

## Dot product problems

1. a) Compute  $\langle 1, 2, -4 \rangle \cdot \langle 2, 3, 5 \rangle$ .

$$2 + 6 - 20 = -12$$

- b) Is the angle between these two vectors acute, obtuse or right?

obtuse as dot product is -ve.

2. Suppose  $\mathbf{B} = \langle 2, 2, 1 \rangle$ . Suppose also that  $\mathbf{B}$  makes an angle of  $30^\circ$  with  $\mathbf{A}$  and  $\mathbf{A} \cdot \mathbf{B} = 6$ . Find  $|\mathbf{A}|$ .

$$\mathbf{A} \cdot \mathbf{B} = |\mathbf{A}| |\mathbf{B}| \cdot \cos 30^\circ$$

3. If  $\mathbf{A} \cdot \mathbf{B} = 0$  what is the angle between  $\mathbf{A}$  and  $\mathbf{B}$ ?

$$6 = |\mathbf{A}| 3 \cdot \sqrt{3}/2$$

$$90^\circ \text{ or } \pi/2$$

$$|\mathbf{A}| = \frac{4}{\sqrt{3}}$$

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