

$$\cos \theta = \frac{\vec{A} \cdot \vec{B}}{|\vec{A}| |\vec{B}|}$$

$$= \frac{3+12}{\sqrt{10} \cdot 5}$$

$$= \frac{3}{\sqrt{10}}$$

Vector Components

1. a) Let $\mathbf{A} = \langle 1, 3 \rangle$ and $\mathbf{B} = \langle 3, 4 \rangle$.

(i) Find the component of \mathbf{A} in the direction of \mathbf{B} .

$$\vec{A} |\cos \theta| = \left\langle \frac{3}{\sqrt{10}}, \frac{9}{\sqrt{10}} \right\rangle$$

(ii) Find the component of \mathbf{B} in the direction of \mathbf{A} .

$$\vec{B} |\cos \theta| = \left\langle \frac{9}{\sqrt{10}}, \frac{12}{\sqrt{10}} \right\rangle$$

b) Let $\mathbf{A} = \langle 3, 5, 7 \rangle$ and $\mathbf{B} = \langle 3, 4, 0 \rangle$. Find the component \mathbf{A} in the direction of \mathbf{B} .

$$\cos \theta = \frac{9+20}{\sqrt{82} \cdot 5} = \frac{29}{5\sqrt{82}} \quad \left(\frac{87}{5\sqrt{82}}, \frac{145}{5\sqrt{82}}, 0 \right)$$

2. Let $\mathbf{A} = \langle a, 2 \rangle$ and $\mathbf{B} = \langle 1, 3 \rangle$. For what values of a is the component of \mathbf{A} along \mathbf{B} equal to 0? For what a is it negative?

$$a+6=0 \quad a=-6 \quad a+6 < 0$$

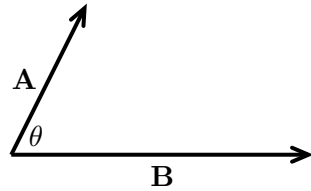
$$a < -6$$

3. For which angle θ is the component of \mathbf{A} in the direction of \mathbf{B} equal to 0.

$$\frac{9}{25} \cdot 2$$

$$\frac{18}{25}$$

$$\frac{18}{25}$$



$$\pi/2$$

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18.02SC Multivariable Calculus
Fall 2010

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