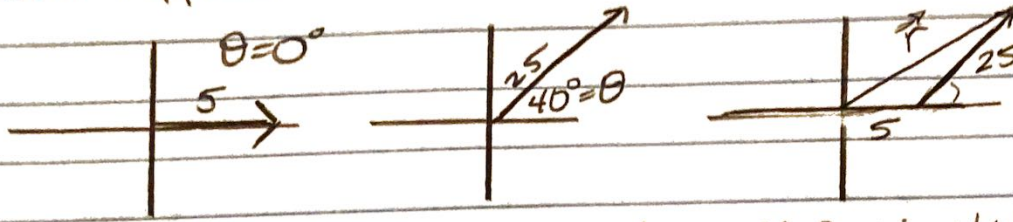


Vector Application w/s II

6.



$$r = 5 \langle \cos 0^\circ, \sin 0^\circ \rangle + 25 \langle \cos 40^\circ, \sin 40^\circ \rangle$$

$$r = \langle 24.15, 16.07 \rangle$$

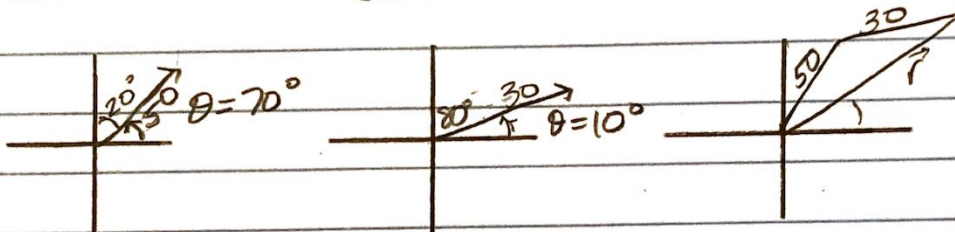
$$\|r\| = \sqrt{(24.15)^2 + (16.07)^2} = \boxed{29.01 \text{ mps}} \leftarrow \text{resultant speed}$$

$$\theta = \tan^{-1} \left(\frac{16.07}{24.15} \right) = \boxed{33.64^\circ}$$

↑
direction

NE not needed since its from the ground.

7.



$$r = 50 \langle \cos 70^\circ, \sin 70^\circ \rangle + 30 \langle \cos 10^\circ, \sin 10^\circ \rangle$$

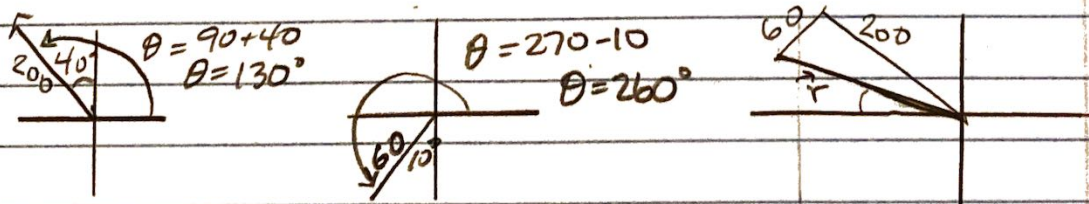
$$r = \langle 46.65, 52.19 \rangle$$

$$\|r\| = \sqrt{(46.65)^2 + (52.19)^2} = \boxed{70 \text{ m}} \text{ resultant distance}$$

$$\theta = \tan^{-1} \left(\frac{52.19}{46.65} \right) = 48.21^\circ$$

E 48.21° N Bearing

8.



$$r = 200 \langle \cos 130^\circ, \sin 130^\circ \rangle + 60 \langle \cos 260^\circ, \sin 260^\circ \rangle$$

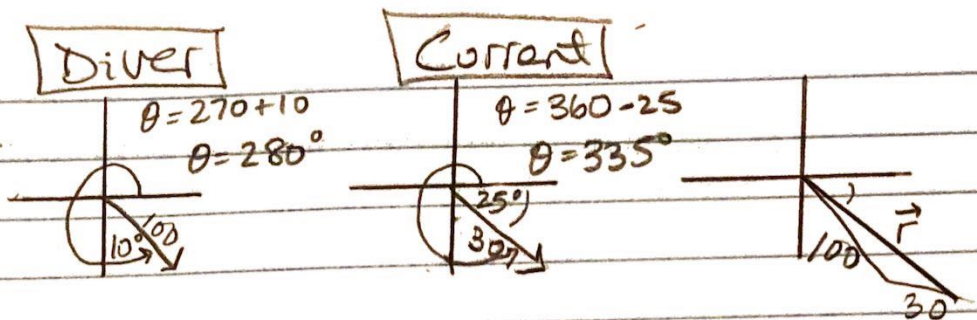
$$r = \langle -138.98, 94.12 \rangle$$

$$\|r\| = \sqrt{(-138.98)^2 + (94.12)^2} = \boxed{167.85 \text{ mph}} \text{ resultant velocity}$$

$$\theta = \tan^{-1} \left(\frac{94.12}{-138.98} \right) = -34.11^\circ$$

W 34.11° N bearing

9.



$$\vec{r} = 100 \langle \cos 280^\circ, \sin 280^\circ \rangle + 30 \langle \cos 335^\circ, \sin 335^\circ \rangle$$

$$\vec{r} = \langle 44.55, -111.16 \rangle$$

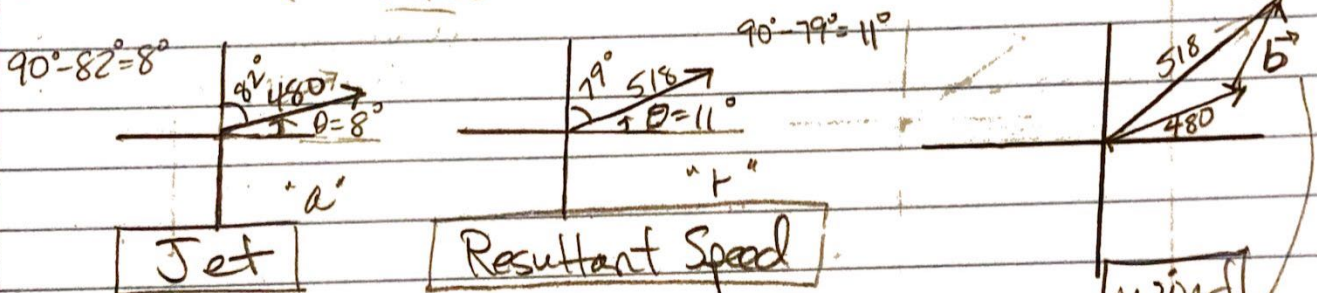
$$\|\vec{r}\| = \sqrt{(44.55)^2 + (-111.16)^2} = \boxed{119.75 \text{ ft/min}}$$

resultant speed

$$\theta = \tan^{-1} \left(\frac{-111.16}{44.55} \right) = -68.16 \quad \boxed{E 68.16^\circ S}$$

Bearing

10.



$$\vec{r} = \vec{a} + \vec{b}$$

$$\vec{r} - \vec{a} = \vec{b}$$

$$\vec{b} = \vec{r} - \vec{a}$$

$$518 \langle \cos 11^\circ, \sin 11^\circ \rangle - 480 \langle \cos 8^\circ, \sin 8^\circ \rangle$$

$$\vec{b} = \langle 33.15, 32.04 \rangle$$

wind speed: $\|\vec{b}\| = \sqrt{33.15^2 + 32.04^2} = \boxed{46.10 \text{ mph}}$

wind direction: $\theta = \tan^{-1} \left(\frac{32.04}{33.15} \right) = 44.02^\circ$

$$\boxed{E 44.02^\circ N}$$