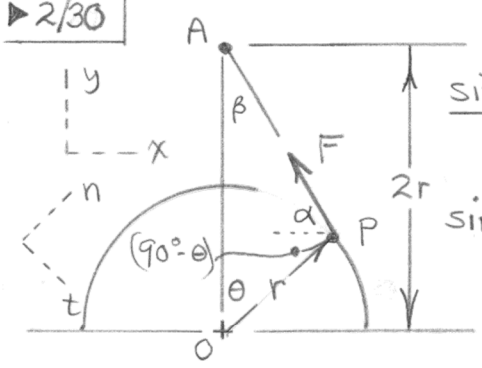
**▶2/30**




$$F = k\delta = k(\overline{AP} - r)$$

$$\frac{\sin(\measuredangle OPA)}{2r} = \frac{\sin\theta}{\overline{AP}}$$

$$\sin[\alpha + (90^\circ - \theta)] = \frac{2r\sin\theta}{\overline{AP}}$$

$$\alpha = \theta - 90^\circ + \sin^{-1}\left(\frac{2r\sin\theta}{\overline{AP}}\right)$$

$\overline{AP}$: $\overline{AP}^2 = r^2 + (2r)^2 - 2r(2r)\cos\theta$

$$\overline{AP} = r\sqrt{5 - 4\cos\theta}$$

Then $F_x = -F\cos\alpha$, $F_y = F\sin\alpha$

For $r = 0.4$ m, $\theta = 40^\circ$, $k = 1400$ N/m:

$$\overline{AP} = 0.4\sqrt{5 - 4\cos 40^\circ} = 0.557 \text{ m}$$

$$\alpha = 40^\circ - 90^\circ + \sin^{-1}\left(\frac{2(0.4)\sin 40^\circ}{0.557}\right) = 62.5^\circ$$

$$F = 1400(0.557 - 0.4) = 219 \text{ N}$$

$$\begin{cases} F_x = -219\cos 62.5^\circ = \underline{-101.2 \text{ N}} \\ F_y = 219\sin 62.5^\circ = \underline{194.4 \text{ N}} \end{cases}$$