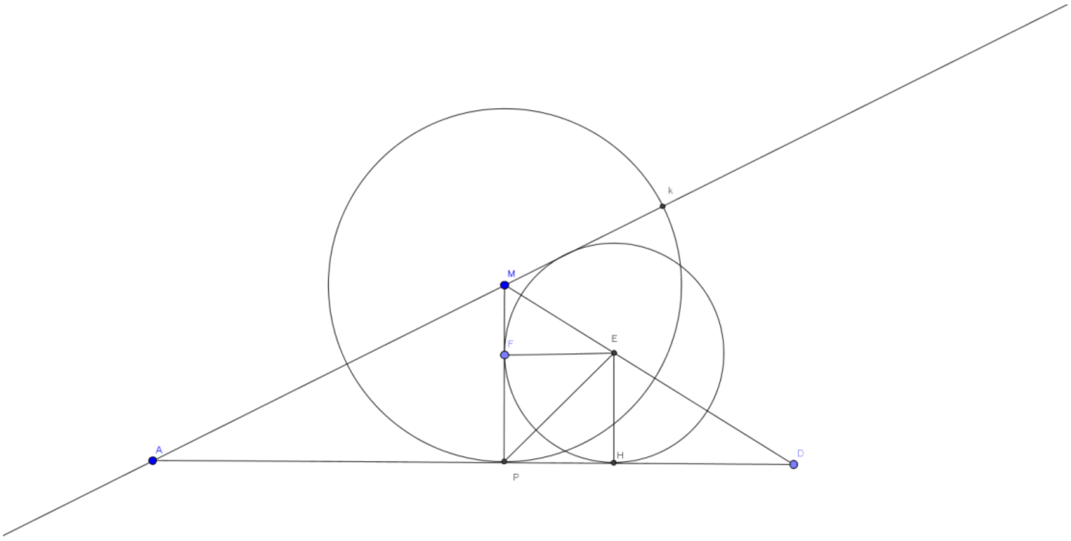

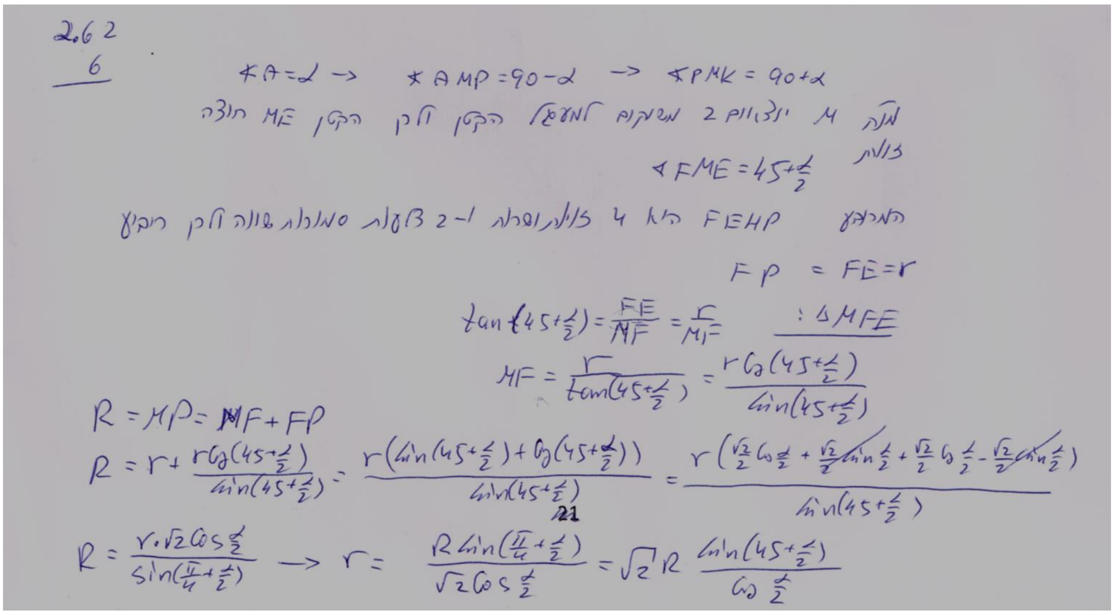

2.6 2
6

$\sphericalangle A=\alpha \rightarrow \sphericalangle AMP=90-\alpha \rightarrow \sphericalangle PMK=90+\alpha$

מנק M יוצאים 2 משיקים למעגל הקטן לכן הקטע ME חוצה זווית

$\sphericalangle FME=45+\frac{\alpha}{2}$

המרובע FEHP הוא 4 זויות ישרות ו-2 צלעות סמוכות שוות לכן ריבוע

$FP = FE=r$

$:\triangle MFE$ $\quad \tan(45+\frac{\alpha}{2})=\frac{FE}{MF}=\frac{r}{MF}$

$MF=\frac{r}{\tan(45+\frac{\alpha}{2})}=\frac{r\cos(45+\frac{\alpha}{2})}{\sin(45+\frac{\alpha}{2})}$

$R=MP=MF+FP$

$R=r+\frac{r\cos(45+\frac{\alpha}{2})}{\sin(45+\frac{\alpha}{2})}=\frac{r(\sin(45+\frac{\alpha}{2})+\cos(45+\frac{\alpha}{2}))}{\sin(45+\frac{\alpha}{2})}=\frac{r\left(\frac{\sqrt2}{2}\cos\frac{\alpha}{2}+\cancel{\frac{\sqrt2}{2}\sin\frac{\alpha}{2}}+\frac{\sqrt2}{2}\cos\frac{\alpha}{2}-\cancel{\frac{\sqrt2}{2}\sin\frac{\alpha}{2}}\right)}{\sin(45+\frac{\alpha}{2})}$

$R=\frac{r\cdot\sqrt2\cos\frac{\alpha}{2}}{\sin(\frac{\pi}{4}+\frac{\alpha}{2})} \rightarrow r=\frac{R\sin(\frac{\pi}{4}+\frac{\alpha}{2})}{\sqrt2\cos\frac{\alpha}{2}}=\sqrt2 R\,\frac{\sin(45+\frac{\alpha}{2})}{\cos\frac{\alpha}{2}}$