Vectors Day 2

Essential Question

How do I calculate the angle between two vectors?

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~~The Dot Product~~

$$u \bullet v = a_1 a_2 + b_1 b_2$$

ex. u=2i+1j, v=5i-6j

$U \cdot V = 2(5) + 1(-6) = 10 - 6 = \boxed{4}$

*Two vectors are orthogonal (perpendicular) if $u \cdot v = 0$

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~~Angle between 2 vectors~~

Dot Product Theorem

$$u \bullet v = \|u\|\|v\|\cos\theta$$

To find an angle... $\cos\theta = \dfrac{u \bullet v}{\|u\|\|v\|}$

ex. u=4i-3j and v=2i+5j

$u \cdot v = 4(2) + (-3)(5) = 8 - 15 = -7$

$\|u\| = \sqrt{4^2 + (-3)^2} = 5$

$\|v\| = \sqrt{2^2 + 5^2} = \sqrt{29}$

$\theta = \cos^{-1}\left(\dfrac{-7}{5\sqrt{29}}\right)$ degrees

$105°$