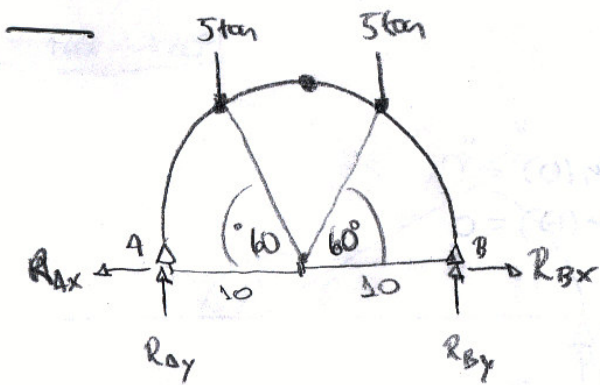
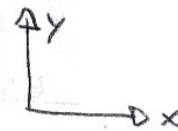




$V(\theta)$
 $N(\theta)$
 $M(\theta)$



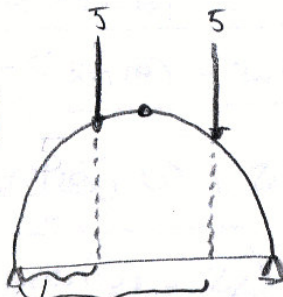
Ec de la estática:

$$R_{Bx} - R_{Ax} = 0$$

$$R_{Bx} = R_{Ax}$$

$$R_{Ax} + R_{By} = 10$$

$$\sum M_A = 0$$



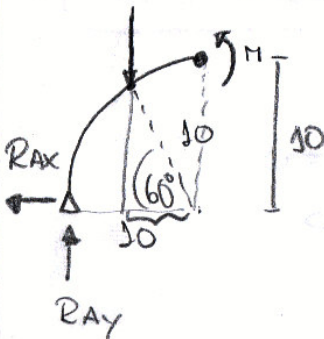
$$-5 \cdot 5 - 5 \cdot 15 + R_{By} \cdot 20 = 0$$

$$20 R_{By} = 100$$

$$R_{By} = 5 \text{ ton}$$

$$R_{Ay} = 5 \text{ ton}$$

• Momentos internos en la rótula deben ser cero



$$M + 10 \cos 60^\circ \cdot 5 - R_{Ay} \cdot 10 - R_{Ax} \cdot 10 = 0$$

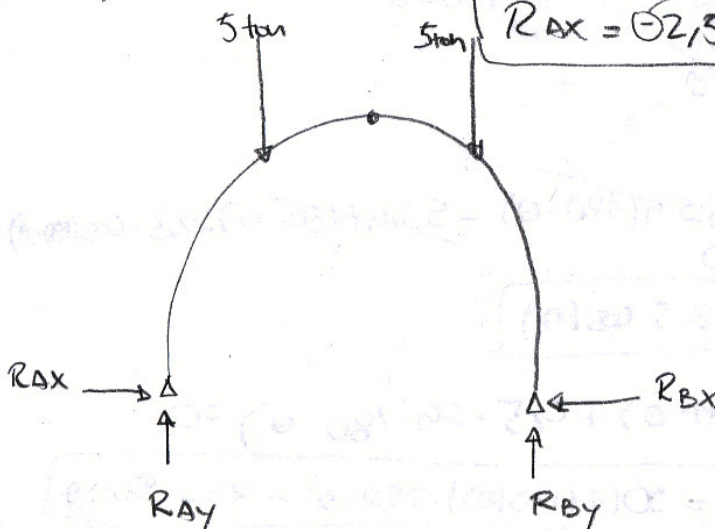
(Por la rótula)

$$25 - 50 - R_{Ax} \cdot 10 = 0$$

$$R_{Ax} \cdot 10 = -25$$

$$R_{Ax} = -2,5 \text{ ton}$$

→ Esto implica que las reacciones eran para el otro lado



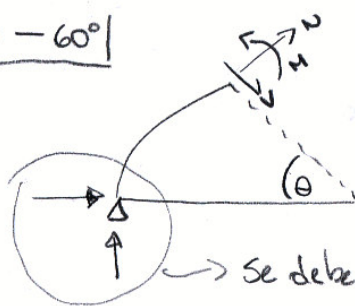
$$R_{Ax} = 2,5 \text{ ton}$$

$$R_{Ay} = 5 \text{ ton}$$

$$R_{Bx} = 2,5 \text{ ton}$$

$$R_{By} = 5 \text{ ton}$$

0 - 60°



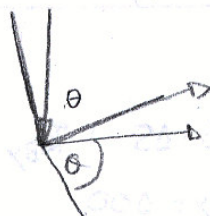
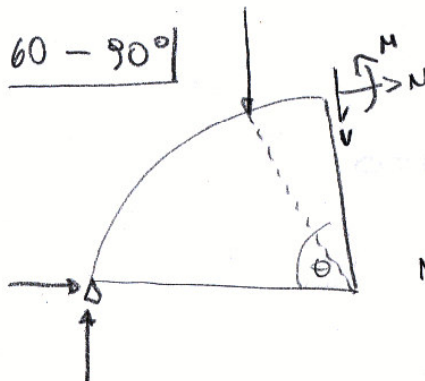
$$N + 5 \cos \theta + 2,5 \sin(\theta) = 0$$

$$V + 2,5 \cos \theta - 5 \sin(\theta) = 0$$

Se deben descomponer los 2 vectores

$$M + 2,5 \cdot 10 \sin \theta - 5 \cdot 10 (1 - \cos(\theta)) = 0$$

60 - 90°



$$N + 5 \cos \theta + 2,5 \sin(\theta) - 5 \cos(\theta) = 0$$

$$N = -2,5 \sin(\theta)$$

$$V + 2,5 \cos(\theta) - 5 \sin(\theta) + 5 \sin(\theta) = 0$$

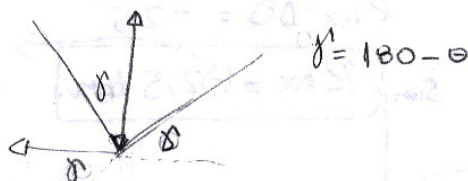
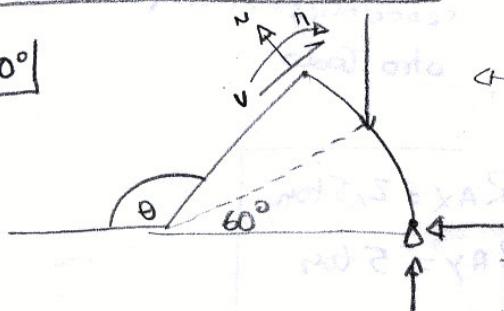
$$V = -2,5 \cos(\theta)$$

$$M + 2,5 \cdot 10 \sin \theta - 5 \cdot 10 (1 - \cos(\theta)) + 5 \cdot 10 (\cos 60 - \cos \theta) = 0$$

$$M + 25 \sin \theta - 50 + 50 \cos(\theta) + 25 - 50 \cos(\theta) = 0$$

$$M = 25(1 - \sin \theta)$$

90 - 120°



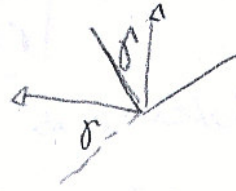
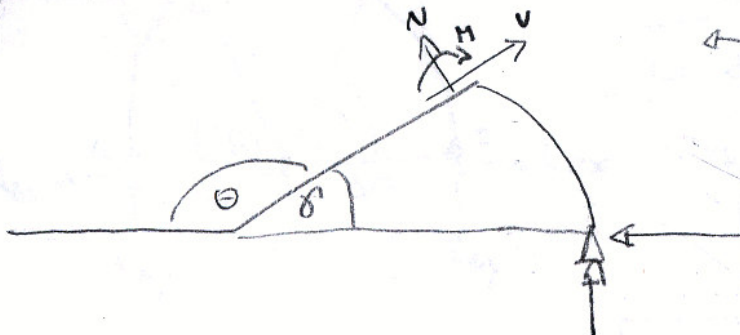
$$V + 5 \sin(180 - \theta) - 5 \sin(180 - \theta) - 2,5 \cos(180 - \theta) = 0$$

$$V = -2,5 \cos(\theta)$$

$$N + 5 \cos(180 - \theta) - 5 \cos(180 - \theta) + 2,5 \sin(180 - \theta) = 0$$

$$N = -2,5 \sin(\theta) \quad M = 50(1 + \cos(\theta)) - 25 \sin(\theta) - 25 + 50 \cos \theta$$

-180°



$$V + 5 \sin(180 - \theta) - 2.5 \cos(180 - \theta) = 0$$

$$\boxed{V = -5 \sin(\theta) - 2.5 \cos(\theta)}$$

$$N + 5 \cos(180 - \theta) + 2.5 \sin(180 - \theta) = 0$$

$$\boxed{N = 5 \cos(\theta) - 2.5 \sin(\theta)}$$

$$M + 2.5 \cdot 10 \cdot \sin(180 - \theta) - 5 \cdot 10 (1 - \cos(180 - \theta)) = 0$$

$$\boxed{M = 50(1 + \cos(\theta)) - 25 \sin(\theta)}$$

