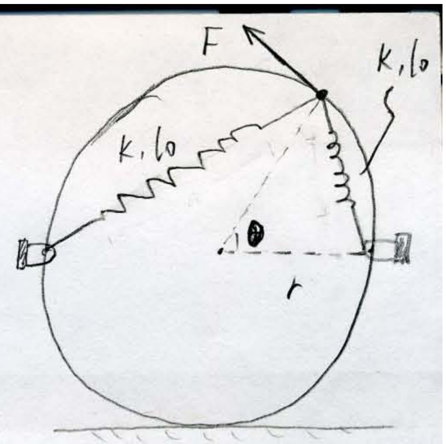
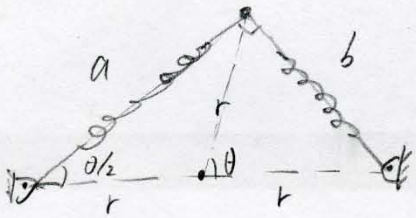
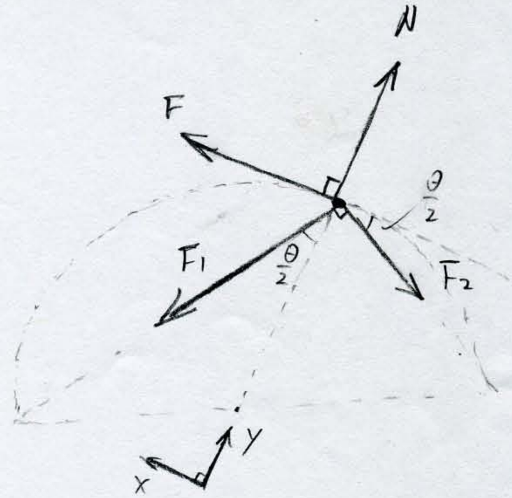
6.1.16)



a)



$a = 2r\cos\frac{\theta}{2}$, $b = 2r\sin\frac{\theta}{2}$



$F_1 = k(2r\cos\frac{\theta}{2} - l_0)$

$F_2 = k(2r\sin\frac{\theta}{2} - l_0)$

$\Sigma F_x = 0$

$\Rightarrow F + F_1\sin\frac{\theta}{2} - F_2\cos\frac{\theta}{2} = 0$

$F = -k(2r\cos\frac{\theta}{2} - l_0)\sin\frac{\theta}{2} + k(2r\sin\frac{\theta}{2} - l_0)\cos\frac{\theta}{2}$

$$\boxed{F = kl_0(\sin\frac{\theta}{2} - \cos\frac{\theta}{2})}$$

b) if $l_0 = 0$, using vector method:

$\Rightarrow \vec{F} + \vec{N} + \vec{F_1} + \vec{F_2} = 0$

$\vec{F_1} = k\,\vec{r}_{A/C}$, $\vec{F_2} = k\,\vec{r}_{B/C} = k\,\vec{r}_{D/A}$

$\Rightarrow \vec{F_1} + \vec{F_2} = k(\vec{r}_{A/C} + \vec{r}_{D/A}) = \vec{r}_{D/C}$

since $\vec{F} = F\hat{i}$, and $\vec{F_1} + \vec{F_2} = -k r_{D/C}\,\hat{j}$, $\vec{N} = N\hat{j}$

$\Rightarrow F\hat{i} + (-k r_{D/C} + N)\hat{j} = 0 \Rightarrow \boxed{F = 0}$