

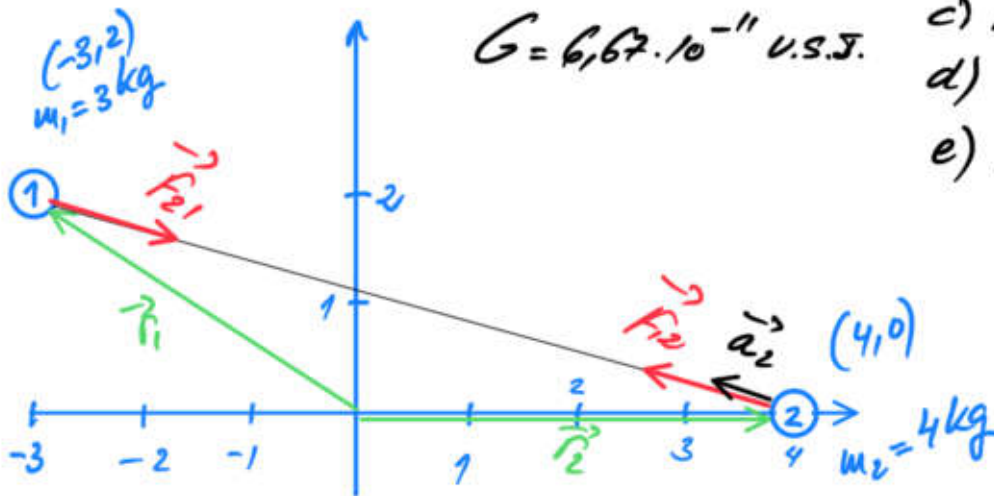
EJERCICIO FQ1BE2673:

$$m_1 = 3 \text{ kg en } (-3, 2)$$

$$m_2 = 4 \text{ kg en } (4, 0)$$

$$G = 6,67 \cdot 10^{-11} \text{ u.s.f.}$$

- a) \vec{r}_1
- b) \vec{r}_2
- c) \vec{F}_{12}
- d) \vec{a}_2
- e) \vec{F}_{21}



$$a) \vec{r}_1 = (-3, 2) = -3\vec{i} + 2\vec{j} \text{ (m)}$$

$$b) \vec{r}_2 = (4, 0) = 4\vec{i} + 0\vec{j} \text{ (m)}$$

$$c) \vec{F}_{12} = ?$$

$$\vec{F}_{12} = -G \frac{m_1 m_2}{r_{12}^2} \frac{\vec{r}_{12}}{r_{12}}$$

$$\vec{r}_{12} = 7\vec{i} - 2\vec{j}$$

$$\vec{r}_{12} = (4, 0) - (-3, 2) = (7, -2)$$

$$|\vec{r}_{12}| = \sqrt{7^2 + (-2)^2} = \sqrt{53} \text{ m}$$

$$\vec{F}_{12} = -6,67 \cdot 10^{-11} \frac{3 \cdot 4}{(\sqrt{53})^2} \frac{7\vec{i} - 2\vec{j}}{\sqrt{53}}$$

$$\vec{F}_{12} = -1,45 \cdot 10^{-11} \vec{i} + 4,15 \cdot 10^{-12} \vec{j} \text{ (N)}$$

$$|\vec{F}_{12}| = \sqrt{(-1,45 \cdot 10^{-11})^2 + (4,15 \cdot 10^{-12})^2} =$$

$$F_{12} = 1,51 \cdot 10^{-11} \text{ N}$$

d) aceleración sobre m_2 ?

$$\vec{F} = m \cdot \vec{a} \Rightarrow \vec{a}_2 = \frac{\vec{F}_{12}}{m_2}$$

$$\vec{a}_2 = \frac{-1,45 \cdot 10^{-11} \vec{i} + 4,15 \cdot 10^{-12} \vec{j}}{4}$$

$$\vec{a}_2 = -3,63 \cdot 10^{-12} \vec{i} + 1,04 \cdot 10^{-12} \vec{j} \text{ (m/s}^2\text{)}$$

$$|\vec{a}_2| = \frac{|\vec{F}_{12}|}{m_2} = 3,78 \cdot 10^{-12} \text{ m/s}^2$$

e) $\vec{F}_{21} = ?$

$$\vec{F}_{21} = 1,45 \cdot 10^{-11} \vec{i} - 4,15 \cdot 10^{-12} \vec{j} \text{ (N)}$$

$$|\vec{F}_{21}| = 4,51 \cdot 10^{-11} \text{ N}$$

- mismo módulo y dirección que \vec{F}_{12}
- sentido contrario!