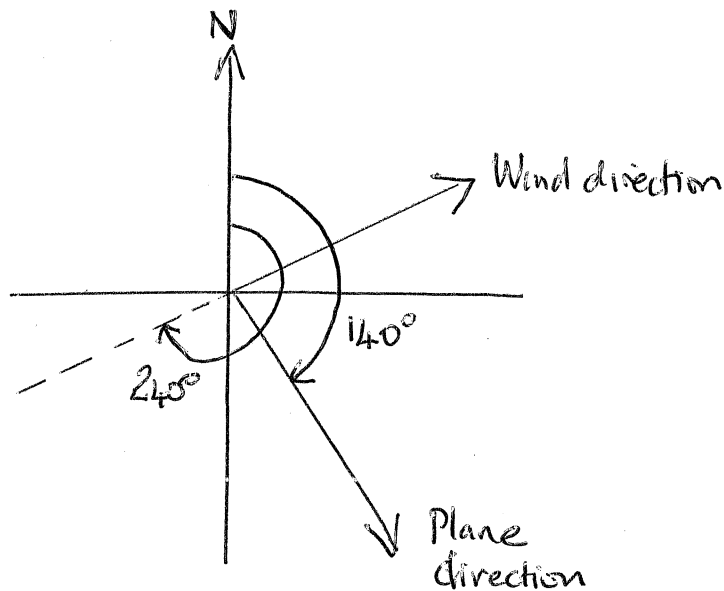
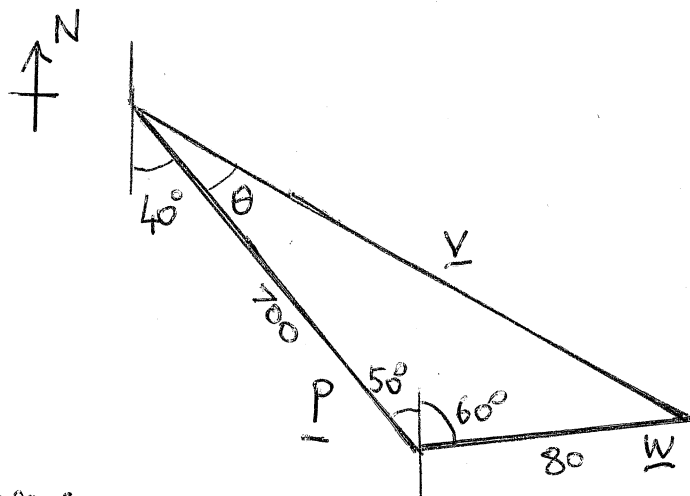


Q1(a)



(b)



Reasons:

40° is from part (a)

50° is because $= 90^\circ - 40^\circ$

60° is from part (a)

So the angle between P and W is $50 + 60 = 110^\circ$

(c) To find the resultant velocity V we need the bearing of V and the length of the vector

For the bearing we want the angle θ shown above

(c) continued

The sides of the triangle are p , w and v

To find θ we must first find v using the cosine rule:

$$\begin{aligned}v^2 &= p^2 + w^2 - 2pw \cos 120^\circ \\&= 700^2 + 80^2 - 2 \times 700 \times 80 \times \cos 120^\circ \\&= 496400 - 112000 \times \frac{1}{2} \\&= 440400\end{aligned}$$

$$\therefore v = \sqrt{440400} = 663.63 \text{ to 2 d.p.}$$

We find θ using the sine rule:

$$\frac{v}{\sin 120^\circ} = \frac{w}{\sin \theta}$$

$$\sin \theta = \frac{w \sin 120^\circ}{v} = \frac{80 \times \frac{\sqrt{3}}{2}}{663.63} = 0.104399$$

$$\theta = \sin^{-1}(0.104399) = 5.99^\circ \text{ to 2 d.p.}$$

Hence the resultant velocity vector v has magnitude

$$663.63 \text{ and bearing } 180^\circ - 40^\circ - 5.99^\circ = 134.01^\circ$$