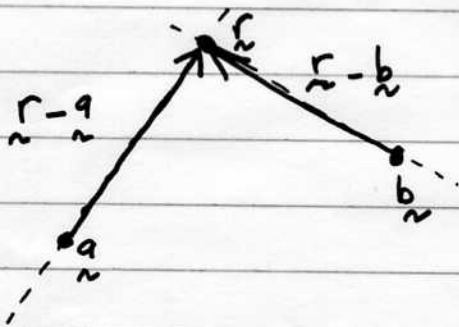
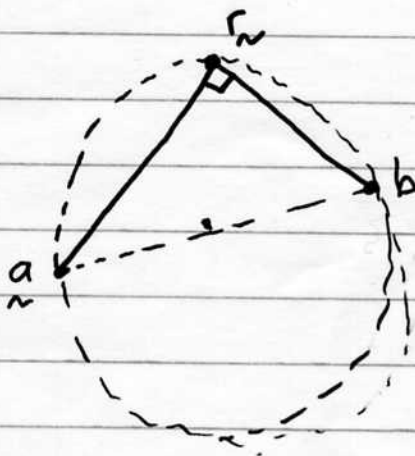


50. You can try to do this algebraically - try to get the equation into the form $(x-x_0)^2 + (y-y_0)^2 + (z-z_0)^2 = r^2$ but it will take a while and be complicated. It is better to try to interpret the equation geometrically.

$(\vec{r}-\vec{a}) \cdot (\vec{r}-\vec{b}) = 0$ means $(\vec{r}-\vec{a}) \perp (\vec{r}-\vec{b})$ are orthogonal. e.g.



So \vec{r} is on a circle centre $\frac{1}{2}$ way between \vec{a} & \vec{b} & \vec{a} & \vec{b} are on the circle as follows:



recall that angle $\widehat{a r b}$ is always a right angle in this case.

So $(\vec{r}-\vec{a}) \cdot (\vec{r}-\vec{b}) = 0$ is a sphere radius $\frac{|\vec{b}-\vec{a}|}{2}$ & center $\frac{\vec{a}+\vec{b}}{2}$ = point $\frac{1}{2}$ way between \vec{a} & \vec{b} .