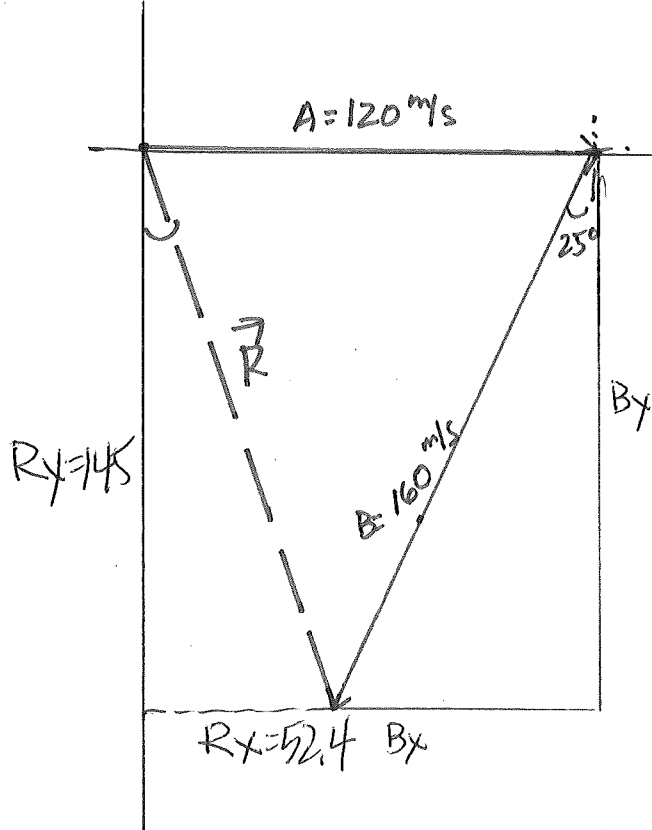


12. An airplane travels straight east (along east axis) at 120 m/s. The wind blows with a velocity of 160 m/s at 25° W of S. What is the resultant velocity of the plane? (Use a scale of 1 cm = 20 m/s)  
 (154 m/s at 19.8° E of S)

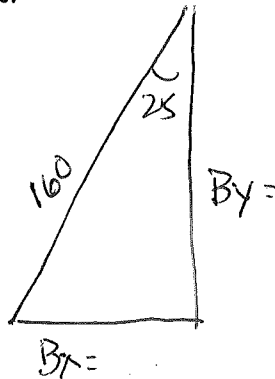
Solve this problem graphically:



graphically  
 $R = 7.8 \times 20 = 156 \frac{m}{s}$  at 19° E of S

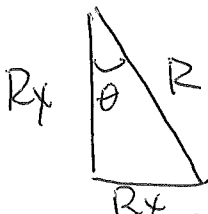
By resolution into components:

$A_x = 120$   
 $A_y > 0$



$\sin 25^\circ = \frac{B_x}{160}$   $B_x = 67.6$

$\cos 25^\circ = \frac{B_y}{160}$   $B_y = 145$



$R_y = B_y = 145$

$R_x = A_x - B_x = 120 - 67.6 = 52.4$

direction:  
 $\tan \theta = \frac{R_x}{R_y} = \frac{52.4}{145}$

magnitude:  $R^2 = R_y^2 + R_x^2$   
 $(145^2) + (52.4)^2 = R = 154.2 \frac{m}{s}$

$\theta = 19.9^\circ$  E of S

so  $R = 154.2 \frac{m}{s}$  at  $19.9^\circ$  E of S