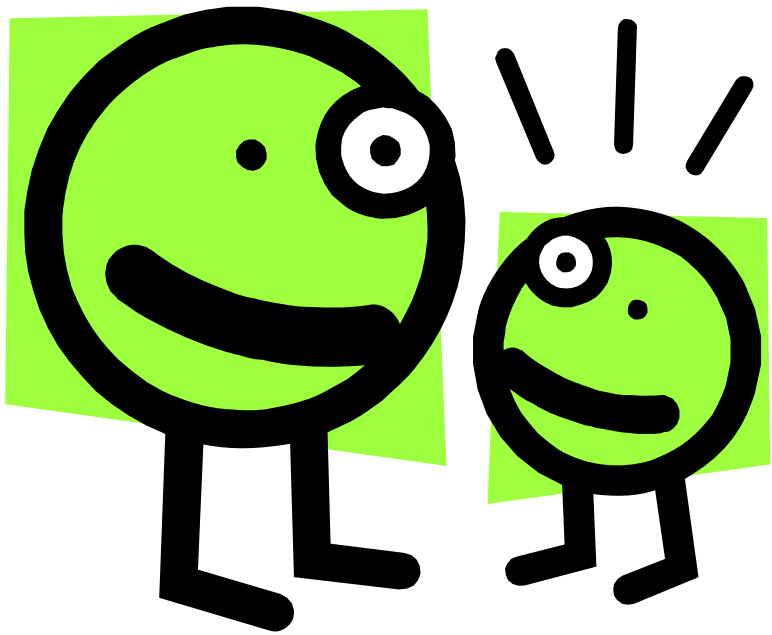
Properties of the Dot Product



If *a*, *b*, and *c* are vectors and *k* is a scalar, then,

1. $\vec{a} \cdot \vec{a} = \left\| \vec{a} \right\|^2$
2. $\vec{a} \cdot \vec{b} = \vec{b} \cdot \vec{a}$
3. $\vec{a} \cdot (\vec{b} + \vec{c}) = \vec{a} \cdot \vec{b} + \vec{a} \cdot \vec{c}$
4. $(k\vec{a}) \cdot \vec{b} = k(\vec{a} \cdot \vec{b}) = \vec{a} \cdot (k\vec{b})$
5. $\vec{0} \cdot \vec{a} = 0$