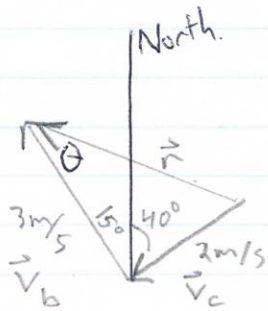


Section 4.4

Py150

7.



$$\vec{r} = \vec{v}_b + \vec{v}_c$$

$$|\vec{r}|^2 = 3^2 + 2^2 - 2(3)(2)\cos 55^\circ$$

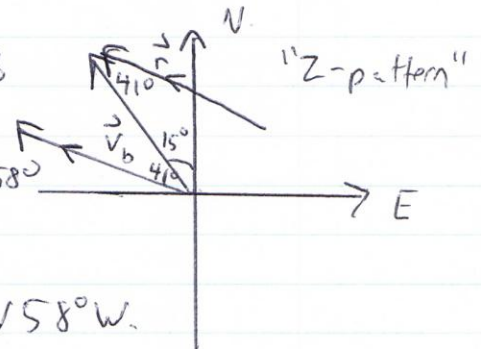
$$|\vec{r}| = 2.5 \text{ m/s}$$

$$\frac{\sin \theta}{2} = \frac{\sin 55^\circ}{2.5}$$

$$\theta = 41^\circ$$

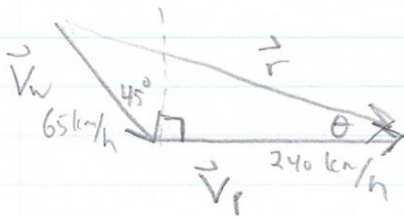
To get directions

Direction is North then $15 + 41 = 58^\circ$ West.



So North 58° West or $N58^\circ W$.

8.



$$\vec{r} = \vec{v}_p + \vec{v}_w$$

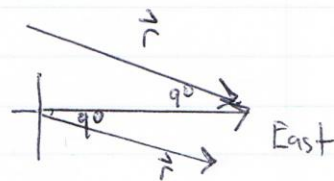
$$|\vec{r}|^2 = 240^2 + 65^2 - 2(240)(65)\cos 135^\circ$$

$$|\vec{r}| = 290 \text{ km/h}$$

∴ ground speed is 290 km/h.

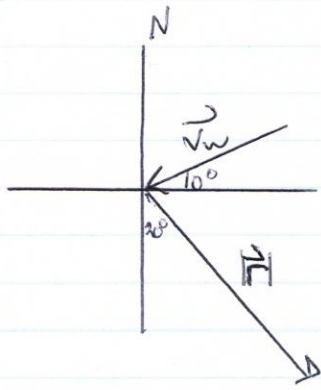
$$\frac{\sin \theta}{65} = \frac{\sin 135^\circ}{290}$$

$$\theta = 9^\circ$$



direction is $S71^\circ E$ or 9° South of East.

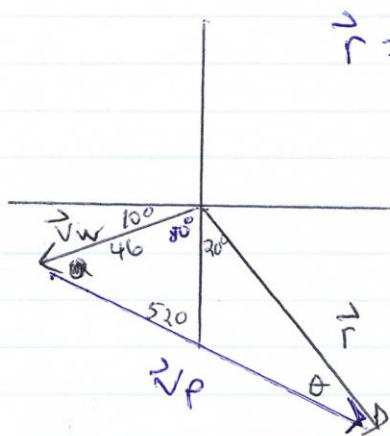
10. a) Information given:



\vec{V}_w = velocity of wind
 \vec{r} = resultant velocity (to destination)
 \vec{V}_p = velocity of plane with respect to air.

$|\vec{V}_w| = 46 \text{ km/h}$ $|\vec{V}_p| = 520 \text{ km/h}$.

"move wind vector"



$\vec{r} = \vec{V}_p + \vec{V}_w$

triangle law.

$\frac{\sin \theta}{46} = \frac{\sin 100^\circ}{520}$

$\theta = 5^\circ$

direction is South then 25° East.

