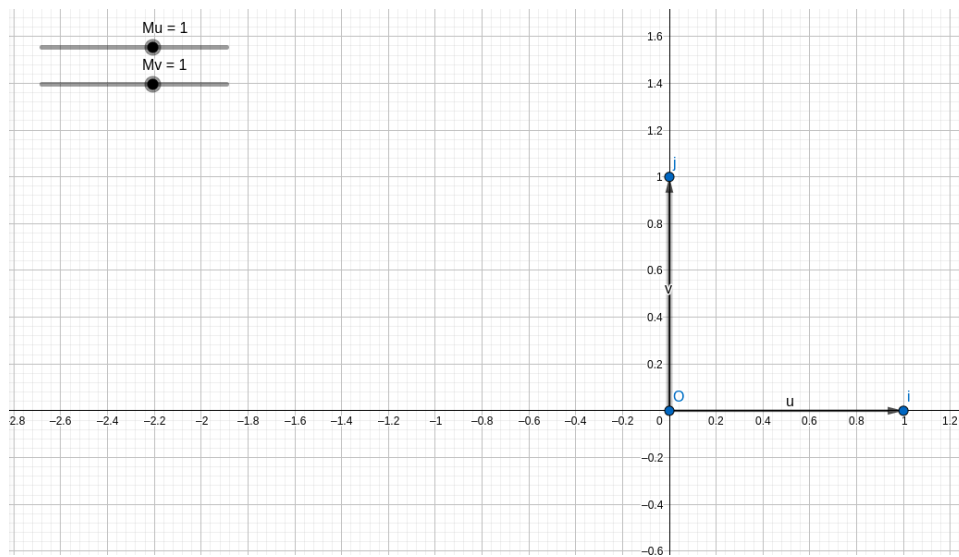
Place “u’ ” with the value as ‘Mu’.



Operation 6:

Place “v’ ” with the value as ‘Mv’.

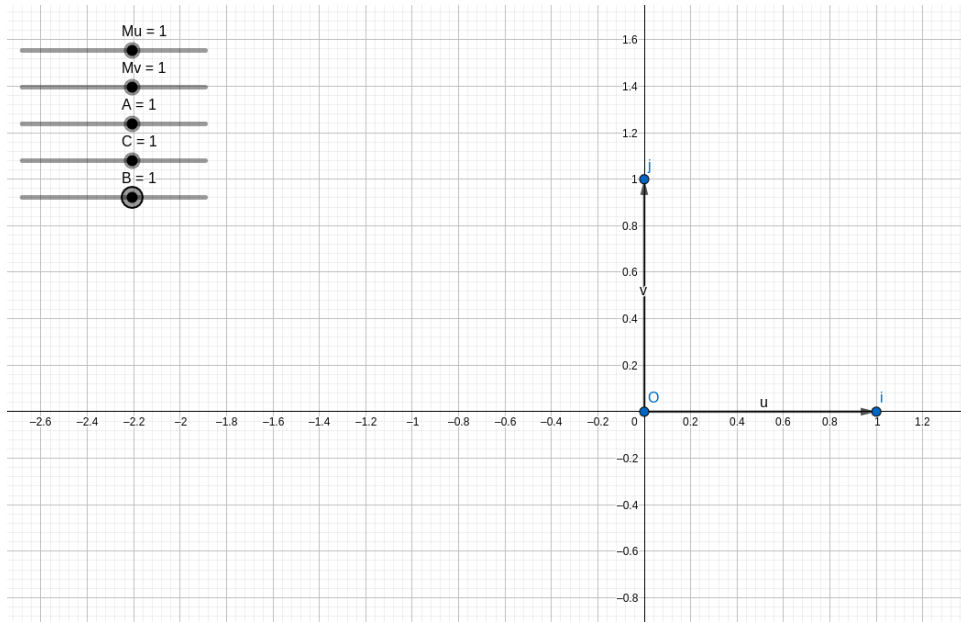




Operation 7:


Place three Scalars 'A', 'B' and 'C' all with the values '1'.

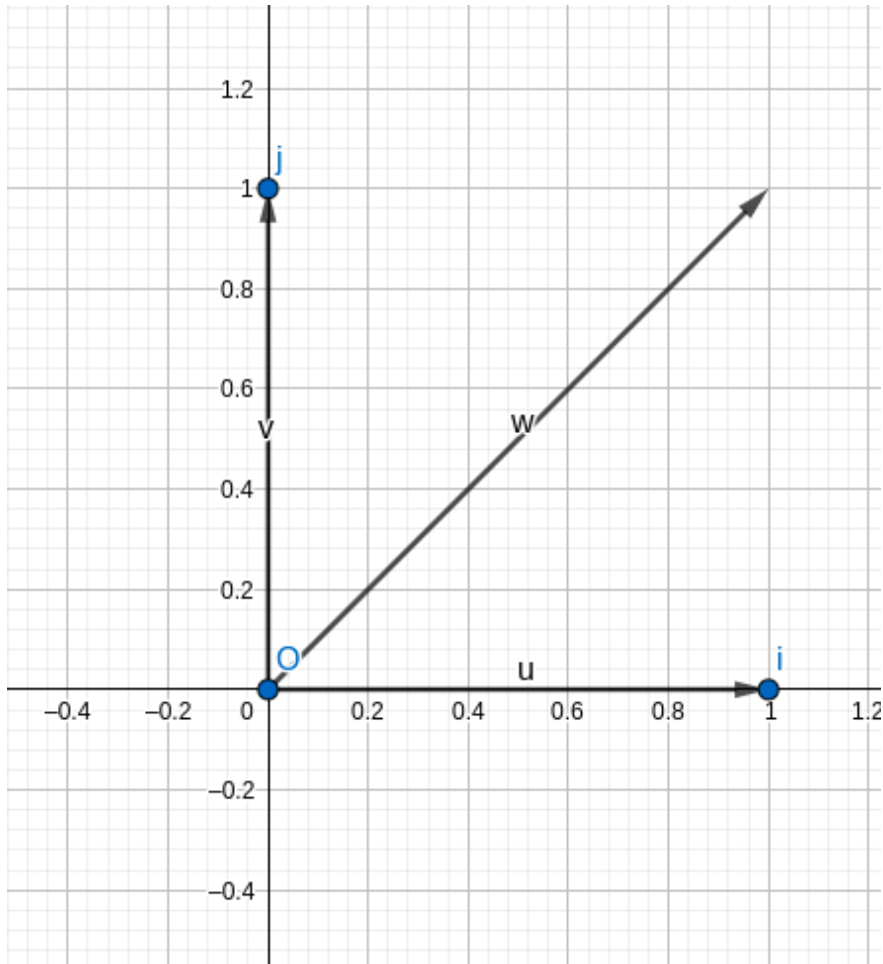
	A = 1	⋮
	-5 5	
	C = 1	⋮
	-5 5	
	B = 1	⋮
	-5 5	



Operation 8:

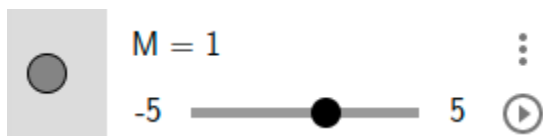
Place a vector 'w' with the values (1,1).

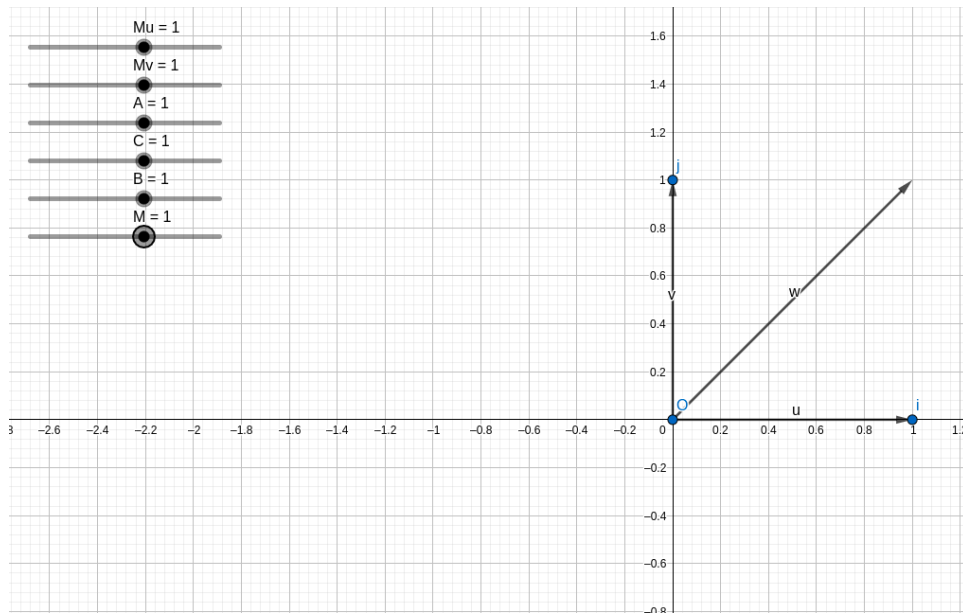
		$w = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$	⋮
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Operation 9:

Place a Scalar 'M' with the value = 1.





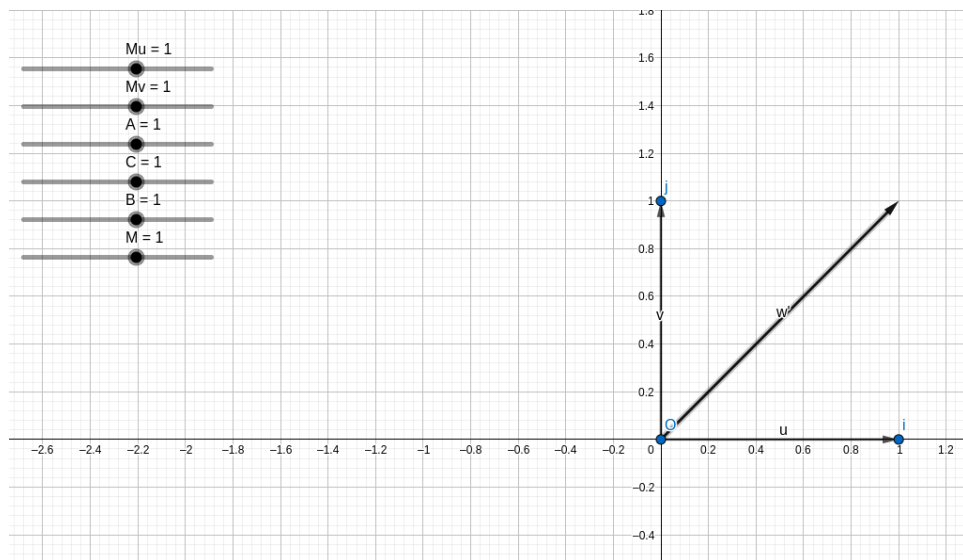
Operation 10:

Place a vector “ w' ” with the value = ‘ Mw ’

$$w' = M w$$

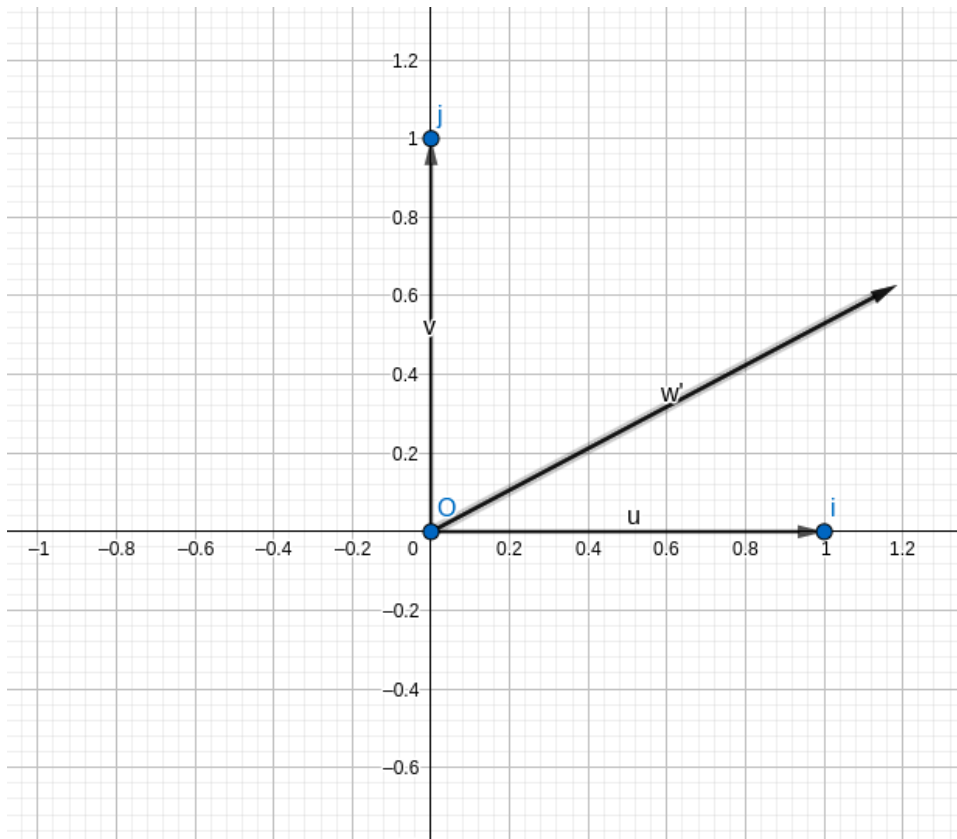
$$\rightarrow \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$

\vdots




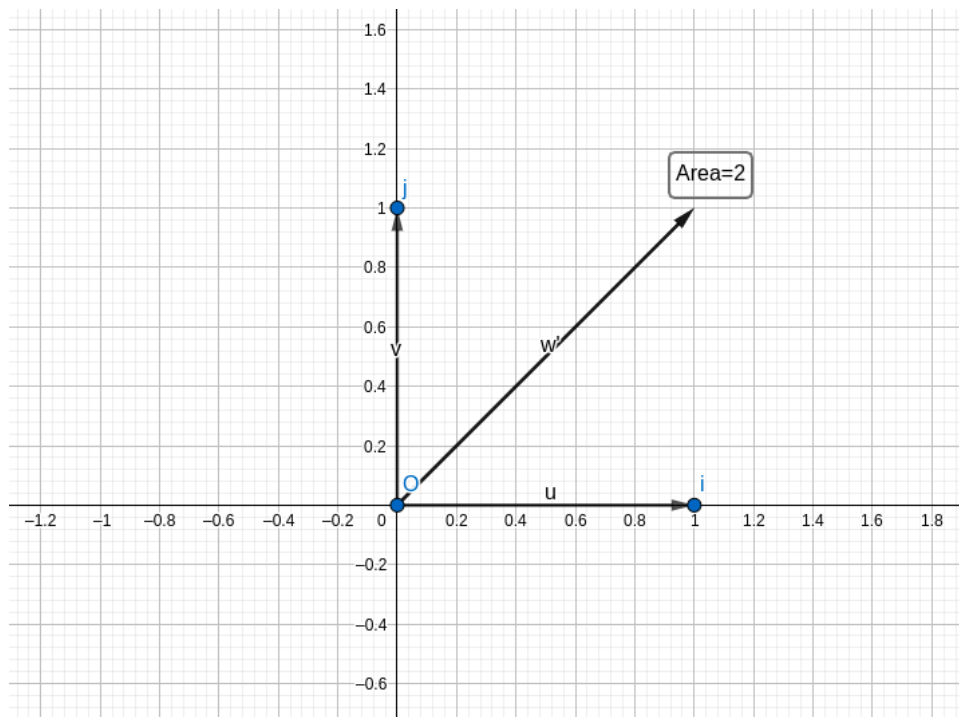
Operation 11:

Moving ‘ w ’ and “ w' ”




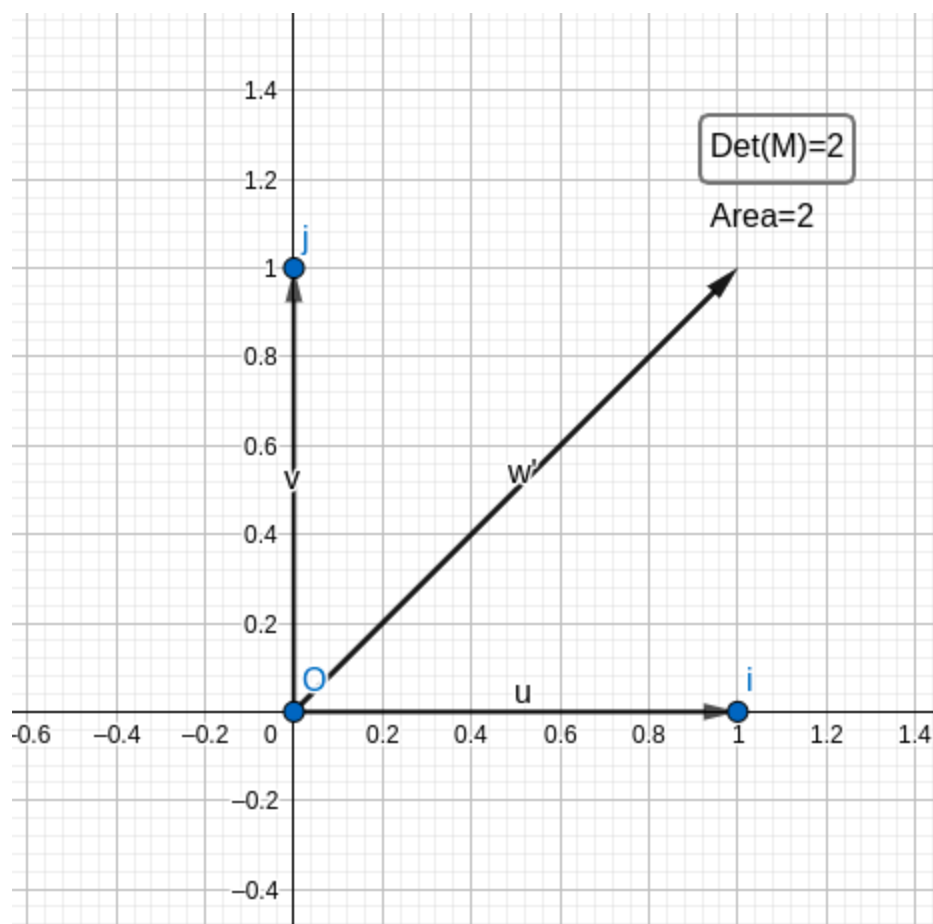
Operation 12:

 Textq1="Area="+q1+" " :



Operation 13:


 Text1="Det(M)=" + d + "" :



Operation 14:

☐ $A' = MA$
 $\rightarrow 1$

☐ $B' = MB$
 $\rightarrow 1$

☐ $C' = MC$
 $\rightarrow 1$

☐ $D' = MD$

Issue:

Some of the Algebraic Expressions like this are not working in GeoGebra.

q2 = Polygon(A',B',C',D')

