

COMPONENTS AND PROJECTIONS

In each of the problems below, you are given a force vector \vec{F} and a distance vector \vec{d} . Suppose the magnitude of \vec{F} corresponds to the number of pounds of force and the magnitude of \vec{d} corresponds to a distance in feet that an object is moved by the force. For each of the problems below find $comp_{\vec{d}}\vec{F}$, $proj_{\vec{d}}\vec{F}$, and the work done by \vec{F} in moving the object the length of \vec{d} . Give exact answers, and on the latter, use units of *foot-pounds*.

1. $\vec{F} = \hat{i} + 2\hat{j} + 3\hat{k}$, $\vec{d} = 2\hat{i} + 2\hat{j} + 5\hat{k}$

2. $\vec{F} = 3\hat{i} + \hat{j} + 4\hat{k}$, $\vec{d} = 8\hat{i} + 2\hat{j} + 6\hat{k}$

3. $\vec{F} = 3\hat{i} + 2\hat{j}$, $\vec{d} = 10\hat{i}$

4. $\vec{F} = \hat{i} + \hat{j}$, $\vec{d} = 5\hat{i} + \hat{j}$

5. $\vec{F} = 2\hat{i} + 2\hat{j} + 2\hat{k}$, $\vec{d} = 2\hat{i} + 2\hat{j} + 2\hat{k}$