

18. Recalling the *straight sections* discussion in Sample Problem 30-1, we see that the current in the straight segments colinear with  $P$  do not contribute to the field at that point. We use the result of problem 16 to evaluate the contributions to the field at  $P$ , noting that the nearest wire-segments (each of length  $a$ ) produce magnetism into the page at  $P$  and the further wire-segments (each of length  $2a$ ) produce magnetism pointing out of the page at  $P$ . Thus, we find (into the page)

$$B_P = 2 \left( \frac{\sqrt{2}\mu_0 i}{8\pi a} \right) - 2 \left( \frac{\sqrt{2}\mu_0 i}{8\pi(2a)} \right) = \frac{\sqrt{2}\mu_0 i}{8\pi a} .$$