Problemas sobre el teorema de Varignon.

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F4–12. If $\mathbf{F}_1 = \{100\mathbf{i} - 120\mathbf{j} + 75\mathbf{k}\}$ lb and $\mathbf{F}_2 = \{-200\mathbf{i} + 250\mathbf{j} + 100\mathbf{k}\}$ lb, determine the resultant moment produced by these forces about point O. Express the result as a Cartesian vector.

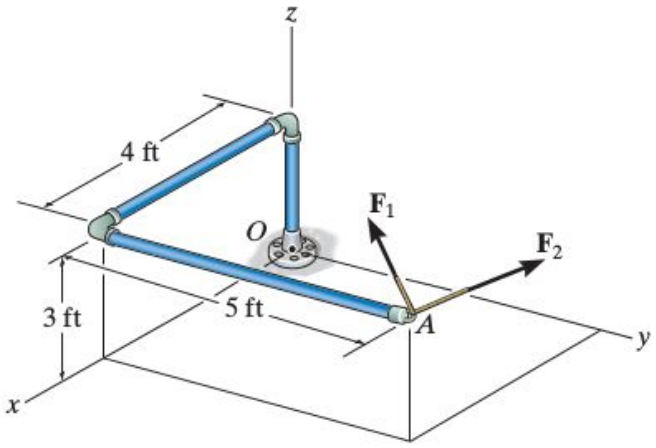

Figure 1: This is a caption

F2 = -200 I+ 250 J+ 100 K

Mo = r x f

= 0 I+ 0 j + 0 k

r2 = 4i + 5j - 3k

fr= -100 I+ 130J +175K

rA = 0 I+ 0J + 0K

rB = 4 I+ 5 J + 3 K

rA x f1 = i j k

0 0 0

100 120 75

= 0 i + 0j+ 0k

rb X f2 i j k

4 5 3

-100 130 75

=i 875-390 - j 700-(-300) +k 500 + 520

= 485 i -1000 j + 1020 k

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.

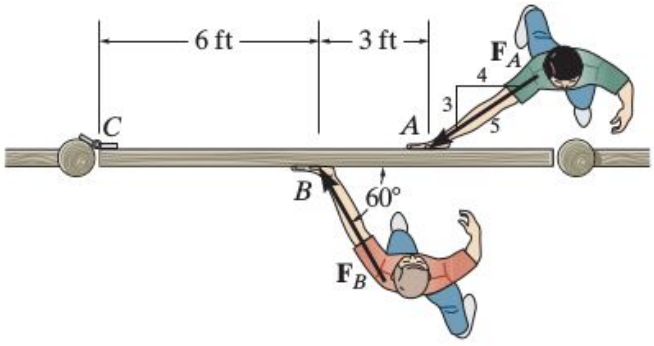

Figure 2: This is a caption

SENϑ = 3/5

COSϑ= 4/5

TANϑ= 3/4

FAx= FA cos ϑ = 4/5 FA

FBy FAY= FA SENϑ = 3/5

FBx = FB COS 60

FBy -FB SEN 60

ΣFx = 0

-FBx - FAy= 0

- 30 libras cos 60 - 4/5 FA=0

4/5 FA= - 30 libras

FA= 4/5(-30 libras cos 60) = 18.75

Para B

rBx= 6 ft FBx = 30 libras COS 60°

By= 0 FBy= 30 libras sen 60°

M A = RA x FAy - rAy = (9 pies) (3/5) - (0) (4/5 FA)= 27/5 libas * pies

Para A

rAx = 9 pies FAx= 4/5 FA

FAy= 0 FAy= 3/5 FA

M B = rBx Fby - rBy FBx = (6 pies) (30 libras sen 60°)- (0) (30 libras cos 60°)= 155.88 libras/pies

ΣM= 0 M B= MA =0

27/5 FA = 155.88

FA = 155.88/ (27/5) = 28.86