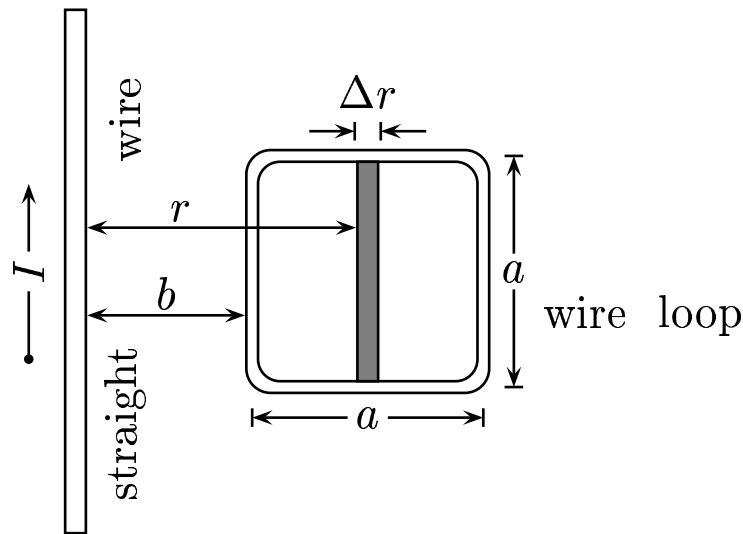


Consider the flux due to a current I in a long wire.



Find the flux ϕ through the square area shown in the sketch.

A) $\phi = \frac{\mu_0 I a}{2 \pi} \ln \frac{a + b}{b}$

B) $\phi = \frac{\mu_0 I}{2 \pi b} a^2$

C) $\phi = \frac{\mu_0 I}{2 \pi (a + b)} a^2$

$$B = \frac{\mu_0 I}{2 \pi r}$$

$$\phi = \int_b^{a+b} B a dr = \frac{\mu_0 I a}{2 \pi} \int_a^{a+b} \frac{dr}{r} = \frac{\mu_0 I a}{2 \pi} \ln \frac{a + b}{b}$$

Answer A.