

# Problemas Sobre El Teorema De Varignon

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**Abstract**—Un concepto usado a menudo en mecánica es el principio de momentos, al cual se le llama a veces teorema de Varignon.

**4-14.** Two boys push on the gate as shown. If the boy at B exerts a force of  $F_B = 30$  lb, determine the magnitude of the force  $F_A$  the boy at A must exert in order to prevent the gate from turning. Neglect the thickness of the gate.

RESUELVA LOS SIGUIENTES PROBLEMAS:

## Problema 1

**F4-12.** If  $F_1 = \{100i - 120j + 75k\}$  lb and  $F_2 = \{-200i + 250j + 100k\}$  lb, determine the resultant moment produced by these forces about point O. Express the result as a Cartesian vector.

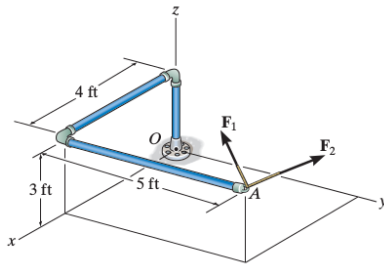


Figure 1. Teorema de Varignon

$$F_1 = 100i - 120j + 75k \text{ lb}$$

$$F_2 = -200i + 250j + 100k \text{ lb}$$

3D

$$M_0 = \vec{R} \times \vec{F}$$

$$F_1 = 100i - 120j + 75k \text{ lb}$$

$$R_A = 4i + 0j + 3k$$

$$F_2 = -200i + 250j + 100k \text{ lb}$$

$$R_B = 4i + 5j + 3k$$

$$R_A \times F_1 = i(0)(75) - (-120)(3) + j(4)(75) - (100)(3) + k(100)(0) - (4)(-120)$$

$$R_A \times F_1 = (360)i + (480)k$$

$$R_B \times F_2 = i(5)(100) - (250)(3) + j(4)(100) - (-200)(3) + k(4)(250) - (-200)(5)$$

$$R_B \times F_2 = (-250)i + (1000)j + (2000)k$$

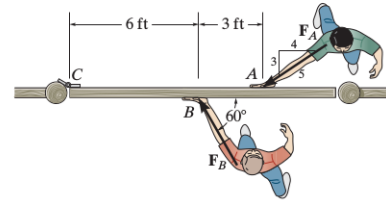


Figure 2. Teorema de Varignon

## Problema 2

$$F_B = 30 \sin 60 (6) = 155.88$$

$$F_A = \frac{3}{5} (9) = 5.4$$

$$F_A = \frac{155.88}{5.4} = 28.86 \text{ Lb}$$