DATE: _____

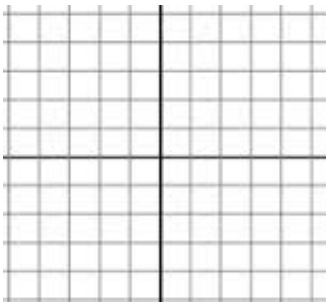
Unit 8 (Chapter 6 & 7): Matrices & Vectors **Pre-Calculus**

6.2 Dot Product of Vectors

Target 8C: Calculate and use properties of the Dot Product

Review of Prior Concepts

1. Let **u** = $\langle 2, -1 \rangle$. Sketch **u** and 2**u**.

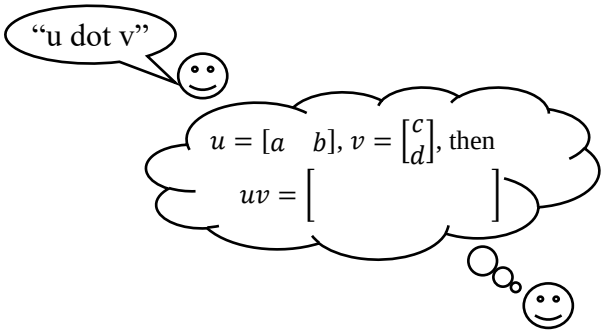


2. Find AB, if $A = \begin{bmatrix} 1 & -3 \end{bmatrix}$ and $B = \begin{bmatrix} 4 \\ 2 \end{bmatrix}$.

Dot Product

If $\vec{u} = \langle a, b \rangle$ and $\vec{v} = \langle c, d \rangle$, then

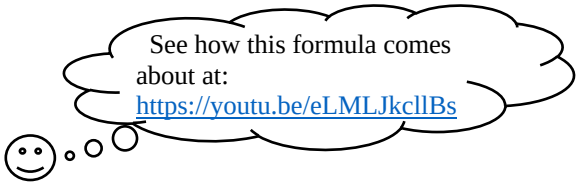
$\vec{u} \cdot \vec{v} =$



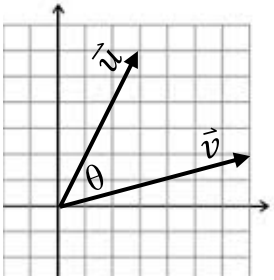
Example

Given $\vec{u} = \langle 1,3 \rangle$ and $\vec{v} = \langle 4,5 \rangle$, find $\vec{u} \cdot \vec{v}$.

Angle Between Two Vectors



$$\cos\theta = \frac{\vec{u} \cdot \vec{v}}{|\vec{u}||\vec{v}|}$$



Example

Given $\vec{u} = \langle 1,3 \rangle$ and $\vec{v} = \langle 4,5 \rangle$, find the angle between $\vec{u}$ and $\vec{v}$.

Now you try…

1. Given $\vec{u} = \langle 2, -4 \rangle$, and $\vec{v} = \langle -8,7 \rangle$, find $\vec{u} \cdot \vec{v}$.

2. Given $\vec{u} = 4\mathbf{i} - 11\mathbf{j}$ and $\vec{v} = -3\mathbf{j}$, find $\vec{u} \cdot \vec{v}$.

3. Given $\vec{u} = \langle -3,8 \rangle$ and $\vec{v} = \langle -1, -9 \rangle$, find the angle between $\vec{u}$ and $\vec{v}$.

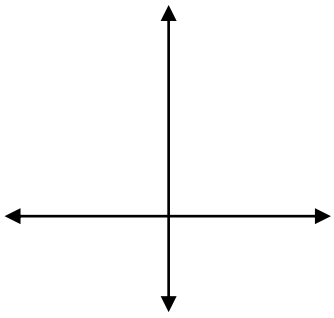
4. Given $\vec{u} = \langle -2,0 \rangle$ and $\vec{v} = \langle 0,5 \rangle$, find the angle between $\vec{u}$ and $\vec{v}$.

Orthogonal Vectors

If $\vec{u} \cdot \vec{v} = 0$, then the vectors are _____.

Example
(Non-calculator)

Given $\vec{u} = \langle \cos\frac{\pi}{3}, \sin\frac{\pi}{3} \rangle$ and $\vec{v} = \langle 3\cos\frac{5\pi}{6}, 3\sin\frac{5\pi}{6} \rangle$, find the angle between $\vec{u}$ and $\vec{v}$.



More Practice

Dot Product

https://www.mathsisfun.com/algebra/vectors-dot-product.html
https://betterexplained.com/articles/vector-calculus-understanding-the-dot-product/
https://youtu.be/KDHuWxy53uM
https://youtu.be/98C7iv8OcnI

Angle Between Vectors

http://onlinemschool.com/math/library/vector/angl/
https://youtu.be/WDdR5s0C4cY
https://youtu.be/4WxniMJYySc

Homework Assignment

p.472 #1-23odd