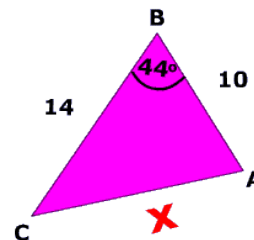


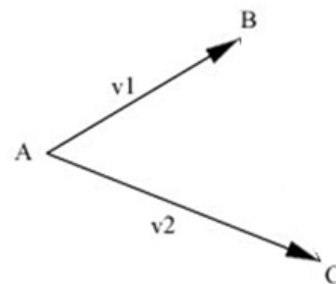
EQ:

Recall: Use the given side lengths and $\angle CBA = 44^\circ$ to find the missing side for $\triangle ABC$.



❖ How can we find the angle between the given vectors?

- draw the resultant of $v_2 - v_1$
- create third side of triangle
- find magnitude of $v_2 - v_1$ _____



Recall: Magnitude is _____

$\|v_2 - v_1\| =$ _____

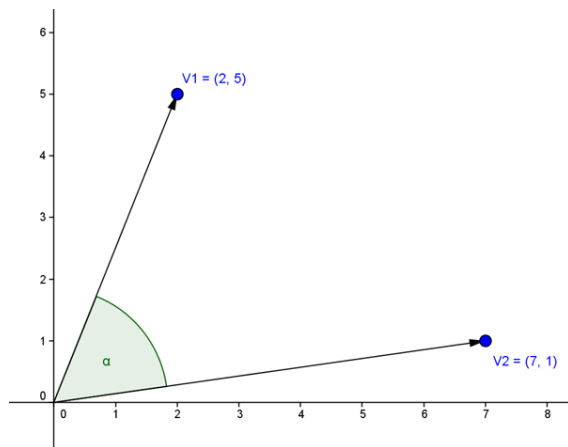
Ex 1. Find the angle between the given vectors.

$v_2 = \langle \text{____}, \text{____} \rangle$ $v_1 = \langle \text{____}, \text{____} \rangle$

- Note these are _____.

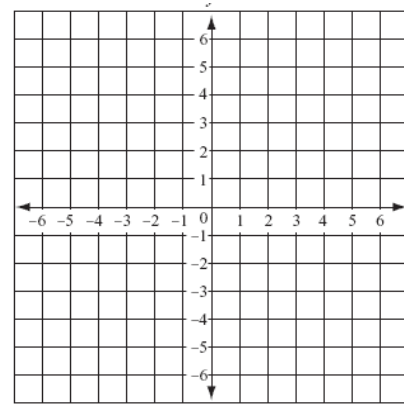
$\|v_2 - v_1\| =$ _____

Now use law of cosines to find α .

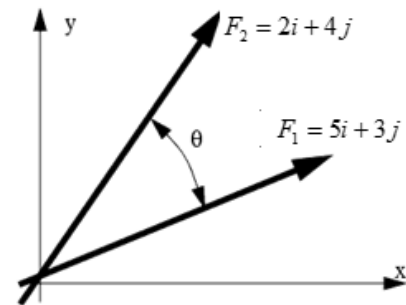


Ex 2. Sketch the vectors then find the angle between them using the Law of Cosines.

$$\vec{w} = -3i + 2j \quad \vec{v} = 4i + j$$



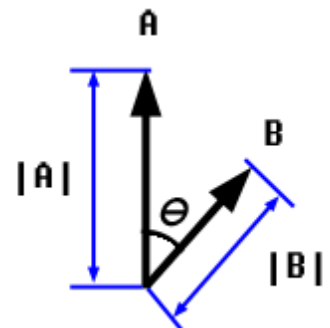
Ex. 3 Find the angle θ between the vectors.



RECALL:

Vector Operations:	Result? Vector or Scalar
1) <u>Addition/ Subtraction</u>	_____
2) <u>Scalar Multiplication</u>	_____
3) <u>Magnitude</u>	_____
4) <u>Dot Product</u>	????

Given two vectors, A and B, as shown to the right, the dot product of vectors A and B will have the following relationship:



$$\underline{\hspace{2cm}} = \underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}}$$

$|A|$ represents the _____ of A

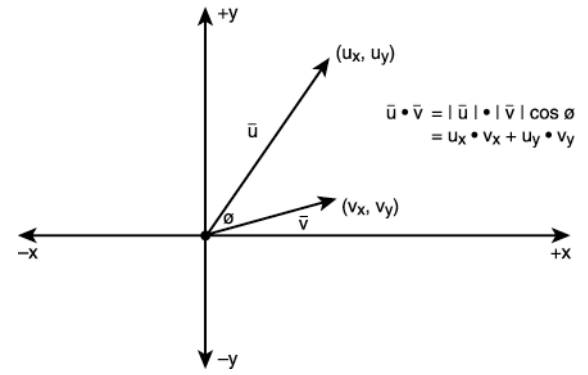
$|B|$ represents the _____ of B

θ is the _____ between the two vectors

• Definition of Dot Product In Component Form:

Given $\vec{v} = \langle v_x, v_y \rangle$ and $\vec{u} = \langle u_x, u_y \rangle$

_____ = _____ + _____



Ex 4. Find the following dot products.

a. $\langle 4, 5 \rangle \cdot \langle 2, 3 \rangle$

b. Given $\vec{v} = 2i - j$ and $\vec{w} = i + 2j$ find $\vec{v} \cdot \vec{w}$.

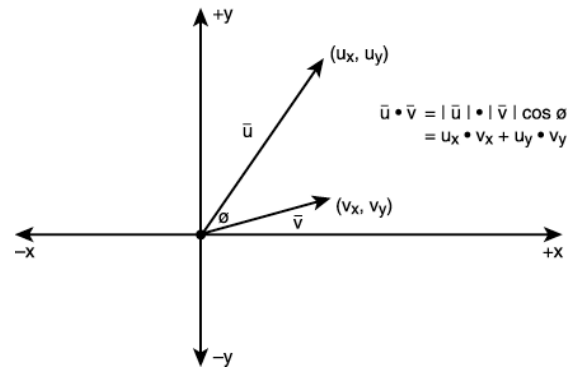
➤ Purpose of dot product: Use as an alternative method for finding an _____ between _____.

RECALL:

_____ = _____

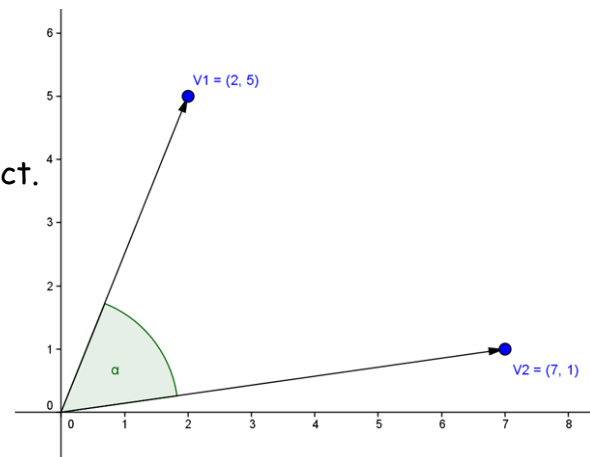
_____ = $\cos \theta$

$\therefore \cos^{-1}(\text{_____}) = \theta$



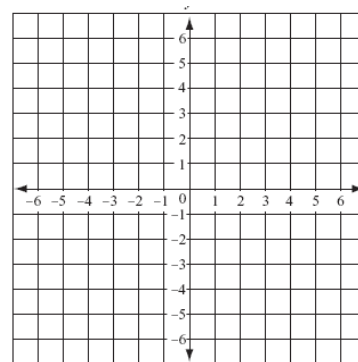
Ex 5. Find the angle between the vectors using the dot product.

$v_2 = \langle \text{_____, _____} \rangle$ $v_1 = \langle \text{_____, _____} \rangle$



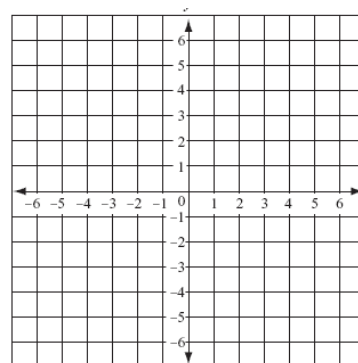
Ex 6. Find the angle between the vectors using the dot product.

$$\vec{w} = -3i + 2j \quad \vec{v} = 4i + j$$

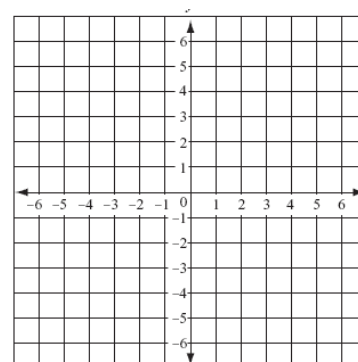


❖ In class practice:

Ex 7. Find the angle between $\vec{w} = 4i - 3j$ and $\vec{v} = 2i + 5j$



Ex 8. Find the angle between $\vec{w} = 3i + 4j$ and $\vec{v} = 5i + 3j$



Ex 9. Find the component vector for each.

RECALL: $\vec{v} = \langle \text{_____}, \text{_____} \rangle$

a. $\theta = 45^\circ, \|\vec{v}\| = 3$

b. $\theta = 120^\circ, \|\vec{v}\| = 5$

c. $\theta = 205^\circ, \|\vec{v}\| = 2$