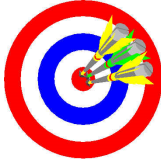


# The Dot Product (of ALGEBRAIC Vectors) 7.4

## Math Learning Target:



"For algebraic and geometric vectors, I can calculate the dot product, state all properties of the dot product, prove them, and I can apply the dot product when it is appropriate. I can apply what I have learned in familiar and unfamiliar settings."

**Recall:** Geometric Vectors versus Algebraic Vectors

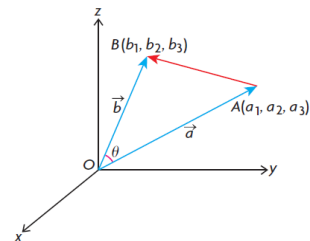
**Recall:** Calculating the Magnitude of a Vector

**Recall:** Calculating the Dot Product

**Recall:** Dot Product Properties

### Theorem

In  $R^3$ , if  $\vec{a} = (a_1, a_2, a_3)$  and  $\vec{b} = (b_1, b_2, b_3)$  then  $\vec{a} \cdot \vec{b} = a_1b_1 + a_2b_2 + a_3b_3$



### Example

Given two vectors:  $\vec{u} = (3, -1, 2)$  and  $\vec{v} = (4, 0, -3)$ .

- Find the acute angle, to the nearest tenth, between the two vectors.
- Find the components of at least one vector perpendicular to both  $\vec{u}$  and  $\vec{v}$ .
- Verify the results using [GeoGebra](#)

- Read page 380 Example 1
- MathSIP!** Page 385 #1, 2a, 3c, 6c, 7, 9a, 10, 13b, 14, 16, 18, 19, 20