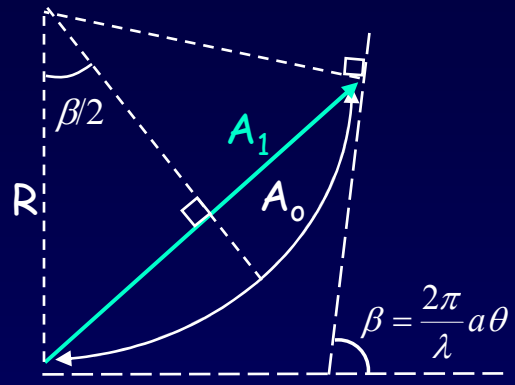
Single-slit Diffraction (2)

We have turned the single-slit problem into the M-slit problem that we already solved in this lecture.

However, as we let M $\rightarrow \infty$, the problem becomes much simpler because the polygon becomes the arc of a circle.

The radius of the circle is determined by the relation between angle and arc length: $\beta = A_o/R$.



Trigonometry: $A_1/2 = R \sin(\beta/2)$

With $R = A_o/\beta$: $$A_1 = A_0 \frac{\sin(\beta/2)}{\beta/2}$$

$I = A^2$: $$I_1 = I_0 \left(\frac{\sin(\beta/2)}{\beta/2} \right)^2$$

You can graph this function

Remember: $\beta/2\pi = \delta_a/\lambda = (a \sin\theta)/\lambda \approx a\,\theta/\lambda$

β = angle between 1st and last phasor