

23. Using the right-hand rule, we see that the current  $i_2$  carried by wire 2 must be out of the page. Now,  $B_{P_1} = \mu_0 i_1 / 2\pi r_1$  where  $i_1 = 6.5 \text{ A}$  and  $r_1 = 0.75 \text{ cm} + 1.5 \text{ cm} = 2.25 \text{ cm}$ , and  $B_{P_2} = \mu_0 i_2 / 2\pi r_2$  where  $r_2 = 1.5 \text{ cm}$ . From  $B_{P_1} = B_{P_2}$  we get

$$i_2 = i_1 \left( \frac{r_2}{r_1} \right) = (6.5 \text{ A}) \left( \frac{1.5 \text{ cm}}{2.25 \text{ cm}} \right) = 4.3 \text{ A} .$$