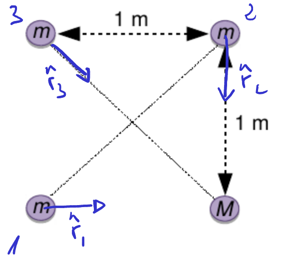
Gainjartze-printzipioa

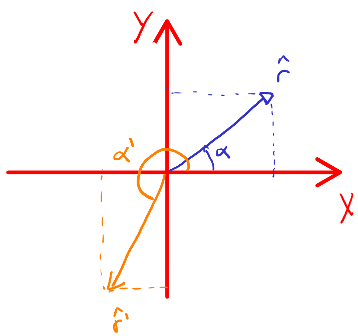
Kalkula ezazu, proposatutako geometrietan, m masek sortutako eremu grabitatorioa M masa dagoen puntuaren gainean, baita masa horrek izango duen indarra ere.



Formulak

$$\vec{g} = -\frac{Gm}{r^2}\hat{r}$$

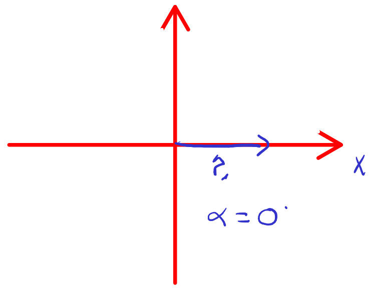
$$\hat{r} = \cos\alpha\,\hat{\imath} + \sin\alpha\,\hat{\jmath}$$



① $r_1 = 1\,m$

$$\hat{r}_1 = \cos 0\,\hat{\imath} + \sin 0\,\hat{\jmath}$$

$$\hat{r}_1 = \hat{\imath}$$

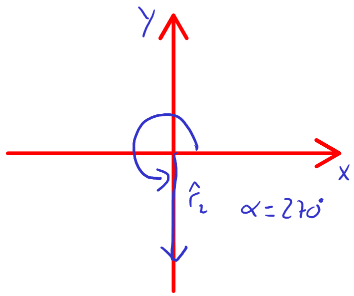


$$\vec{g}_1 = -\frac{Gm}{r_1^2}\hat{\imath}$$

② $r_2 = 1\,m$

$$\hat{r}_2 = \cos 270°\,\hat{\imath} + \sin 270°\,\hat{\jmath}$$

$$\hat{r}_2 = -\hat{\jmath}$$

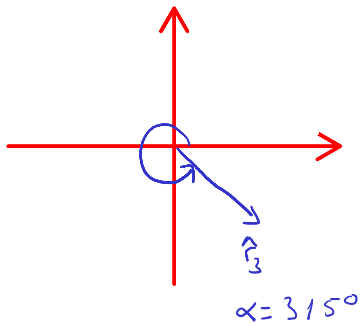


$$\vec{g}_2 = -\frac{Gm}{r_2^2}(-\hat{\jmath})$$

③ $r_3 = \sqrt{2}\,m$

$$\hat{r}_3 = \cos 315°\,\hat{\imath} + \sin 315°\,\hat{\jmath}$$

$$= \frac{1}{\sqrt{2}}\hat{\imath} - \frac{1}{\sqrt{2}}\hat{\jmath}$$



$$\vec{g}_3 = -\frac{GM}{r_3^2}\left(\frac{1}{\sqrt{2}}\hat{\imath} - \frac{1}{\sqrt{2}}\hat{\jmath}\right)$$

$$= -GM\left(\frac{1}{2\sqrt{2}}\hat{\imath} - \frac{1}{2\sqrt{2}}\hat{\jmath}\right)$$

$$\vec{g} = \vec{g}_1 + \vec{g}_2 + \vec{g}_3$$

$$\vec{g} = -GM\left(\frac{1}{2\sqrt{2}} + 1\right)\hat{\imath} - GM\left(-1 - \frac{1}{2\sqrt{2}}\right)\hat{\jmath}$$

$$\underline{\underline{= GM \cdot 1'35\,(-\hat{\imath} + \hat{\jmath})}}$$