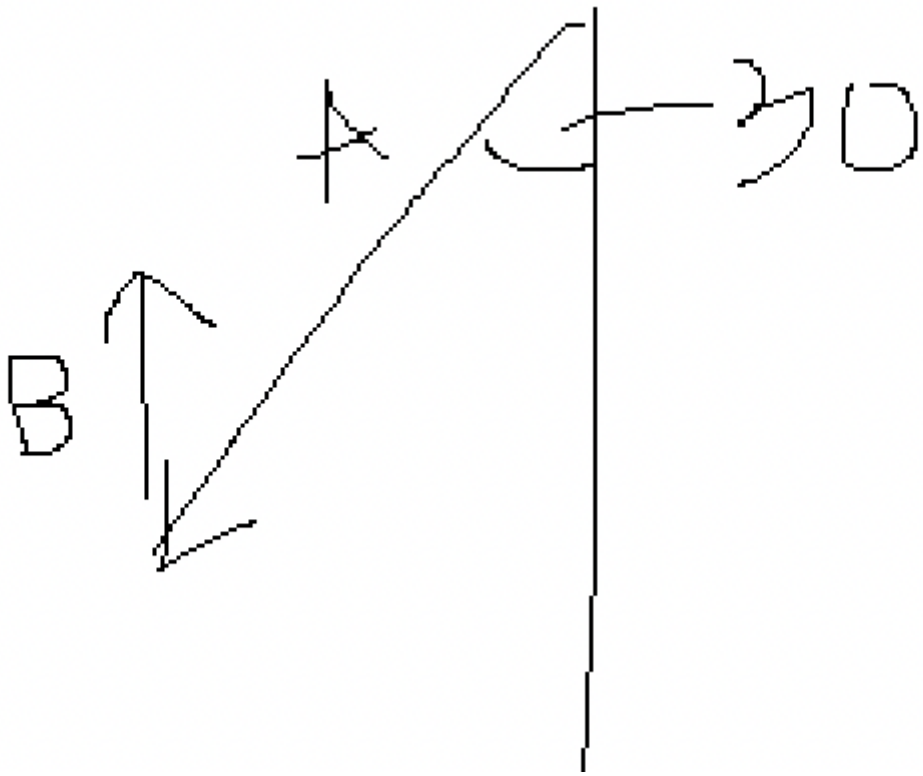
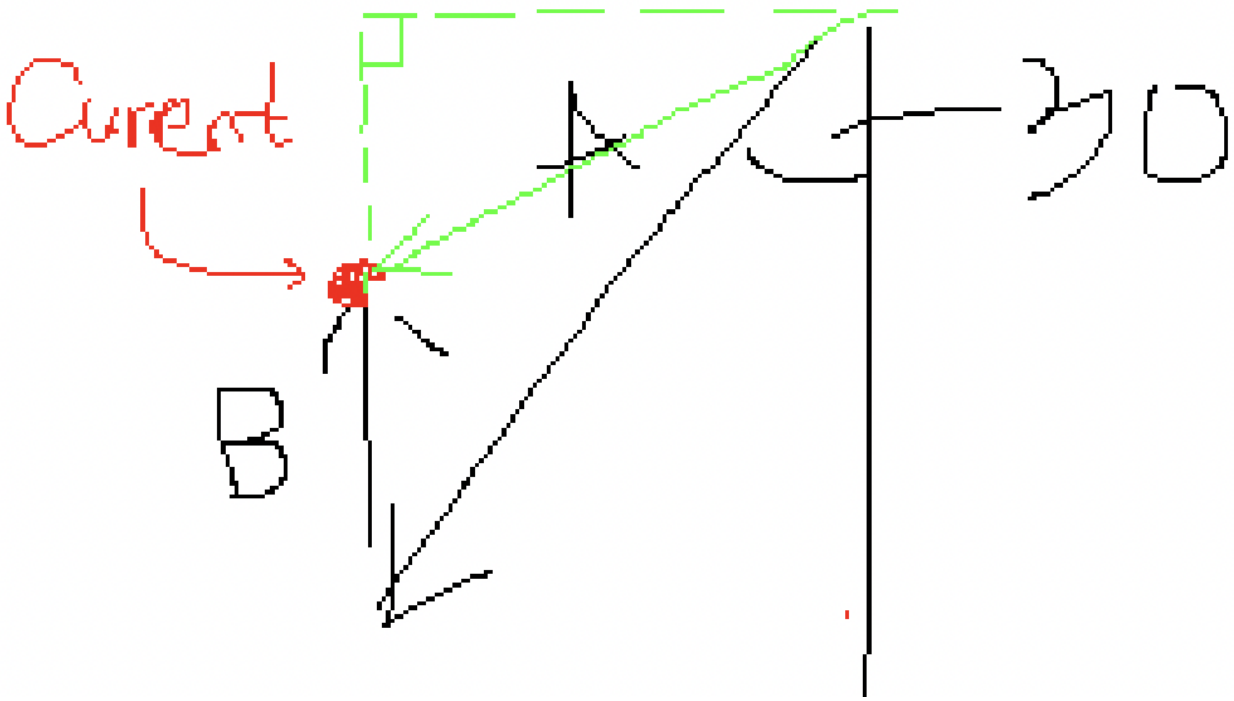
OV_04_26_22

Practice FRQ Problems

Problem 1

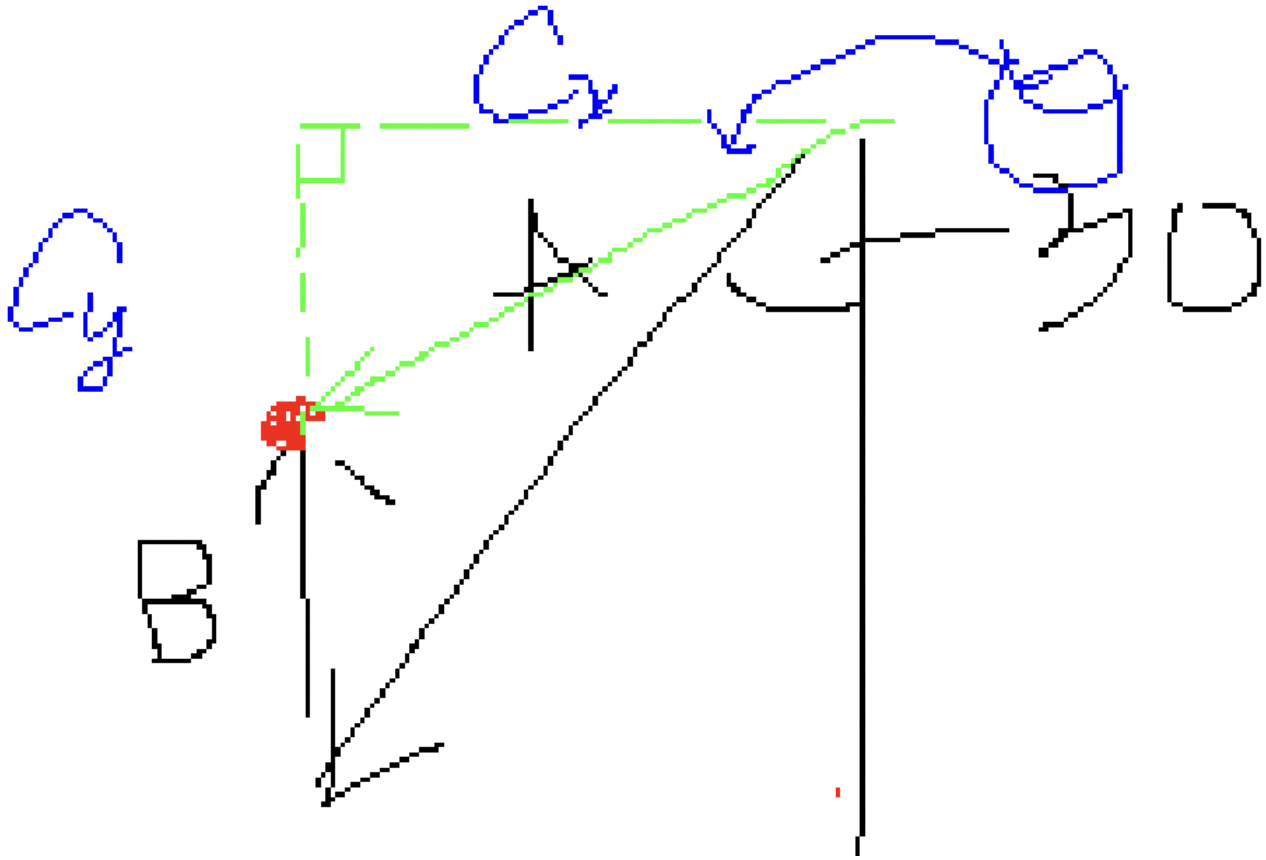


When it asks for the magnitude and direction of the bus, imagine drawing a new vector from the origin to the current location of the bus. The **magnitude** of a vector is the length of the vector.



We need a right triangle in order to use the pythagorean theorem. Look! In green, we *created* our own right triangle. If we find its leg lengths, we can find the hypotenuse. We will call them C_y and C_x. From the figure, its clear that the leg lengths satisfies...

$$C_y = A_y - B_y = 2090.15$$
$$C_x = A_x - B_x = 406.75$$



Then use pythagorean theorem to find the magnitude of vector C. Lastly, use trig relationships to find the direction of vector C.

$$tan(\theta) = \frac{C_y}{C_x}$$

To isolate θ, we need to take the inverse of tan on both sides which gives us

$$\theta = tan^{-1}(\frac{C_y}{C_x})$$

Since the angle begins on the west vector and opens downward, the direction of vector C is θ *south of west*.