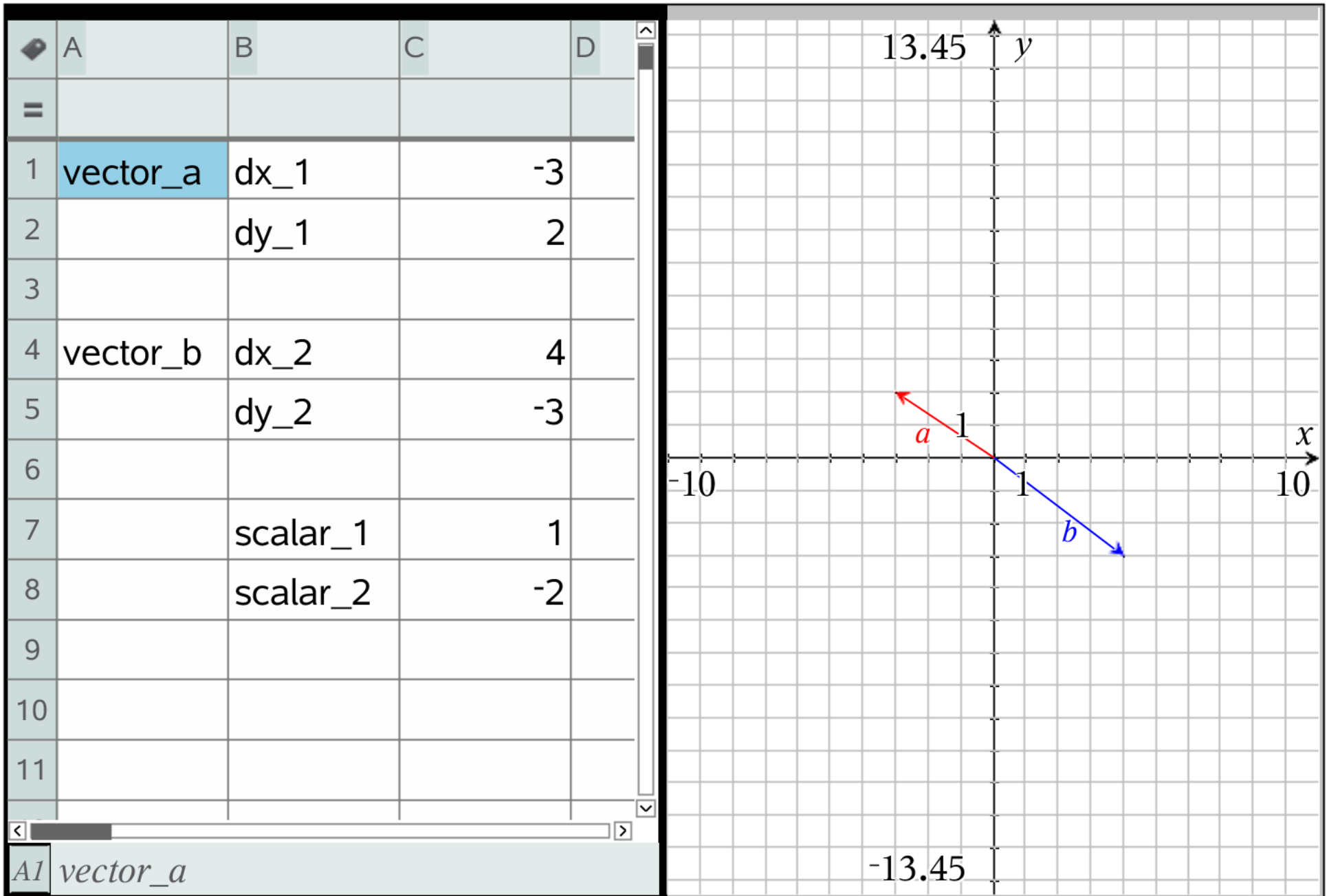
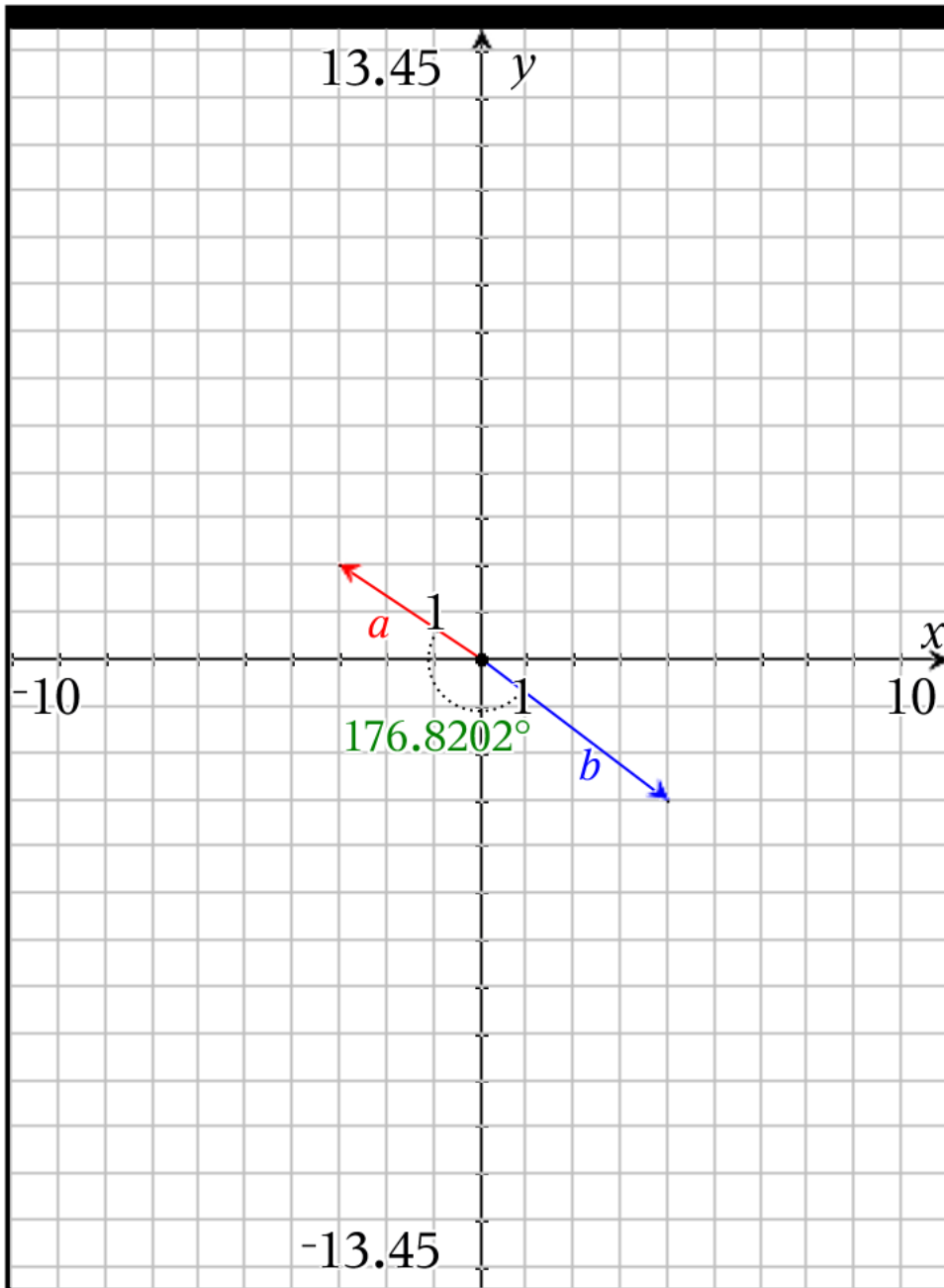


Problem 1





To find angle between vectors

1) Find magnitudes of vectors

$$a = \begin{bmatrix} -3 \\ 2 \end{bmatrix} \quad |a| = \sqrt{(13)} = \sqrt{13}$$

$$b = \begin{bmatrix} 4 \\ -3 \end{bmatrix} \quad |b| = \sqrt{(25)} = 5$$

2) Find dot product of vectors

$$a \cdot b = (-3)(4) + (2)(-3) = -18$$

3) Apply  $\cos(\theta) = \frac{a \cdot b}{|a| \cdot |b|}$

so  $\cos \theta$  has ratios

$$= -18 / (\sqrt{13} \sqrt{25}) = -18 / (\sqrt{325}) = \frac{-18 \cdot \sqrt{13}}{65}$$

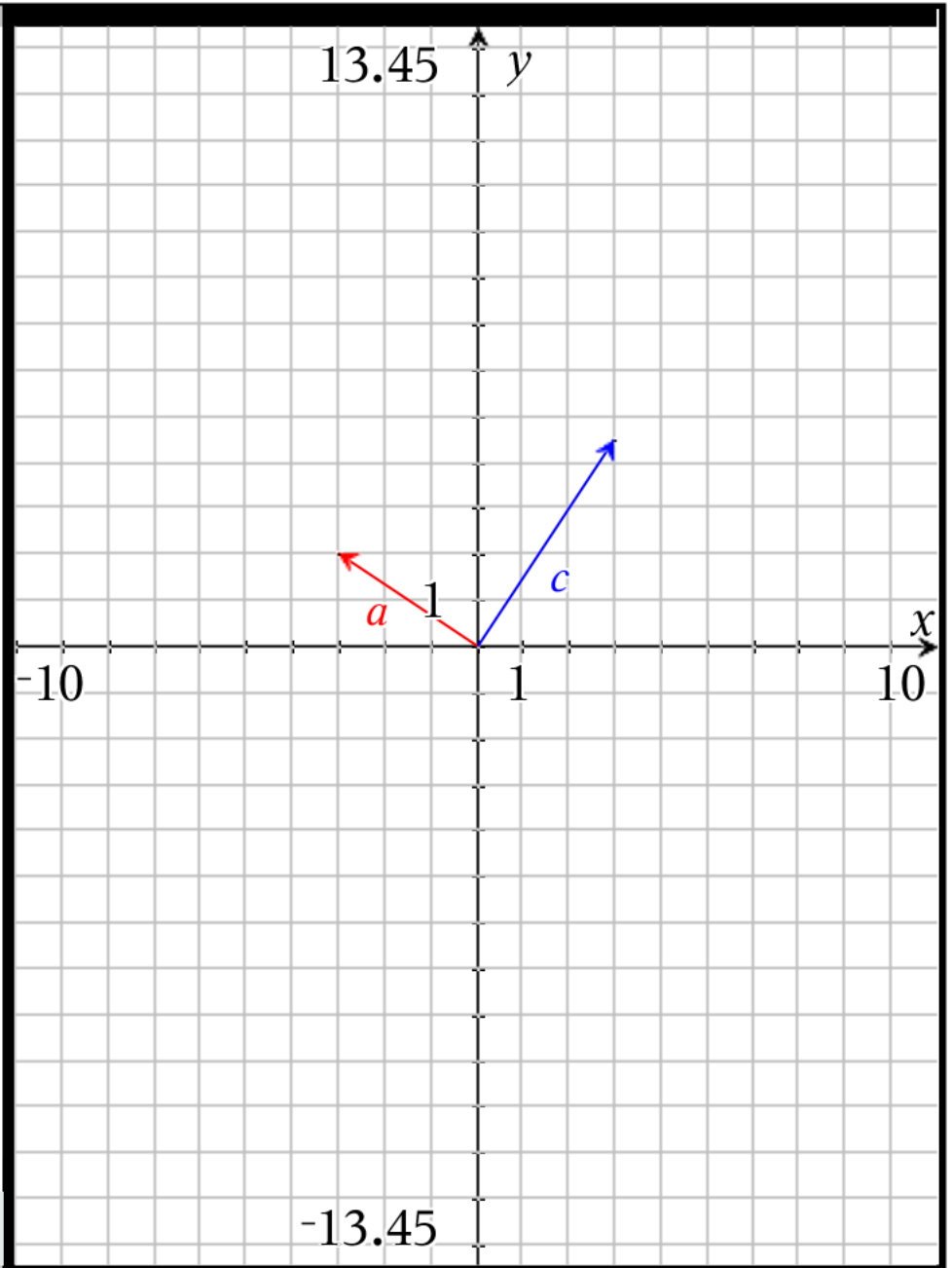
4) Use inverse cos to find  $\theta$

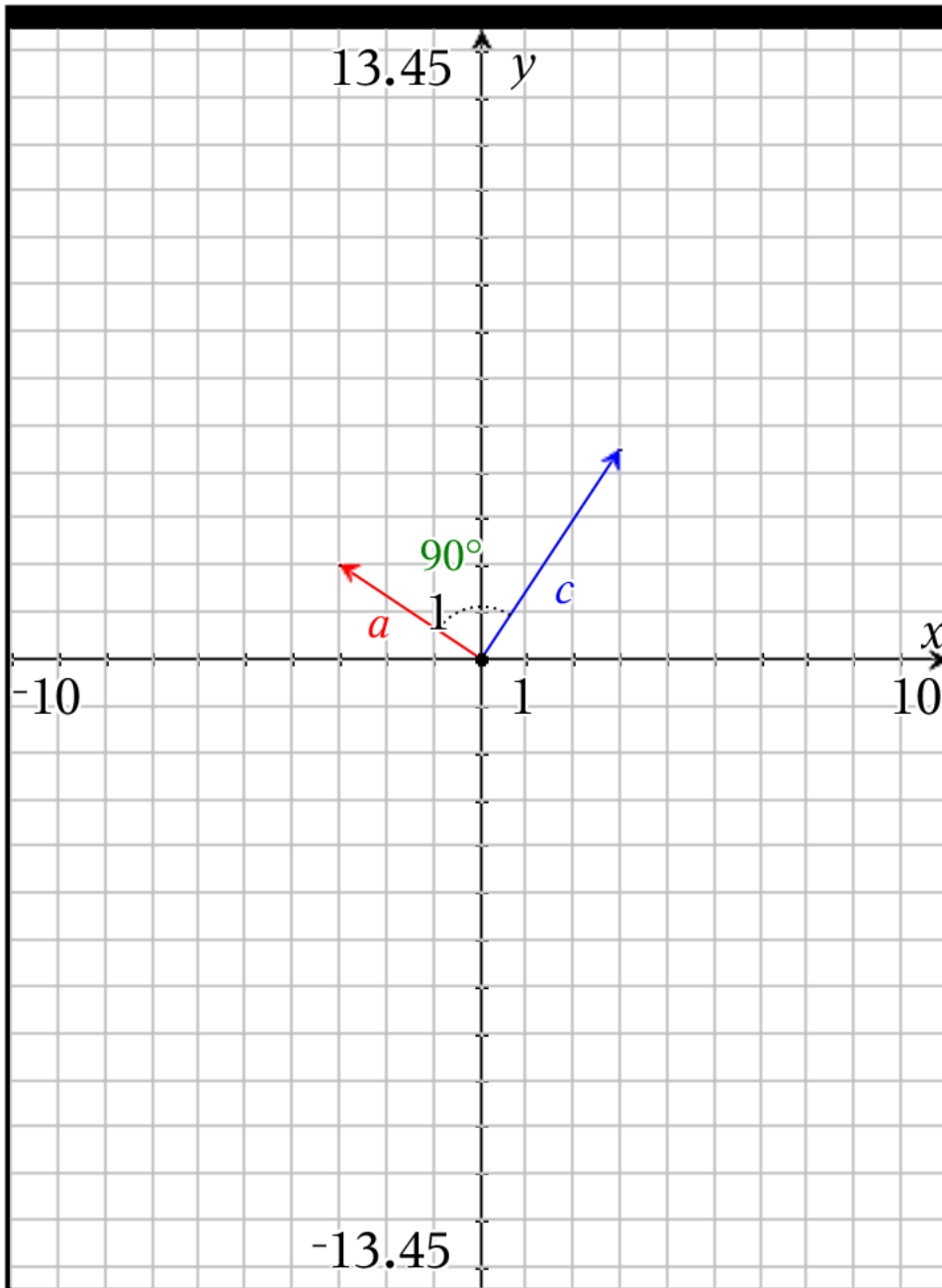
$$\theta = \cos^{-1}(-18 / (\sqrt{325})) = 176.82^\circ$$

Problem 2

	A	B	C	D
	=			
1	vector_a	dx_1		-3
2		dy_1		2
3				
4	vector_c	dx_2		3
5		dy_2		4.5
6				
7		scalar_1		1
8		scalar_2		-2
9				
10				
11				

A1 vector\_a





To find angle between vectors

1) Find magnitudes of vectors

$$a = \begin{bmatrix} -3 \\ 2 \end{bmatrix} \quad |a| = \sqrt{(13)} = \sqrt{13}$$

$$c = \begin{bmatrix} 3 \\ 4.5 \end{bmatrix} \quad |c| = \sqrt{(29.25)} = 5.40833$$

2) Find dot product of vectors

$$a \cdot c = (-3)(3) + (2)(4.5) = 0.$$

3) Apply  $\cos(\theta) = \frac{a \cdot b}{|a| \cdot |b|}$

so  $\cos \theta$  has ratios

$$= 0. / (\sqrt{13} \sqrt{29.25}) = 0. / (\sqrt{380.25}) = 0.$$

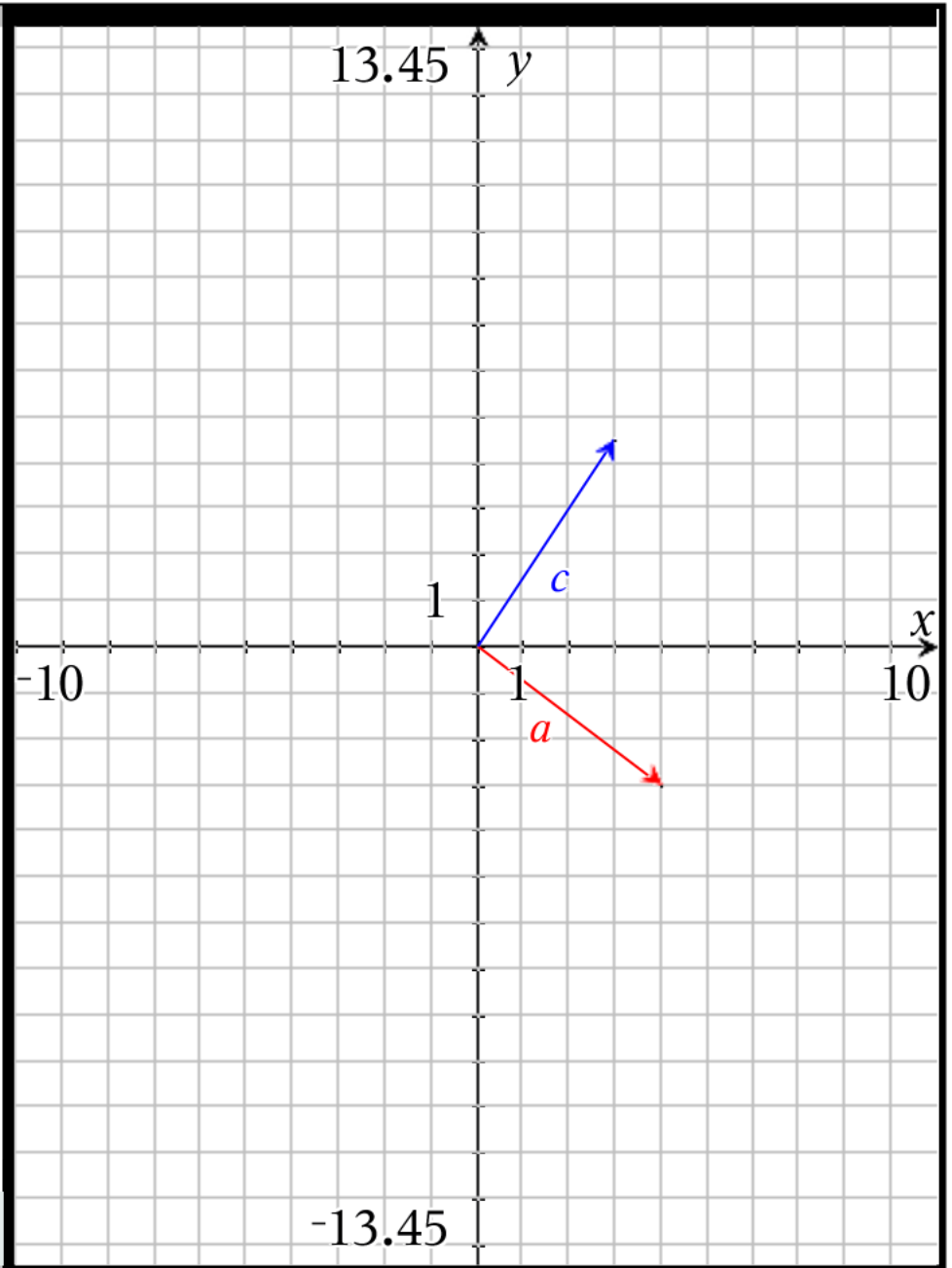
4) Use inverse cos to find  $\theta$

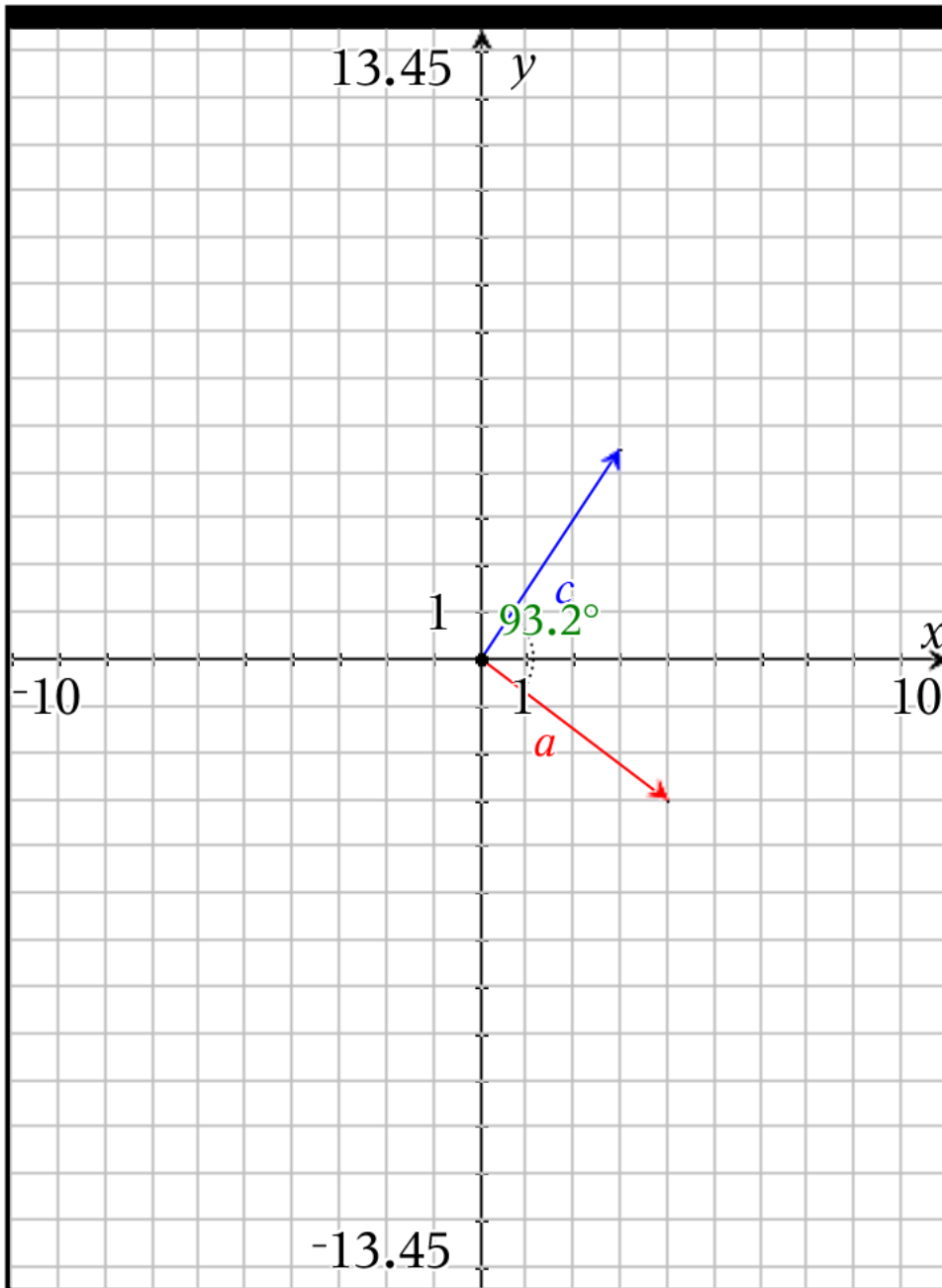
$$\theta = \cos^{-1}(0. / (\sqrt{380.25})) = 90.^\circ$$

Problem 3

	A	B	C	D
=				
1	vector_b	dx_1		4
2		dy_1		-3
3				
4	vector_c	dx_2		3
5		dy_2		4.5
6				
7		scalar_1		1
8		scalar_2		-2
9				
10				
11				

A1 vector\_b





To find angle between vectors

1) Find magnitudes of vectors

$$b = \begin{bmatrix} 4 \\ -3 \end{bmatrix} \quad |b| = \sqrt{(25)} = 5$$

$$c = \begin{bmatrix} 3 \\ 4.5 \end{bmatrix} \quad |c| = \sqrt{(29.25)} = 5.40833$$

2) Find dot product of vectors

$$a \cdot b = (4)(3) + (-3)(4.5) = -1.5$$

3) Apply  $\cos(\theta) = \frac{a \cdot b}{|a| \cdot |b|}$

so  $\cos \theta$  has ratios

$$= -1.5 / (\sqrt{25} \sqrt{29.25}) = -1.5 / (\sqrt{731.25}) = -0.05547$$

4) Use inverse cos to find  $\theta$

$$\theta = \cos^{-1}(-1.5 / (\sqrt{731.25})) = 93.1798^\circ$$