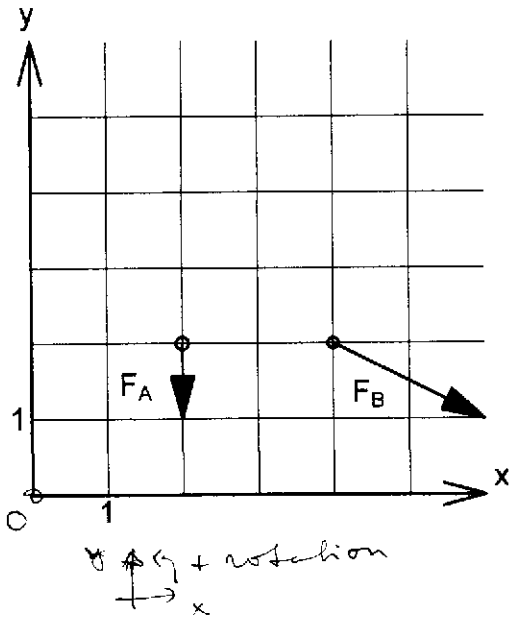


2) What is the resultant of the force system with respect to the origin?
$F_A=(0,-1)$, $F_B=(2,-1)$
What is the line of action of the resultant?

Solution:

$\Sigma F_x = F_{Ax} + F_{Bx} = 0 + 2 = 2$ units

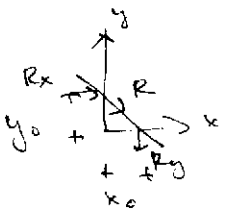
$\Sigma F_y = -1 - 1 = -2$ units

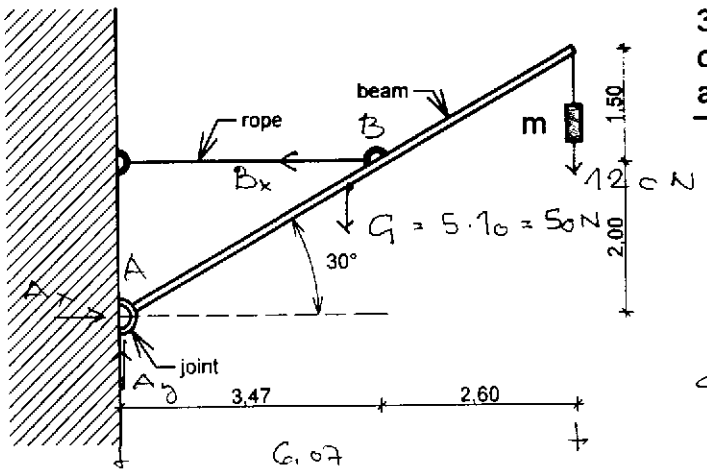
$\Sigma M_O = M_{F_A} + M_{F_B} = -1 \cdot 2 - 1 \cdot 4 - 2 \cdot 2 =$
$= -10$ units

$R = (R_x, R_y, M_{R_O}) = (2, -2, -10)$

$M_{R_O} = R_x \cdot y_0 = -2 \cdot y_0 = -10 \rightarrow y_0 = 5$ units

$M_{R_O} = R_y \cdot x_0 = -2 \cdot x_0 = -10 \rightarrow x_0 = 5$ units





3) The mass of the beam is 5 kg, the hanging mass is of m=12 kg. What is the force in the rope (magnitude) and the force at the joint (componentwise)?

$\Sigma M_A = -6{,}07 \cdot 120 - \frac{6{,}07}{2} \cdot 50 + 2 \cdot B_x = 0$

$B_x = 440$ N (←)

$\Sigma F_x = B_x + A_x = 440 + A_x = 0$

$A_x = -440$ N →

$\Sigma F_y = -50 - 120 + A_y = 0$

$A_y = 170$ N ↑