Topic: Moments of the system

Question: Calculate the moments of the system.

$m_1 = 2$

$P_1(1,3)$

and

$m_2 = 3$

$P_2 = (-1,4)$

and

$m_3 = 5$

$P_3 = (3, -2)$

Answer choices:

A $M_y = 8$ $M_x = 14$

B $M_y = 50$ $M_x = 30$

C $M_y = 14$ $M_x = 8$

D $M_y = 30$ $M_x = 50$

Solution: C

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.

$$M_y = (2)(1) + (3)(-1) + (5)(3)$$

$$M_y = 2 - 3 + 15$$

$$M_y = 14$$

and

$$M_x = (2)(3) + (3)(4) + (5)(-2)$$

$$M_x = 6 + 12 - 10$$

$$M_x = 8$$

The moments of the system are $M_y = 14$ and $M_x = 8$.

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$m_1 = 5$

$P_1 = (-2,2)$

and

$m_2 = 7$

$P_2 = (3,4)$

and

$m_3 = 3$

$P_3 = (2,3)$

Answer choices:

A $M_y = 17$ $M_x = 47$

B $M_y = 47$ $M_x = 17$

C $M_y = 20$ $M_x = 44$

D $M_y = 37$ $M_x = 47$

Solution: A

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.

$$M_y = (5)(-2) + (7)(3) + (3)(2)$$

$$M_y = -10 + 21 + 6$$

$$M_y = 17$$

and

$$M_x = (5)(2) + (7)(4) + (3)(3)$$

$$M_x = 10 + 28 + 9$$

$$M_x = 47$$

The moments of the system are $M_y = 17$ and $M_x = 47$.

Topic: Moments of the system

Question: Calculate the moments of the system.

$m_1 = 3$

$P_1 = (-3,2)$

and

$m_2 = 6$

$P_2 = (4,2)$

and

$m_3 = 7$

$p_3 = (3,3)$

Answer choices:

A $M_y = 39$ $M_x = 36$

B $M_y = 51$ $M_x = 39$

C $M_y = 39$ $M_x = 51$

D $M_y = 36$ $M_x = 39$

Solution: D

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.

$$M_y = (3)(-3) + (6)(4) + (7)(3)$$

$$M_y = -9 + 24 + 21$$

$$M_y = 36$$

and

$$M_x = (3)(2) + (6)(2) + (7)(3)$$

$$M_x = 6 + 12 + 21$$

$$M_x = 39$$

The moments of the system are $M_y = 36$ and $M_x = 39$.