1.2-Dot Product

Definitions:

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

Derivation of the Computational Formula:

Properties of the Dot Product-

From the defintion of the dot product, it follows that the angle between 2 vectors is given by

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

Scalar and Vector Projections-

Work-

Examples:

Find $\mathbf{a} \cdot \mathbf{b}$:

if $\mathbf{a} =< 1, -1 >$ and $\mathbf{b} =< 1, 2 >$

in the figure given in class

Find the angle between the vectors $< 1, 2 >$ and $6\mathbf{i} - 8\mathbf{j}$.

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

If $\mathbf{a} =< 4, 5 >$ and $\mathbf{b} =< 1, -2 >$, find the scalar and vector projection of $\mathbf{b}$ onto $\mathbf{a}$

A 10 kg block slides down a ramp which is 5 m tall and 3 m horizontal. Find the work done by gravity if the block slides (friction-free) all the way down the ramp.

On Your Own: 1.2 #1-7odd,9,10,13,16,17,19,21,22,25,27,30,33,34,36,39,41,42,43,45,47,49,53,56,57