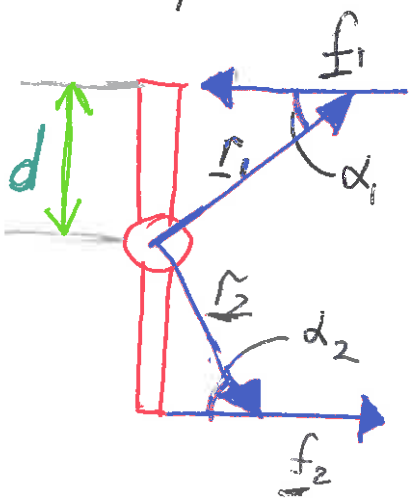
A vector $\underline{V} = (a, b, c)$

has a direction (arrow) and a magnitude $|\underline{V}|$

Examples force, position, acceleration, eeg window

force has a line of action $\underline{f}$

Example 2 A key turning in a lock



$d = |\underline{r}_1| \sin\alpha_1$

$\underline{f}_1 + \underline{f}_2 = 0$

$\underline{\tau} = \underline{r}_1 \times \underline{f}_1 + \underline{r}_2 \times \underline{f}_2$

$= d|\underline{f}_1| + d|\underline{f}_2|$

$= 2d|\underline{f}_1|$

because $r \times f = |r||f| \sin\alpha$

$= |f| d$

Also $\underline{f}_2 = -\underline{f}_1$

and $|-\underline{f}_1| = |\underline{f}_1|$