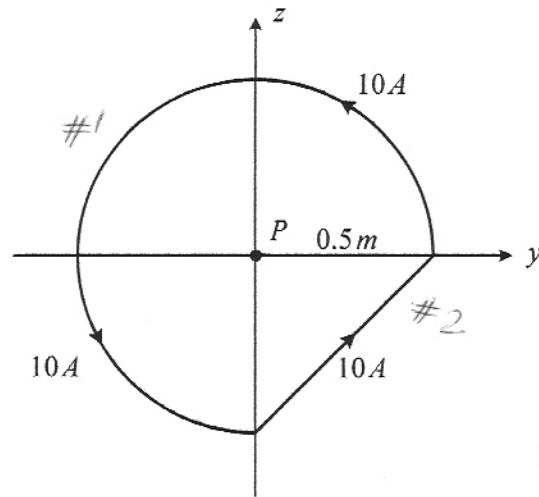


Name:

KEY

I.D. Number:

The figure below shows a single-turn closed circuit that carries 10 A of D.C. current. The circuit, which lies entirely in the $y-z$ plane, consists of a *three-quarter-circle* ring (0.5 m radius) and a *straight* section. Calculate the resulting \vec{H} field vector at the observation point P , which lies at the origin.



$$\vec{H}_1 = \frac{3}{4} \frac{I}{2a} \vec{a}_x = \frac{3}{4} \frac{10}{(1)} \vec{a}_x = 7.5 \vec{a}_x$$

$$\vec{H}_2 = \vec{a}_x \frac{10}{4\pi \left(\frac{0.5}{\sqrt{2}}\right)} [\cos 45^\circ - \cos 135^\circ]$$

$$= \vec{a}_x 3.183$$

$$\therefore \vec{H} = 10.683 \vec{a}_x \text{ A/m}$$