

64. (a) The difference between this and Sample Problem 6 is that the current in wire 2 is reversed from what is shown in Fig. 30-59(a). Thus, we replace $i \rightarrow -i$ in the expression for $B_2(x)$ and add the fields:

$$B_1(x) + B_2(x) = \frac{\mu_0 i}{2\pi(d+x)} + \frac{\mu_0(-i)}{2\pi(d-x)} = -\frac{\mu_0 i x}{\pi(d^2 - x^2)}$$

which is equivalent to the desired result.

- (b) As remarked in that Sample Problem, this expression does not apply within the wires themselves. If we assume the wires have nearly zero thickness, then the expression applies over nearly all of the range $-0.02 < x < 0.02$ (with SI units understood). To be definite about this issue, we have picked a small wire radius (.005 m) and graphed the field over the range $-0.0195 \leq x \leq 0.0195$.

