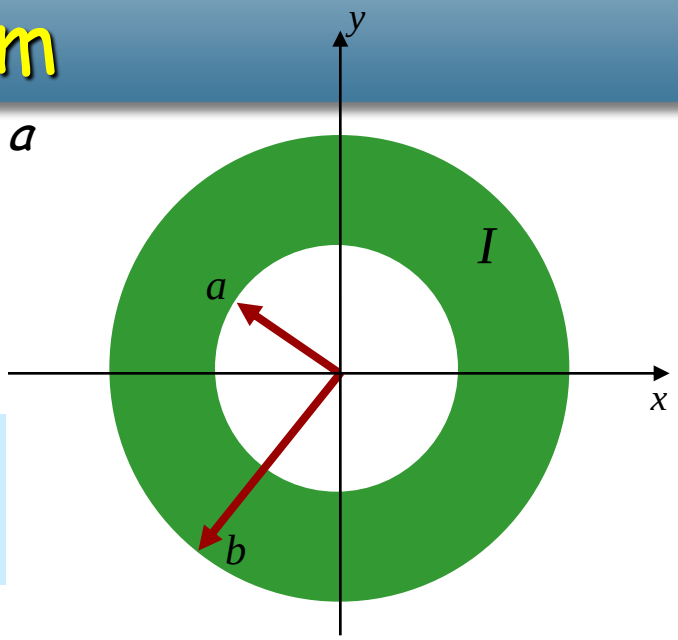
# Example Problem

An infinitely long cylindrical shell with inner radius *a* and outer radius *b* carries a uniformly distributed current I ***out of the screen***.

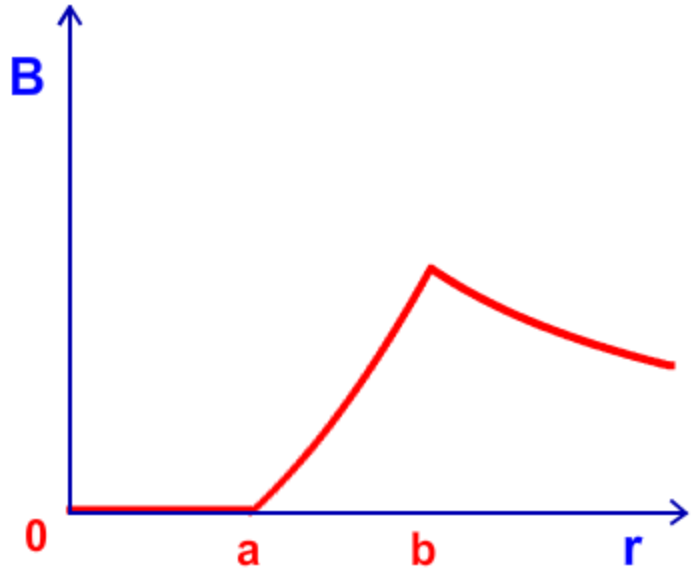



Sketch |B| as a function of *r*.

How big is B at *r* = *b*?

$$B = \frac{\mu_o I}{2\pi r} \cdot \frac{(r^2 - a^2)}{(b^2 - a^2)}$$

Let I = 10 A, b = 1 mm




$$B(b) = \frac{\mu_o I}{2\pi b}$$

$$= \frac{4\pi x 10^{-7}\ \mathrm{Tm/A} \cdot 10\mathrm{A}}{2\pi \cdot 0.001\,\mathrm{m}}$$

$$= 2x10^{-3}\ \mathrm{T}$$