Topic: Moments of the system, x-axis

Question: Calculate the moments of the system.

Answer choices:

A $M_y = 0$ $M_x = 101$

B $M_y = 0$ $M_x = 20$

C $M_y = 20$ $M_x = 0$

D $M_y = 101$ $M_x = 0$

Solution: D

In this problem the masses are located on a real number line. However, we calculate the moments of the system in the same manner as we would if the masses were located somewhere in the quadrant plane. We consider the real number line to be the x-axis. This means that the masses are on points in which the y-coordinate is 0.

Therefore, the masses and their locations are

$$m_1 = 9$$

$$P_1 = (2,0)$$

and

$$m_2 = 4$$

$$P_2 = (5,0)$$

and

$$m_3 = 7$$

$$P_3 = (9,0)$$

To calculate the moments of a system we'll use the formulas

$$M_y = m_1(x_1) + m_2(x_2) + m_3(x_3)$$

and

$$M_x = m_1(y_1) + m_2(y_2) + m_3(y_3)$$

where m_1, m_2 and m_3 are the given masses and $P_1(x_1, y_1)$, $P_2(x_2, y_2)$ and $P_3(x_3, y_3)$ are the points associated with those masses.

We'll plug the values we've been given into the formulas for M_y and M_x.

$$M_y = (9)(2) + (4)(5) + (7)(9)$$

$$M_y = 18 + 20 + 63$$

$$M_y = 101$$

and

$$M_x = (9)(0) + (4)(0) + (7)(0)$$

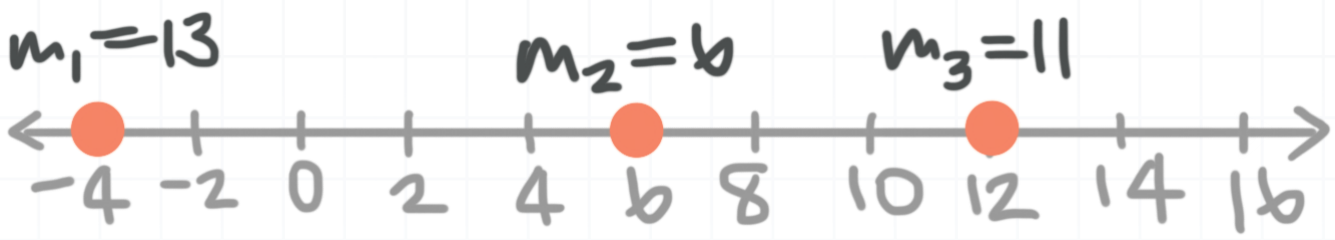
$$M_x = 0 + 0 + 0$$

$$M_x = 0$$

The moments of the system are $M_y = 101$ and $M_x = 0$.

Topic: Moments of the system, x-axis

Question: Calculate the moments of the system.



Answer choices:

A $M_y = 14$ $M_x = 0$

B $M_y = 116$ $M_x = 0$

C $M_y = 0$ $M_x = 116$

D $M_y = 0$ $M_x = 14$

Solution: B

In this problem the masses are located on a real number line. However, we calculate the moments of the system in the same manner as we would if the masses were located somewhere in the quadrant plane. We consider the real number line to be the x-axis. This means that the masses are on points in which the y-coordinate is 0.

Therefore, the masses and their locations are

$$m_1 = 13$$

$$P_1 = (-4,0)$$

and

$$m_2 = 6$$

$$P_2 = (6,0)$$

and

$$m_3 = 11$$

$$P_3 = (12,0)$$

To calculate the moments of a system we'll use the formulas

$$M_y = m_1(x_1) + m_2(x_2) + m_3(x_3)$$

and

$$M_x = m_1(y_1) + m_2(y_2) + m_3(y_3)$$

where m_1, m_2 and m_3 are the given masses and $P_1(x_1, y_1)$, $P_2(x_2, y_2)$ and $P_3(x_3, y_3)$ are the points associated with those masses.

We'll plug the values we've been given into the formulas for M_y and M_x.

$$M_y = (13)(-4) + (6)(6) + (11)(12)$$

$$M_y = -52 + 36 + 132$$

$$M_y = 116$$

and

$$M_x = (13)(0) + (6)(0) + (11)(0)$$

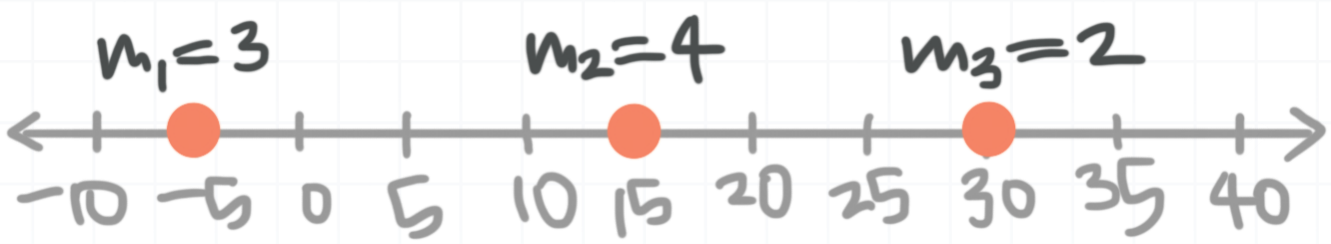
$$M_x = 0 + 0 + 0$$

$$M_x = 0$$

The moments of the system are $M_y = 116$ and $M_x = 0$.

Topic: Moments of the system, x-axis

Question: Calculate the moments of the system.



Answer choices:

A $M_y = 105$ $M_x = 0$

B $M_y = 40$ $M_x = 0$

C $M_y = 0$ $M_x = 105$

D $M_y = 0$ $M_x = 40$

Solution: A

In this problem the masses are located on a real number line. However, we calculate the moments of the system in the same manner as we would if the masses were located somewhere in the quadrant plane. We consider the real number line to be the x-axis. This means that the masses are on points in which the y-coordinate is 0.

Therefore, the masses and their locations are

$$m_1 = 3$$

$$P_1 = (-5,0)$$

and

$$m_2 = 4$$

$$P_2 = (15,0)$$

and

$$m_3 = 2$$

$$P_3 = (30,0)$$

To calculate the moments of a system we'll use the formulas

$$M_y = m_1(x_1) + m_2(x_2) + m_3(x_3)$$

and

$$M_x = m_1(y_1) + m_2(y_2) + m_3(y_3)$$

where m_1, m_2 and m_3 are the given masses and $P_1(x_1, y_1)$, $P_2(x_2, y_2)$ and $P_3(x_3, y_3)$ are the points associated with those masses.

We'll plug the values we've been given into the formulas for M_y and M_x.

$$M_y = (3)(-5) + (4)(15) + (2)(30)$$

$$M_y = -15 + 60 + 60$$

$$M_y = 105$$

and

$$M_x = (3)(0) + (4)(0) + (2)(0)$$

$$M_x = 0 + 0 + 0$$

$$M_x = 0$$

The moments of the system are $M_y = 105$ and $M_x = 0$.