71. (a) We use Eq. 29-2 and Eq. 3-30:

$$
\begin{aligned}
\vec{F} &= q\vec{v} \times \vec{B} \\
&= (+e)\left((v_y B_z - v_z B_y)\,\hat{\mathrm{i}} + (v_z B_x - v_x B_z)\,\hat{\mathrm{j}} + (v_x B_y - v_y B_x)\,\hat{\mathrm{k}}\right) \\
&= \left(1.60 \times 10^{-19}\right)\Big(\left((4)(0.008) - (-6)(-0.004)\right)\hat{\mathrm{i}} + \\
&\qquad \left((-6)(0.002) - (-2)(0.008)\right)\hat{\mathrm{j}} + \left((-2)(-0.004) - (4)(0.002)\right)\hat{\mathrm{k}}\Big) \\
&= \left(1.28 \times 10^{-21}\right)\hat{\mathrm{i}} + \left(6.41 \times 10^{-22}\right)\hat{\mathrm{j}}
\end{aligned}
$$

with SI units understood.

(b) By definition of the cross product, $\vec{v} \perp \vec{F}$. This is easily verified by taking the dot (scalar) product of $\vec{v}$ with the result of part (a), yielding zero, provided care is taken not to introduce any round-off error.

(c) There are several ways to proceed. It may be worthwhile to note, first, that if B_z were 6.00 mT instead of 8.00 mT then the two vectors would be exactly antiparallel. Hence, the angle θ between $\vec{B}$ and $\vec{v}$ is presumably "close" to 180°. Here, we use Eq. 3-20:

$$
\theta = \cos^{-1}\frac{\vec{v}\cdot\vec{B}}{|\vec{v}|\,|\vec{B}|} = \cos^{-1}\frac{-68}{\sqrt{56}\,\sqrt{84}} = 173^\circ\ .
$$