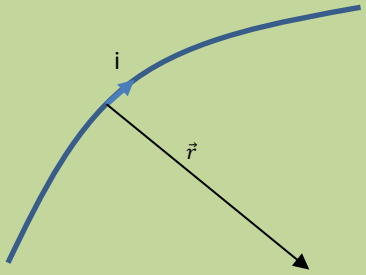
CONCEPT: BIOT-SAVART LAW WITH CALCULUS

- For ANY current, magnetic field $\vec{r}$ away is

$\vec{B} =$ _____

- Known as Biot-Savart Law



- Biot-Savart Law reduces to familiar equations:

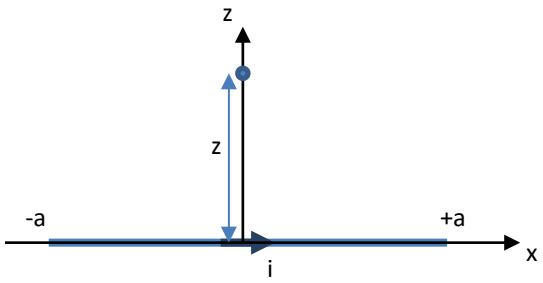
- Point charge: $B = \frac{\mu_0}{4\pi}\frac{qvsin\theta}{r^2}$

- Current-carrying wire: $B = \frac{\mu_0 I}{2\pi r}$

EXAMPLE: Show that the Biot-Savart law for a current is the same as the equation above for a point charge.

EXAMPLE: MAGNETIC FIELD DUE TO FINITE, CURRENT-CARRYING WIRE

What is the magnetic field at the position shown in the following figure due to the finite, current-carrying wire?



PRACTICE: MAGNETIC FIELD AT CENTER OF RING OF CURRENT

What is the magnetic field at the center of the following ring of current?