PROB. 15-22

$r = 6\,IN$, $\omega = 4\,\frac{RAD}{s}$ CLOCKWISE

FIND $\alpha$ FOR $a_B = 120\,\frac{IN}{s^2}$

$a_t = r\alpha$, $a_n = r\omega^2$

$a_n = (6\,IN)\left(4\,\frac{RAD}{s}\right)^2 = 96\,\frac{IN}{s^2}$

$a_B = \sqrt{a_t^2 + a_n^2}$

$a_t^2 = a_B^2 - a_n^2$

$a_t = \sqrt{a_B^2 - a_n^2}$

$r\alpha = \sqrt{a_B^2 - a_n^2}$

$\alpha = \frac{1}{r}\sqrt{a_B^2 - a_n^2}$

$\alpha = \frac{1}{(6\,IN)} \cdot \sqrt{(120)^2 - (96)^2}$ $\boxed{= 12\,\frac{RAD}{s^2}}$