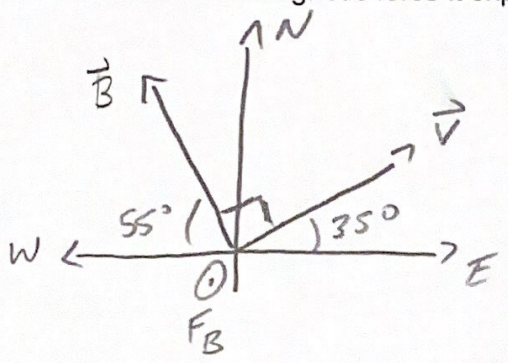
Quiz 21.1A

a) A glider carrying a charge of 410 μC is flying through the air in a direction 35° North of East at a rate of 28 m/s. The glider feels a magnetic force of 7.7×10^{-8} N directed vertically upward. What is the magnitude and direction of the uniform magnetic field through which the glider is flying, assuming the field is perpendicular to the velocity?

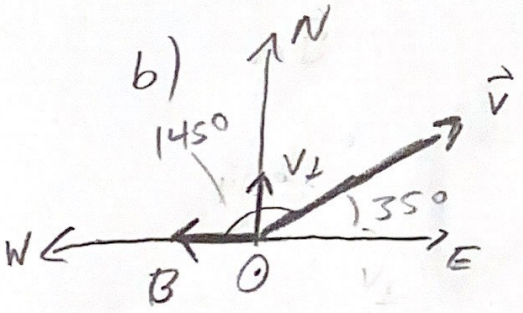
b) If the glider with the same charge and same velocity as in (a) is moving through a uniform magnetic field of 7.8 μT directed due ~~North~~ West, what will be the magnitude and direction of the magnetic force it experiences?



a) $\vec{B}$ must point as shown due to RHR #1.

$7.7 \times 10^{-8} = (410 \times 10^{-6})(28) B \sin 90$

$\boxed{B = 6.7\ \mu T,\ 55°\ N\ of\ W}$



b) F_B points ⊙ due to B, $v_\perp$ & RHR #1

$F_B = (410 \times 10^{-6})(28)(7.8 \times 10^{-6}) \sin 145°$

$= \boxed{5.1 \times 10^{-8} N,\ out\ of\ page}$