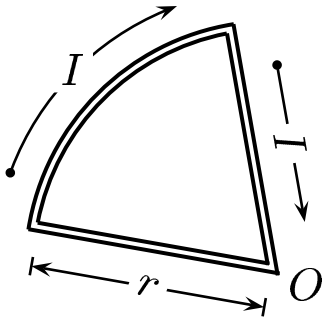
A current loop consists of one circular arc subtended by an angle $\alpha$, and two radial segments. There is a clockwise current $I$ and the radius is $r$.




The direction of the magnetic field at the center $O$

A) is into the paper.
B) is out of the paper.
C) cannot be determined since $B = \infty$.
D) cannot be determined since $B = 0$.

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Based on the Biot-Savart law, $\delta\vec{B} = \frac{\mu}{4\pi}\frac{\vec{r}\times i\,\delta\vec{L}}{r^3}$. Taking the cross product, one finds that for any current segment along the circle, the corresponding $\delta\vec{\mathrm{B}}$ at the center always points into the paper and the currents along the two radial segments do not contribute to the magnetic field at the center.

So $\vec{\mathrm{B}}$ due to the entire current loop should also point into the paper.

Answer **A**.

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