EJERCICIO FQ1BE3405:

"achimagec.com"

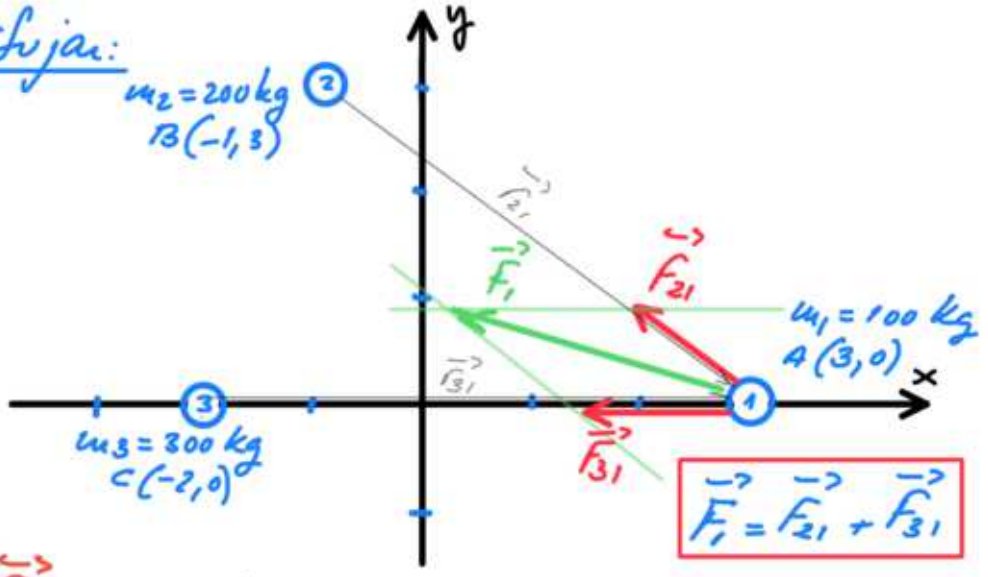
$m_1 = 100\ kg$ en $A(3,0)$

$m_2 = 200\ kg$ en $B(-1,3)$

$m_3 = 300\ kg$ en $C(-2,0)$

$G = 6{,}67 \cdot 10^{-11}$ U.S.I.

a) Dibuja:



b) $\vec{F}_{21} = ?$ y $F_{21} = ?$

$$\vec{F}_{21} = -G\frac{m_2 m_1}{r_{21}^2}\frac{\vec{r}_{21}}{r_{21}} = \ldots = -6{,}67\cdot10^{-11}\frac{200\cdot100}{5^2}\frac{4\vec{\imath}-3\vec{\jmath}}{5} =$$

$$\vec{r}_{21} = 4\vec{\imath} - 3\vec{\jmath} \Rightarrow |\vec{r}_{21}| = \sqrt{4^2+(-3)^2} = \sqrt{25} = 5\ m$$

VECTOR

$$= \boxed{\vec{F}_{21} = -4{,}27\cdot10^{-8}\vec{\imath} + 3{,}20\cdot10^{-8}\vec{\jmath}\ (N)}$$

$$|\vec{F}_{21}| = \sqrt{(-4{,}27\cdot10^{-8})^2 + (3{,}20\cdot10^{-8})^2} = \boxed{5{,}34\cdot10^{-8}\ N = F_{21}}$$

MÓDULO

c) $\vec{F}_{31} = ?$ y $F_{31} = ?$

$$\vec{F}_{31} = -G\frac{m_3 m_1}{r_{31}^2}\frac{\vec{r}_{31}}{r_{31}} = \ldots = -6{,}67\cdot10^{-11}\frac{300\cdot100}{5^2}\frac{5\vec{\imath}}{5} =$$

$$\vec{r}_{31} = 5\vec{\imath} \Rightarrow |\vec{r}_{31}| = 5\ m$$

VECTOR

$$= \boxed{\vec{F}_{31} = -8\cdot10^{-8}\vec{\imath}\ (N)}$$

$$\boxed{|\vec{F}_{31}| = F_{31} = 8\cdot10^{-8}\ N}$$

MÓDULO

d) $\vec{F_1} = ?$ y $|\vec{F_1}| = ?$

$$\vec{F_1} = \vec{F_{21}} + \vec{F_{31}}$$

$$\vec{F_{21}} = -4{,}27 \cdot 10^{-8}\,\vec{i} + 3{,}2 \cdot 10^{-8}\,\vec{j}\ (N)$$

$$+$$

$$\vec{F_{31}} = -8 \cdot 10^{-8}\,\vec{i} + 0\,\vec{j}\ (N)$$

$$= \vec{F_1} = -1{,}23 \cdot 10^{-7}\,\vec{i} + 3{,}2 \cdot 10^{-8}\,\vec{j}\ (N)$$

$$|\vec{F_1}| = \sqrt{(-1{,}23 \cdot 10^{-7})^2 + (3{,}2 \cdot 10^{-8})^2} =$$

$$|\vec{F_1}| = 1{,}27 \cdot 10^{-7}\ N$$

e) Aceleración y módulo: sobre m_1

$$\vec{F} = m_1 \cdot \vec{a_1} \Rightarrow \vec{a_1} = \frac{\vec{F_1}}{m_1} = \frac{-1{,}23 \cdot 10^{-7}\,\vec{i} + 3{,}2 \cdot 10^{-8}\,\vec{j}}{100} =$$

$$\vec{a_1} = -1{,}23 \cdot 10^{-9}\,\vec{i} + 3{,}2 \cdot 10^{-10}\,\vec{j}\ (m/s^2)$$

$$|\vec{a_1}| = \sqrt{(-1{,}23 \cdot 10^{-9})^2 + (3{,}2 \cdot 10^{-10})^2} = 1{,}27 \cdot 10^{-9}\ m/s^2$$

También:

$$|\vec{a_1}| = \frac{|\vec{F_1}|}{m_1} = \frac{1{,}27 \cdot 10^{-7}}{100} = 1{,}27 \cdot 10^{-9}\ m/s^2$$