

72. (a) From symmetry, we conclude that any x -component of force will vanish (evaluated over the entirety of the bent wire as shown). By the right-hand rule, a field in the \hat{k} direction produces on each part of the bent wire a y -component of force pointing in the $-\hat{j}$ direction; each of these components has magnitude

$$|F_y| = i \ell |\vec{B}| \sin 30^\circ = 8 \text{ N} .$$

Therefore, the the force (in Newtons) on the wire shown in the figure is $-16\hat{j}$.

- (b) The force exerted on the left half of the bent wire points in the $-\hat{k}$ direction, by the right-hand rule, and the force exerted on the right half of the wire points in the $+\hat{k}$ direction. It is clear that the magnitude of each force is equal, so that the force (evaluated over the entirety of the bent wire as shown) must necessarily vanish.