1.2-Dot Product

Definitions:

The *dot product* of the vectors **a** and **b** is given by

Dot Product computation formula

From the definition, it follows that the angle between two vectors is given by

a and **b** are *orthogonal* if and only if

Orthogonal complements

Scalar and Vector projections

Work

Examples:

Find $\mathbf{a} \cdot \mathbf{b}$ if $\mathbf{a} =< 3, 2 >$ and $\mathbf{b} = \mathbf{i} - 4\mathbf{j}$

Find the angle between $\mathbf{a} =< 3, 1 >$ and $\mathbf{b} =< -2, 4 >$.

Find x such that $\mathbf{a} =< x, 1 > \perp \mathbf{b} =< 4 + x, 3 >$

If $\mathbf{a} = \mathbf{i} + 3\mathbf{j}$ and $\mathbf{b} =< 4, 1 >$, find the scalar and vector projection of $\mathbf{a}$ onto $\mathbf{b}$

A 5 kg block slides down a frictionless ramp 5 meters tall and 12 meters long (horizontally). Find the work done by gravity if the block slides the entire length of the ramp.

On Your Own: #5,9,10,13,19,23,27,31,33,35,37,43,47,53,55,57