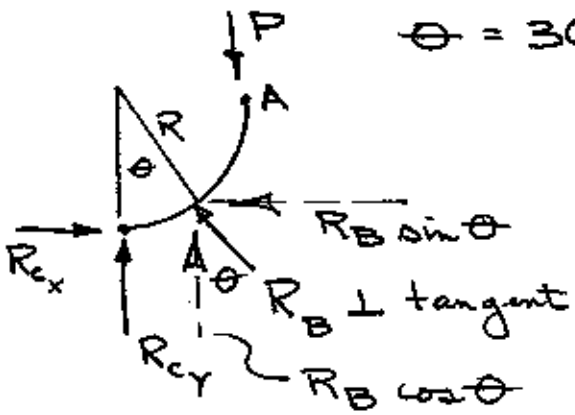
MECH 234 + 235

PROB. 4.81



$\theta = 30°$

FIND:

REACTIONS AT B + C

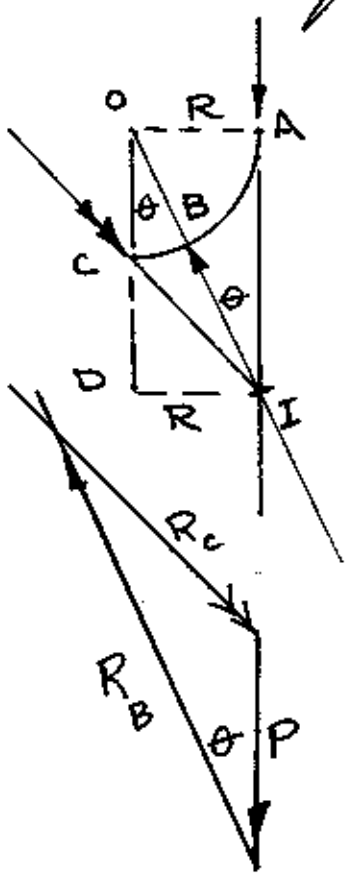
R_B = SINGLE REACTION AT THE ROLLER NORMAL TO THE TANGENT AT THE SURFACE.

$\Sigma F_x = 0 = R_{cx} - R_B \sin 30°$

$\Sigma F_y = 0 = R_{cy} + R_B \cos 30° - P$

$\Sigma M_c = 0$ REQUIRES GEOM. FOR CHORD LENGTHS.

INSTEAD: for $\Sigma F = 0$, ALL FORCE VECTORS MUST INTERSECT. DIRECTION OF P AND R_B KNOWN.



$\therefore$ THE $\vec{R}_c = R_{cx} + R_{cy}$

MUST ALSO PASS THRU SAME INTERSECTION.

$\Sigma F = 0$ = CLOSED FORCE POLYGON

$\therefore$ LAW of COSINES + LAW of SINES

$$AI = OD = \frac{R}{\tan\theta}$$

$$CD = OD - R = \frac{R}{\tan\theta} - R$$

$$CD =$$