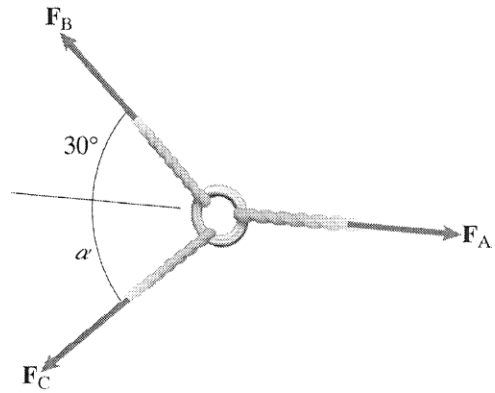
EM211 | Statics | Fall AY07
Quiz 1 | Graphical Addition of Vectors | 17 APR 2006
Name KEY A | Period 4 5 6 .

The sum of the forces $\mathbf{F}_A+\mathbf{F}_B+\mathbf{F}_C=\mathbf{0}$. F_A=100N and α=60°. Find F_B and F_C.



Given

Find

2

Relationships

Law of Sines

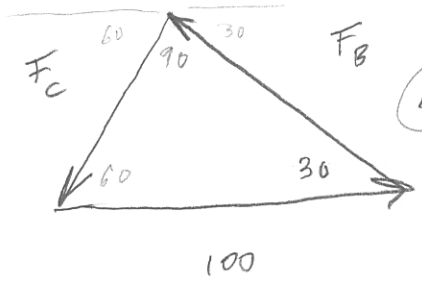
4 $\frac{F_B}{\sin 60} = \frac{F_C}{\sin 30} = \frac{100}{\sin 90}$

$100 = 1.15 F_B = 2 F_C$

$\Rightarrow$ $\boxed{F_B = 86.6\,N}$

$\boxed{F_C = 50\,N}$

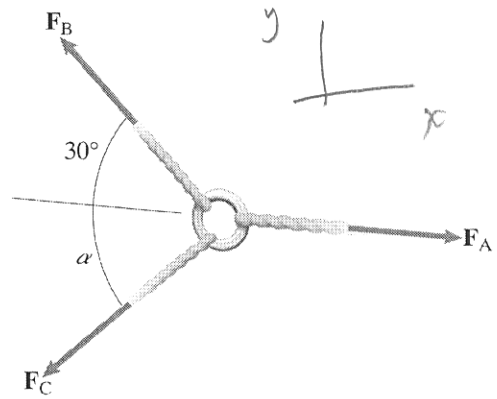
Vector Triangle



4

EM211 | Statics | Fall AY07
Quiz 1 | Graphical Addition of Vectors | 17 APR 2006
Name KEY B | Period 4 5 6 .

The sum of the forces $\mathbf{F}_A+\mathbf{F}_B+\mathbf{F}_C=\mathbf{0}$. F_A=100N and α=60°. Find F_B and F_C.



Given

Find (1)

Relationships

$\vec{F}_A = 100(\hat{i})$ $\quad \vec{F}_B = F_B(-\cos 30\hat{i} + \sin 30\hat{j})$

(5) $\vec{F}_B = F_B(-0.866\hat{i} + 0.5\hat{j})$

$\vec{F}_C = F_C(-\cos 60\hat{i} - \sin 60\hat{j})$ $\quad \vec{F}_C = F_C(-0.5\hat{i} - 0.866\hat{j})$

$\Sigma F_x = 100 - 0.866F_B - 0.5F_C = 0$

(4) $\Sigma F_y = 0.5F_B - 0.866F_C = 0 \Rightarrow F_B = 1.73F_C$

Then $+0.866(1.73)F_C + 0.5F_C = 100$

$2F_C = 100$ $\quad \boxed{F_C = 50N}$

$\boxed{F_B = 86.5N}$