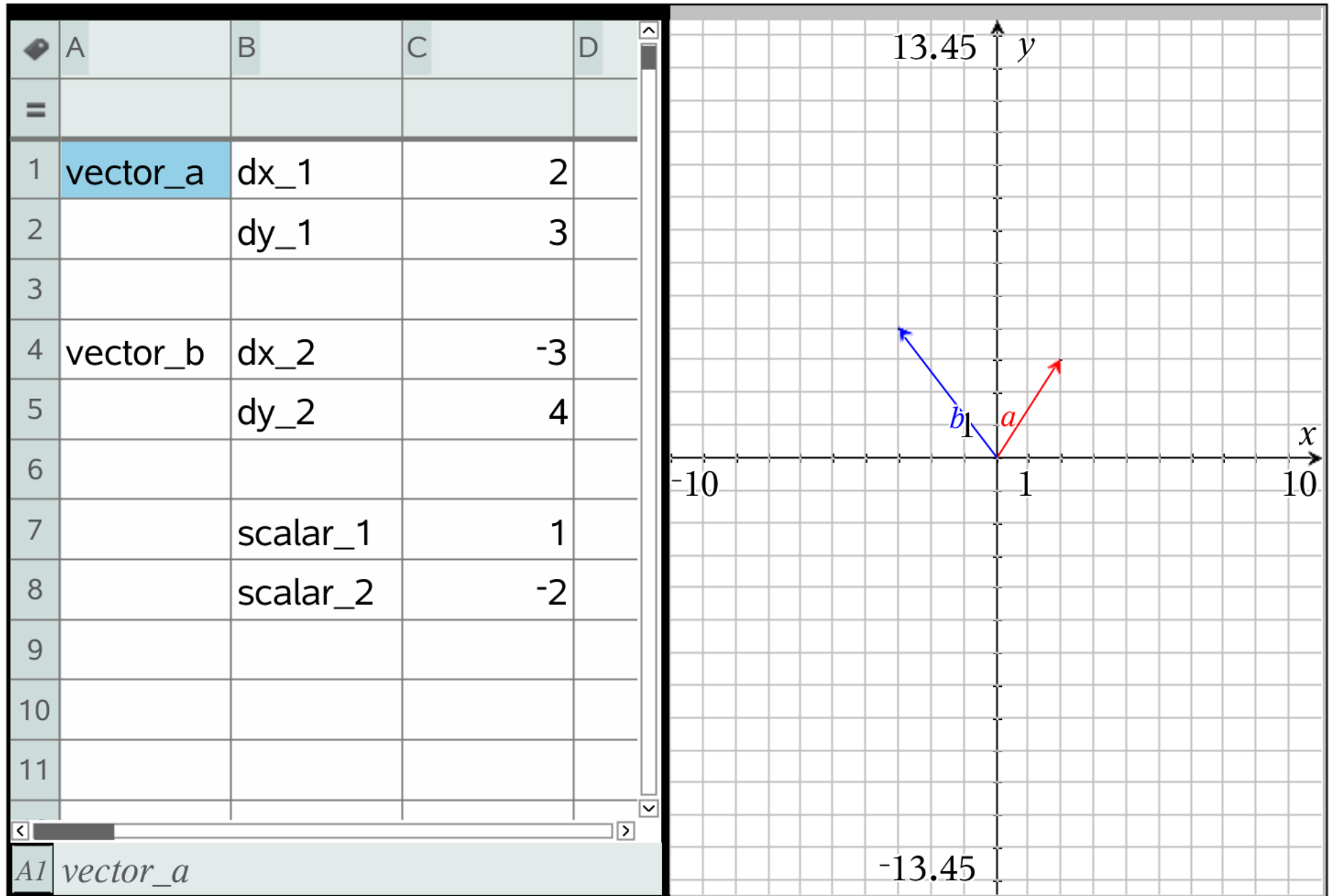
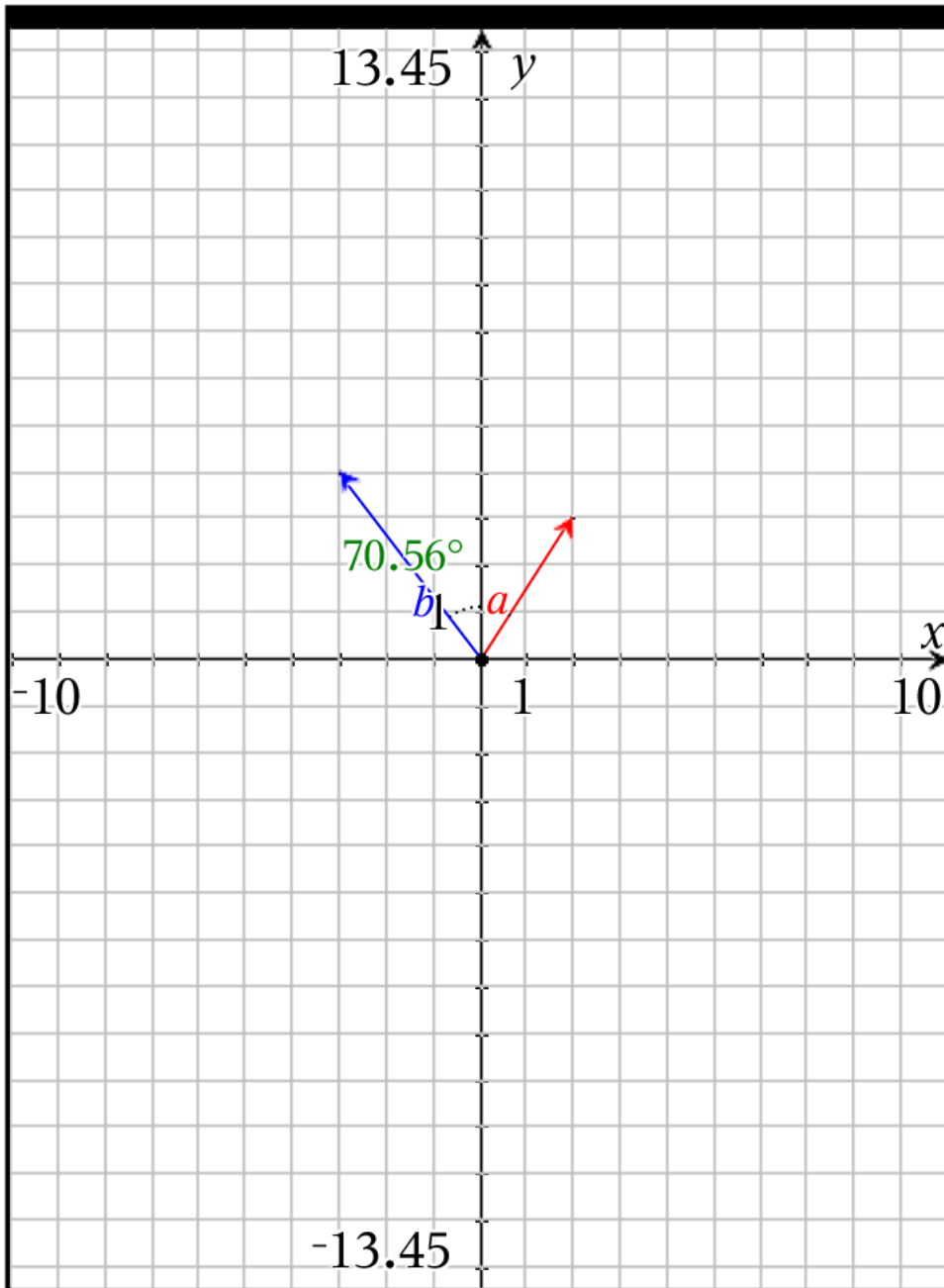


Problem 1





To find angle between vectors

1) Find magnitudes of vectors

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

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

2) Find dot product of vectors

$$a \cdot b = (2)(-3) + (3)(4) = 6$$

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

so $\cos \theta$ has ratios

$$= 6 / (\sqrt{13} \sqrt{25}) = 6 / (\sqrt{325}) = \frac{6 \cdot \sqrt{13}}{65}$$

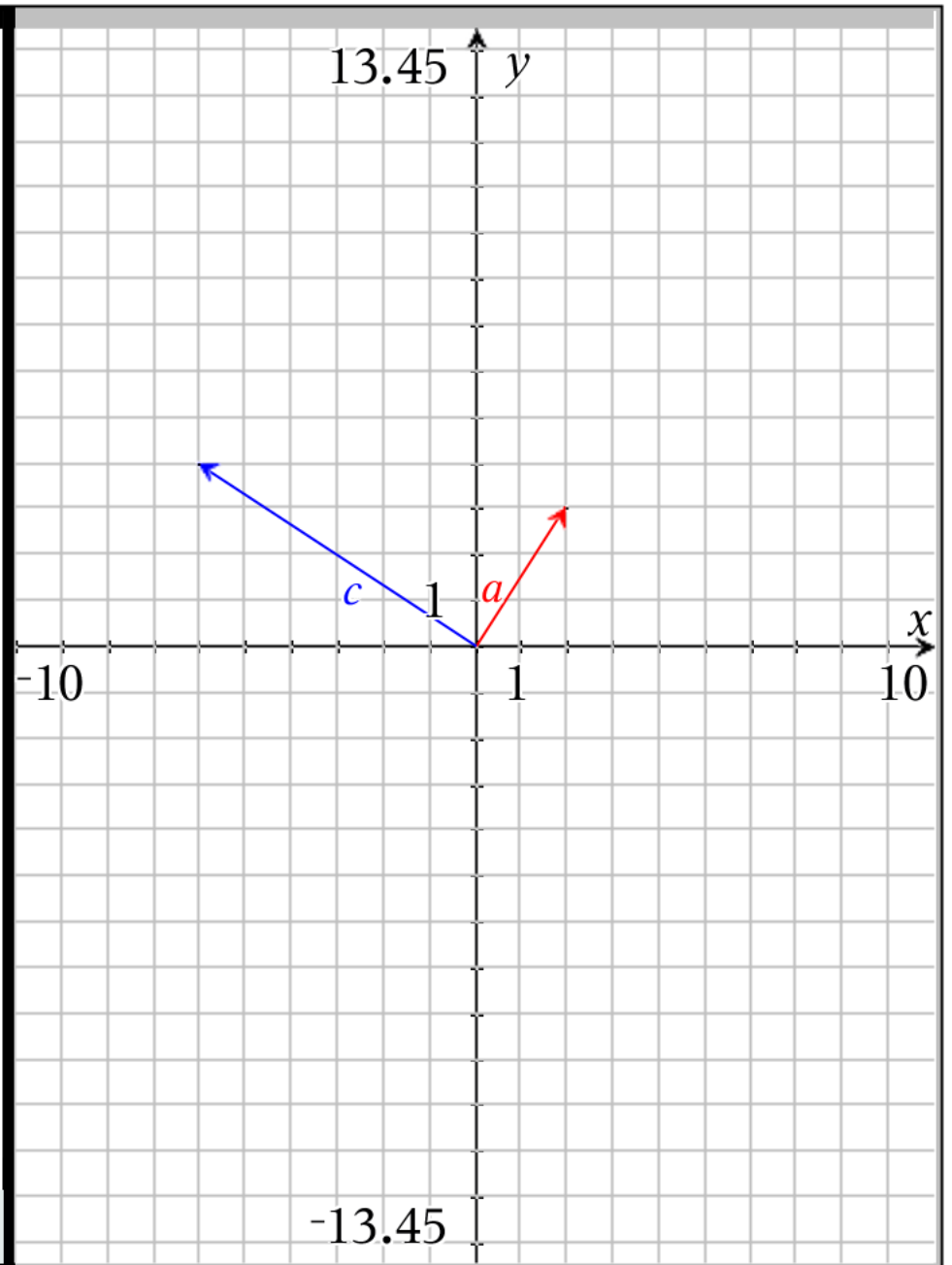
4) Use inverse cos to find θ

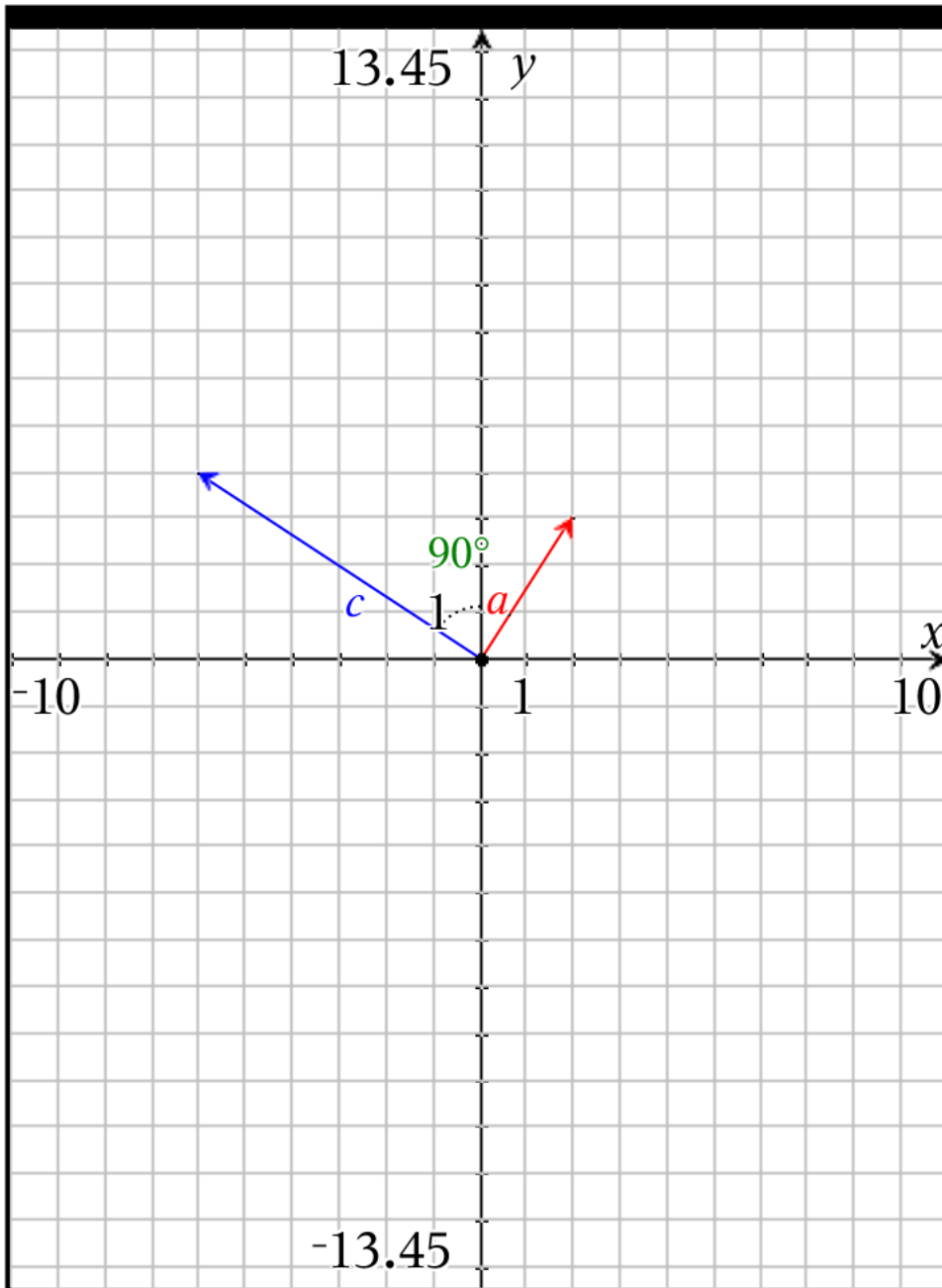
$$\theta = \cos^{-1}(6 / (\sqrt{325})) = 70.56^\circ$$

Problem 2

	A	B	C	D
=				
1	vector_a	dx_1		2
2		dy_1		3
3				
4	vector_c	dx_2		-6
5		dy_2		4
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

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

$$c = \begin{bmatrix} -6 \\ 4 \end{bmatrix} \quad |c| = \sqrt{(52)} = 2 \cdot \sqrt{13}$$

2) Find dot product of vectors

$$a \cdot c = (2)(-6) + (3)(4) = 0$$

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

so $\cos \theta$ has ratios

$$= 0 / (\sqrt{13} \sqrt{52}) = 0 / (\sqrt{676}) = 0$$

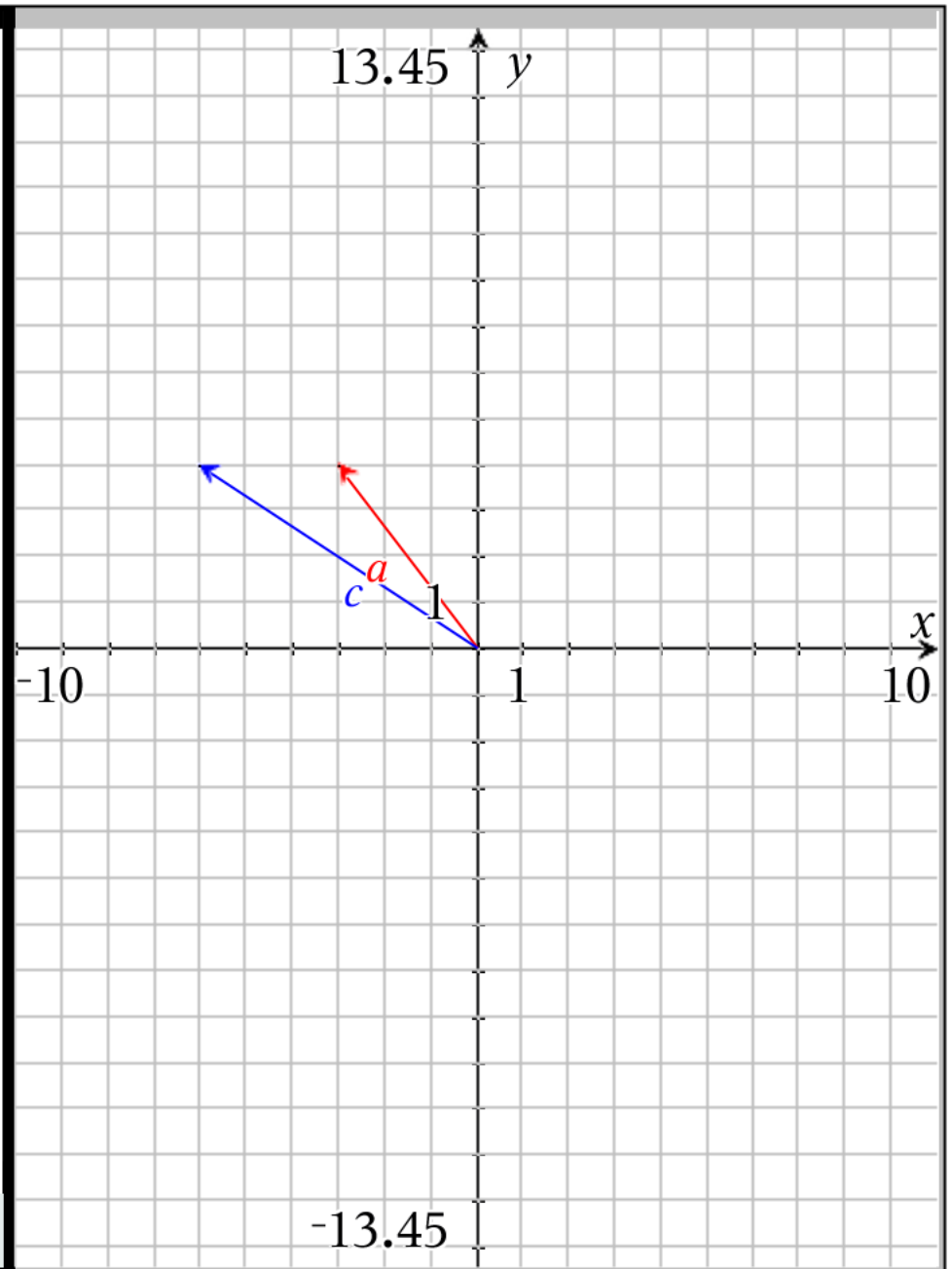
4) Use inverse cos to find θ

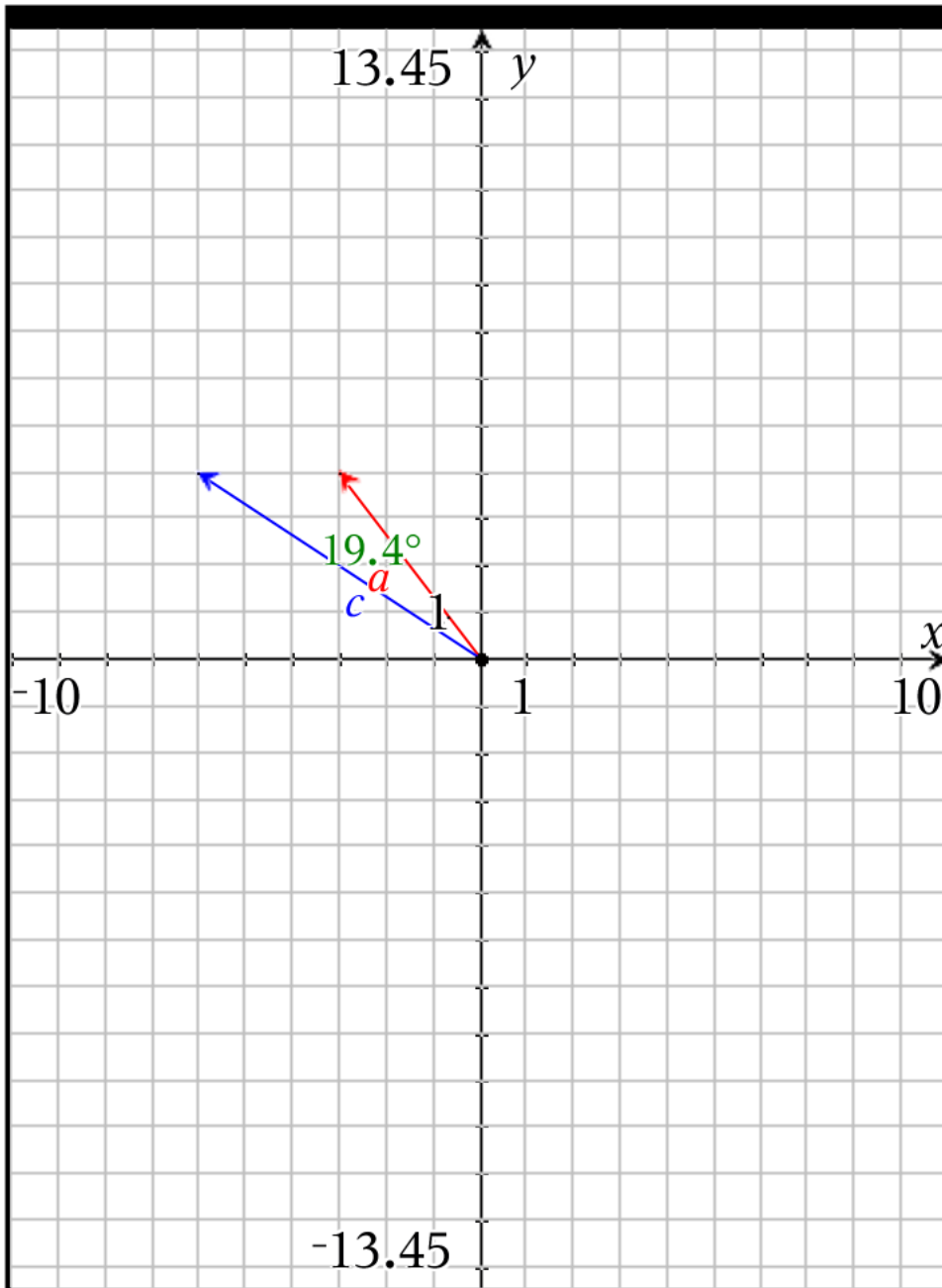
$$\theta = \cos^{-1}(0 / (\sqrt{676})) = 90.^\circ$$

Problem 3

	A	B	C	D
	=			
1	vector_b	dx_1		-3
2		dy_1		4
3				
4	vector_c	dx_2		-6
5		dy_2		4
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

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

$$c = \begin{bmatrix} -6 \\ 4 \end{bmatrix} \quad |c| = \sqrt{(52)} = 2 \cdot \sqrt{13}$$

2) Find dot product of vectors

$$a \cdot b = (-3)(-6) + (4)(4) = 34$$

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

so $\cos \theta$ has ratios

$$= 34 / (\sqrt{25} \sqrt{52}) = 34 / (\sqrt{1300}) = \frac{17 \cdot \sqrt{13}}{65}$$

4) Use inverse cos to find θ

$$\theta = \cos^{-1}(34 / (\sqrt{1300})) = 19.44^\circ$$